

## IGNORING PATENTS\*

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More than 2.5 million United States patents have been issued in the last twenty years.<sup>1</sup> While these patents are spread across all industries, a large percentage is concentrated in the information technology (IT) industries and others in biotechnology.<sup>2</sup> The prevalence of patents in these industries has caused a number of people to worry about an “anticommons” in patent law, in which companies that want to make a product find it impossible to acquire all the rights they need from many different owners.<sup>3</sup> This is a particular problem for semiconductor, telecommunications, and software companies, which must aggregate hundreds or thousands of different components to make an integrated product. Each of those components may be

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1. There were 2,524,321 patents issued between March 18, 1987 and March 18, 2007. To get an idea of how big this number is, consider that U.S. Patent No. 4,651,345 issued March 24, 1987, and U.S. Patent No. 7,191,469 issued March 13, 2007. In other words, more than a third of all the patents issued in 217 years of U.S. history were issued in the last twenty years. Note that this doesn’t include design, plant, or reissue patents. Not all of those patents are still in force, however. See Kimberly A. Moore, *Worthless Patents*, 20 BERKELEY TECH. L.J. 1521, 1526 (2005) (53.7% of patents “expire for failure to pay . . . maintenance fees”).

2. See, e.g., John R. Allison & Mark A. Lemley, *Who’s Patenting What? An Empirical Exploration of Patent Prosecution*, 53 VAND. L. REV. 2099, 2148 tbl.1 (2000) (in the 1990s, 24.2% of the patents issued were computer-related, 9.3% were semiconductor patents, 7.7% were electronics patents, and 3.7% were biotechnology patents); Mark A. Lemley & Bhaven N. Sampat, *Is the Patent Office a Rubber Stamp?* 31 (Stanford Pub. Law & Legal Theory Working Paper Series, Research Paper No. 999098, 2007), available at <http://ssrn.com/abstract=999098> (1/2 of all patent applications filed in January 2001 were in the IT industries).

3. For a discussion of the anticommons, see Michael A. Heller, *The Tragedy of the Anticommons: Property in the Transition from Marx to Markets*, 111 HARV. L. REV. 621 (1998) and Michael A. Heller & Rebecca S. Eisenberg, *Can Patents Deter Innovation? The Anticommons in Biomedical Research*, 280 SCI. 698 (1998). The origin of the term and the concept dates to Frank I. Michelman, *Property, Utility, and Fairness: Comments on the Ethical Foundations of “Just Compensation” Law*, 80 HARV. L. REV. 1165 (1967).

patented, some by many different people.<sup>4</sup> The threat that any one of those patent owners can obtain an injunction shutting down the entire integrated product allows them to extort settlements well in excess of the value of their patent.<sup>5</sup> The patent damages rules similarly permit excessive recoveries, such as the recent \$1.5 billion jury verdict against Microsoft for infringing one of many patents covering just one of many features of an add-on to the Microsoft Windows product.<sup>6</sup> Patent law permits these product manufacturers to be found to be “willful” infringers liable for treble damages and attorneys’ fees, even if they were unaware of the patent or even the patent owner at the time they began selling the product.<sup>7</sup> And even if the manufacturer can avoid any of these risks by invalidating or proving noninfringement of each of these patents, doing so will cost millions of dollars per case in legal fees.<sup>8</sup> Given these problems, it’s a wonder companies make products in patent-intensive industries at all.

And yet make products they do. Both my own experience and what limited empirical evidence there is suggest that companies do not seem much deterred from making products by the threat of all this patent litigation.<sup>9</sup> Intel continues to make microprocessors, Cisco routers, and Microsoft operating system software, even though they collectively face nearly

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4. For a number of examples involving hundreds or thousands of patents covering a particular technology, see Mark A. Lemley & Carl Shapiro, *Patent Holdup and Royalty Stacking*, 85 TEX. L. REV. 1991, 2025-29 (2007) (documenting the stacking problem in 3G wireless phones, WiFi, DVD players, and other industries).

5. *Id.*

6. See, e.g., Robert A. Guth & Nick Wingfield, *Microsoft Hit With \$1.52 Billion Verdict in MP3 Suit; Ruling in Alcatel’s Favor May Have Broad Impact on Digital-Music Firms*, WALL ST. J., Feb. 23, 2007, at A3. That verdict was later vacated, but Microsoft remains on the hook for an unspecified amount of damages. On the general problem of overcompensation by reasonable royalty awards in component industries, see Lemley & Shapiro, *supra* note 4, at 2017-25.

7. See, e.g., *Underwater Devices Inc. v. Morrison-Knudsen Co.*, 717 F.2d 1380 (Fed. Cir. 1983), *overruled by In re Seagate Tech., LLC*, 497 F.3d 1360 (Fed. Cir. 2007) (en banc). On the odd definition of willfulness and its problems, see Mark A. Lemley & Ragesh K. Tangri, *Ending Patent Law’s Willfulness Game*, 18 BERKELEY TECH. L.J. 1085 (2003). The *Seagate* decision by the Federal Circuit significantly tightened up the standard for proving willfulness. See *In re Seagate Tech.*, 497 F.3d 1360 (Fed. Cir. 2007) (en banc). The revised standard still permits companies that independently developed the invention to be found willful, but only if they were “objectively reckless” in responding to the patent once they learned of it. *Id.* at 1384.

8. AIPLA, *Report of Economic Survey 2007*, at 21-22 (cost of a high-stakes patent case is \$3 million per side in legal fees pre-trial, and \$5 million if the case goes to trial).

9. While empirical evidence on this question is hard to come by, the 2003 IPO survey of IP managers found that only twenty-three percent said that competitor patents played an important role in companies deciding to abandon later-stage development of otherwise promising technologies. Iain M. Cockburn & Rebecca Henderson, *Survey Results from the 2003 Intellectual Property Owners Association Survey on Strategic Management of Intellectual Property* D.2 (Oct. 2003).

100 patent-infringement lawsuits at a time and receive hundreds more threats of suit each year.<sup>10</sup> Companies continue to do research on gene therapy, and even make “gene chips” that incorporate thousands of patented genes,<sup>11</sup> despite the fact that a significant fraction of those genes are patented.<sup>12</sup> Universities and academic researchers continue to engage in experimentation with patented inventions despite the now clear rule that they are not immune from liability for doing so.<sup>13</sup> John Walsh’s study suggests that threats of patent infringement are not in fact responsible for deterring much, if any, research.<sup>14</sup>

What’s going on here? The answer, I think, is straightforward, if surprising: both researchers and companies in component industries simply ignore patents. Virtually everyone does it. They do it at all stages of endeavor. Companies and lawyers tell engineers not to read patents in starting their research, lest their knowledge of the patent disadvantage the company by making it a willful infringer.<sup>15</sup> Walsh et al., similarly find that much of the reason university researchers are not deterred by patents is that they

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10. There were 2,720 patent suits filed in 2005. Univ. of Houston Law Ctr., Patent, All P-T-C, and All Civil Actions—1970–2007, at 2 (Jeffery Johnson et al., eds.), [http://www.patstats.org/Historical\\_Filings\\_PatentSuits\\_OtherSuits.rev2.doc](http://www.patstats.org/Historical_Filings_PatentSuits_OtherSuits.rev2.doc) (last visited May 4, 2008).

11. Affymetrix, for example, makes a “genome on a chip” that incorporates all the genes in the human body. Affymetrix, <http://www.affymetrix.com> (last visited May 4, 2008).

12. More than 4,000 of those genes are patented. Stefan Lovgren, *One-Fifth of Human Genes Have Been Patented, Study Reveals*, NAT’L GEOGRAPHIC NEWS, Oct. 13, 2005, [http://news.nationalgeographic.com/news/2005/10/1013\\_051013\\_gene\\_patent.html](http://news.nationalgeographic.com/news/2005/10/1013_051013_gene_patent.html). *But cf.* David E. Adelman & Kathryn L. DeAngelis, *Patent Metrics: The Mismeasure of Innovation in the Biotech Patent Debate*, 85 TEX. L. REV. 1677 (2007) (mapping the density of patents in biotechnology fields and finding relatively little concentration).

13. See *Madey v. Duke Univ.*, 307 F.3d 1351 (Fed. Cir. 2002).

14. John P. Walsh et al., *Effects of Research Tool Patents and Licensing on Biomedical Innovation*, in PATENTS IN THE KNOWLEDGE-BASED ECONOMY 285 (Wesley M. Cohen & Stephen A. Merrill eds., 2003) [hereinafter Walsh et al., *Effects*]; see also John P. Walsh et al., *Where Excludability Matters: Material v. Intellectual Property in Academic Biomedical Research*, 36 RES. POL’Y 1184, 1188-90 (2007) [hereinafter Walsh et al., *Matters*] (finding that even after *Madey*, patents didn’t deter academic researchers).

15. See, e.g., Edwin H. Taylor & Glenn E. Von Tersch, *A Proposal to Shore Up the Foundations of Patent Law that the Underwater Line Eroded*, 20 HASTINGS COMM. & ENT. L.J. 721, 737 (1998) (“As matters now stand many companies discourage employees from reading patents. This presumably lessens the chance that the company will be found to have knowledge of a patent. However, this defeats the basic purpose of the patents [sic] laws, dissemination of information.”); Dennis Fernandez, *Move Over Letterman: Top 10 Most Common IP Management Mistakes for New Companies*, PAT. STRATEGY & MGMT., July 1, 2003, at 3 (“Additionally, in many cases it may be appropriate for companies, as a matter of policy, to discourage looking at issued patents owned by other entities so as to avoid awareness of potentially infringed patents.”); Lemley & Tangri, *supra* note 7, at 1100-02.

never learn of the patent in the first place.<sup>16</sup> When their research leads to an invention, their patent lawyers commonly don't conduct a search for prior patents before seeking their own protection in the Patent and Trademark Office (PTO).<sup>17</sup> Nor do they conduct a search before launching their own product. Rather, they wait and see if any patent owner claims that the new product infringes their patent. Even then, it is common in many industries characterized by a significant number of "patent trolls"<sup>18</sup> to ignore the first cease-and-desist letter one receives from a patent owner, secure in the knowledge that patent litigation is expensive and uncertain and that some letter-writers will never follow up with a serious threat of suit.<sup>19</sup> Finally, and most significantly, companies in component industries who in fact get sued for patent infringement never pull their product off the market pending the outcome of the suit. Rather, they decide to take their chances in court and hope that they can avoid infringement or invalidate the patent. Even if they embark upon a product redesign to avoid infringing the asserted patent, the redesign rarely replaces the original product unless and until the patent is held valid and infringed.<sup>20</sup> This intentional ignorance of patent rights in the hands of others has led some to label major manufacturers in the IT industries "patent pirates."<sup>21</sup>

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16. Walsh et al., *Matters*, *supra* note 14, at 1189. Empirical research suggests that scientists don't in fact gain much of their knowledge from patents, turning instead to other sources. See, e.g., Wesley M. Cohen et al., *R&D Spillovers, Patents and the Incentives to Innovate in Japan and the United States*, 31 RES. POL'Y 1349, 1362-64 (2002).

17. Cockburn & Henderson, *supra* note 9, at F.6 (a survey of IP managers found that 53% disagreed with the statement "[w]e always do a patent search before initiating any R&D or product development effort").

18. These are chiefly the computing and electronics industries. See Mark A. Lemley & Nathan Myhrvold, *Tracking Patent Trolls* (Working Paper 2008) (on file with author) (documenting the rates of litigation by "non-practicing entities" in those industries).

19. A number of in-house counsel in technology companies have told me privately that this is their policy.

It is worth distinguishing the practice of cross-licensing among large companies, which involves "ignoring" patents only in a different sense. Large companies in the IT industry often cross-license each other, usually on royalty-free terms, because each company knows that it infringes the other's patents, so that asserting its own patents against the other would be self-destructive. One could argue that this is not ignoring patents, but in the sense I mean here I think it is. Companies in cross-licenses generally do not assert their patents or use them to generate revenue; they enter into symmetric deals that allow both sides to clear patents out of the way.

20. In several high-profile patent cases in 2006, the adjudged infringer asserted that it had developed a non-infringing alternative but did not implement it pending final resolution of the case, instead either settling or fighting the injunction. See *eBay Inc. v. MercExchange, L.L.C.*, 547 U.S. 388 (2006); *NTP, Inc. v. Research in Motion, Ltd.*, 418 F.3d 1282 (Fed. Cir. 2005).

21. Wikipedia offers this meaning in the first three citations for the term. Patent Pirate, Wikipedia, [http://en.wikipedia.org/wiki/Patent\\_pirate](http://en.wikipedia.org/wiki/Patent_pirate) (last visited May 4, 2008).

To get a perspective on how strange this might seem to an outsider to the patent system—or even to an outsider to the component industries in which this behavior is common—compare it to the world of real property. If I want to build a house, I’d better be darn sure that I own the land on which the house is built. In fact, it would be foolhardy to begin construction before I owned the rights to the land, in the hopes that I would be able to obtain the rights later. Nor would a prospective homebuilder put up with significant uncertainty about the boundaries of the land on which she was building. People don’t often build houses that might or might not be on their land, hoping that they would ultimately win any property dispute. And even if a few people were so reckless as to want to do one of these things, banks won’t fund construction without certainty in the form of a title insurance search report indicating that the builder unambiguously owns all the rights she needs.

It is currently very much in vogue to talk about patent rights as a form of property, and in particular to draw analogies to real property.<sup>22</sup> So let’s

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Interestingly, the term has also been used for those on the other side, particularly patent trolls. *Id.*

22. See Frank H. Easterbrook, *Intellectual Property is Still Property*, 13 HARV. J.L. & PUB. POL’Y 108, 112 (1990) (maintaining that a “right to exclude in intellectual property is no different in principle from the right to exclude in physical property”); see also Stephen L. Carter, *Does It Matter Whether Intellectual Property is Property?*, 68 CHI.-KENT L. REV. 715 (1993); Kenneth W. Dam, *Some Economic Considerations in the Intellectual Property Protection of Software*, 24 J. LEGAL STUD. 321 (1995); John F. Duffy, *Intellectual Property Isolationism and the Average Cost Thesis*, 83 TEX. L. REV. 1077 (2005); Trotter Hardy, *Property (and Copyright) in Cyberspace*, 1996 U. CHI. LEGAL F. 217; F. Scott Kieff, *Property Rights and Property Rules for Commercializing Inventions*, 85 MINN. L. REV. 697 (2001); Edmund W. Kitch, *Elementary and Persistent Errors in the Economic Analysis of Intellectual Property*, 53 VAND. L. REV. 1727 (2000); Edmund W. Kitch, *Patents: Monopolies or Property Rights?*, 8 RES. L. & ECON. 31 (1986); Edmund W. Kitch, *The Nature and Function of the Patent System*, 20 J.L. & ECON. 265 (1977); David McGowan, *Copyright Nonconsequentialism*, 69 MO. L. REV. 1 (2004); cf. Wendy J. Gordon, *An Inquiry Into the Merits of Copyright: The Challenges of Consistency, Consent, and Encouragement Theory*, 41 STAN. L. REV. 1343 (1989) (discussing similarities between copyright law and common law property). In other cases, property theorists don’t focus on intellectual property (IP) but use IP examples as part of a broader theory of property. See Thomas W. Merrill & Henry E. Smith, *Optimal Standardization in the Law of Property: The Numerus Clausus Principle*, 110 YALE L.J. 1, 3-9, 19-20 (2000) (arguing that the principle of numerus clausus is virtually omnipresent in many areas of property law, including IP, although recognizing that it “is probably at its weakest in . . . [this] area”). Of the property scholars, Richard Epstein’s work is perhaps the most thoughtful. He believes that the characteristics of IP largely but not entirely parallel real property, and he focuses on the distinctions between the two to justify limits on IP law. See Richard A. Epstein, *Liberty Versus Property? Cracks in the Foundations of Copyright Law* 26-27 (U. Chi. L. & Econ., Working Paper No. 204, 2004), available at <http://ssrn.com/abstract=529943>; cf. Adam Mossoff, *Is Copyright Property?*, 42 SAN DIEGO L. REV. 29 (2005) (arguing for the property position while distinguishing IP from real property); Michael A. Carrier, *Cabining Intellectual Property Through a Property Paradigm*, 54 DUKE L.J. 1 (2004) (endorsing the real property analogy but focusing on the limits im-

engage in a thought experiment: what if we took the analogy seriously and actually behaved with patents as we do with real property? Product manufacturers would have to stop ignoring patents. No venture capitalist or bank (or shareholder, should Intel fund the project internally) would give Intel the money to build a new manufacturing plant (or “fab”) unless it could demonstrate that it had conducted an exhaustive search for patents it might infringe in manufacturing its chips and had obtained irrevocable or at least long-term licenses<sup>23</sup> to use any patent that anyone might conceivably later assert

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posed on real property to justify limits on IP). But Epstein still begins with the baseline assumption—adopted implicitly from the real property model—that someone ought to own an invention. Other scholars have lamented the rise of property rhetoric and its effects, while acknowledging its growing significance in the debate. See, e.g., Rochelle Cooper Dreyfuss, *We Are Symbols and Inhabit Symbols, So Should We Be Paying Rent? Deconstructing the Lanham Act and Rights of Publicity*, 20 COLUM.-VLA J.L. & ARTS 123, 140 (1996) (speaking of the “privatization” of words and symbols); Shubha Ghosh, *Deprivatizing Copyright*, 54 CASE W. RES. L. REV. 387, 389 (2003) (“To conceive of copyright as essentially private property . . . is to ignore the important historical and realist tradition that has envisioned real property as an instrumental construct designed to pursue certain social and political goals . . .”); Mark A. Lemley, *Romantic Authorship and the Rhetoric of Property*, 75 TEX. L. REV. 873, 895-903 (1997) (reviewing JAMES BOYLE, SHAMANS, SOFTWARE, AND SPLEENS: LAW AND THE CONSTRUCTION OF THE INFORMATION SOCIETY (1996) and concluding that the “propertization” of IP law “is a very bad idea”); Robert P. Merges, *Property Rights Theory and the Commons: The Case of Scientific Research*, SOC. PHIL. & POL’Y, Summer 1996, at 145, 146-47 (discussing the “creeping propertization” in the pure sciences); Neil Weinstock Netanel, *Copyright and a Democratic Civil Society*, 106 YALE L.J. 283, 314-21 (1996) (tracing the connection to the preeminence of the Chicago School of economic analysis); Kenneth L. Port, *The Illegitimacy of Trademark Incontestability*, 26 IND. L. REV. 519, 552 (1993) (noting that “courts generally use property rhetoric to describe trademarks” and arguing that this “is quite problematic because there is, in actuality, no property right in the trademark itself”); Arti Kaur Rai, *Evolving Scientific Norms and Intellectual Property Rights: A Reply to Kieff*, 95 NW. U. L. REV. 707, 710-13 (2001) (discussing propertization in academic science); Pamela Samuelson, *Information as Property: Do Ruckelshaus and Carpenter Signal a Changing Direction in Intellectual Property Law?*, 38 CATH. U. L. REV. 365, 396-97 (1989) (hoping that “the first amendment’s protection of free speech interests will serve as some check on the reach of the information as property doctrine”); cf. Dan Hunter, *Cyberspace as Place and the Tragedy of the Digital Anticommons*, 91 CAL. L. REV. 439 (2003) (noting the effects of analogizing the internet to real property). One measure of the extent to which the parallel has filtered through the legal academy is that first-year property casebooks now include significant discussions of IP. See, e.g., JOHN P. DWYER & PETER S. MENELL, *PROPERTY LAW AND POLICY: A COMPARATIVE INSTITUTIONAL PERSPECTIVE* 502-43 (1998). I should note that I think the property analogy is seriously flawed, for reasons I have explained elsewhere. See Mark A. Lemley, *Property, Intellectual Property, and Free Riding*, 83 TEX. L. REV. 1031 (2005); Mark A. Lemley, *What’s Different About Intellectual Property?*, 83 TEX. L. REV. 1097 (2005).

23. While the vast majority of people who build houses own the land on which they are built, there are exceptions, notably in Hawaii and at Stanford, where a central entity owns the underlying land but grants long-term renewable leases of that land to the people who build improvements on it. For a discussion of this background, see *Hawaii Housing Authority v. Midkiff*, 467 U.S. 229 (1984).

against the chips or the manufacturing plant. Intel, in turn, would look to a group of “patent insurance” firms that would spring up and that would conduct the search and determine what patents needed to be licensed. Unless and until all of this had happened, Intel could not start construction of its fab, much less make or sell chips produced by that fab. If there were significant disagreement over whether a party legitimately owned patent rights, perhaps Intel could bring a declaratory judgment action to try to clarify those rights, but it would hold construction in abeyance until it got an answer.<sup>24</sup> And since there is no experimental use defense to patent infringement, scientists at both universities and corporations would have to conduct a similar search and wait to get permission from all possible interested parties before they began their research, lest they infringe a patent in the lab.

Would this world be desirable? I’m skeptical. Let’s begin with the benefits of such a world. Patent owners would get paid early and often. Patent litigation would decrease, or maybe even disappear entirely, because anyone who wanted to make a product would find the patent owner and enter into a deal up front, or else not make the product. And patent owners who compete in the marketplace, and rely on the patent to preserve exclusivity, would not face competition during the often-protracted period during which the patent is being litigated.

At the same time, these benefits would come at significant cost. First, both research and the manufacture of products would be regularly delayed for years and perhaps decades as potential defendants identified and cleared rights. The problem is not simply the time and cost required to find and evaluate the patents, contact the patent owner, and negotiate a license, though those costs may be significant. Rather, the legal rights in question may not even exist at the time Intel needs to make its investment decision. Many, perhaps most, patent lawsuits are filed against independent developers who themselves came up with the idea, generally at about the same time the patentee did.<sup>25</sup> The fact that it takes over three and a half years for the PTO to issue a patent, and that for at least eighteen months of that time the application is not published,<sup>26</sup> means that the wait to identify the relevant

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24. Until 2007, such a suit would have been impossible because the Federal Circuit limited declaratory judgment relief to cases where the plaintiff could show a “reasonable apprehension of imminent suit.” See, e.g., *Teva Pharms. USA, Inc. v. Pfizer, Inc.*, 395 F.3d 1324 (Fed. Cir. 2005). The Supreme Court flatly rejected that standard in *MedImmune, Inc. v. Genentech, Inc.*, 127 S. Ct. 764 (2007), in favor of a more liberal—though not yet clearly defined—standard for declaratory relief.

25. Chris Cotropia and I are currently conducting an empirical study of the extent of independent development, but it seems to be present in the overwhelming majority of patent cases.

26. 35 U.S.C. § 122(b) (2000). Some applications may be secret for much longer because the statute permits those who file applications only in the United States to delay publication for up to five years. *Id.*

rights may be significant indeed. The problem is even worse because of the common practice of filing continuation applications, which permit applicants to change their claims in an application for up to twenty years after the application was filed and even after a patent has issued on that application.<sup>27</sup> A true title-search system would require Intel to wait until we knew for sure whether a patent would issue on any existing continuation application. Nor would the uncertainty end then; ten years of claim construction litigation have made clear that we rarely know for sure what a patent covers even after it issues.<sup>28</sup> So it is not clear that we will know even then which patents Intel must license. The significant delay of a title-search system harms consumer welfare because both innovation and product deployment occur later than they otherwise would.<sup>29</sup>

Second, a real-property patent system would replace competition with central coordination in a significant number of cases. So far we have assumed that the patent owners will be willing to license their patents. But that is likely not to be true in many cases. Patent owners who compete in the marketplace want exclusivity, and there is no license price an equally efficient competitor will be willing to pay that will compensate for the loss of monopoly rights. Even patent owners who do not compete in the marketplace may find it more lucrative to grant an exclusive rather than a non-exclusive license to someone who does make a product, for the same reasons. Nor will a competing company be particularly sympathetic to efforts by outsiders to engage in research on the invention if the effect of that research will be to design around or improve that core invention. The effect of a real-property or title-search system is to replace competition in the shadow of a patent while it is being litigated with single-firm markets whenever the patentee participates in the market, either directly or by proxy. Researchers who could not obtain a license would direct their scientific efforts into different fields, and potential competitors would do the same, meaning that the owner of a core patent could control who, if anyone,

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27. See Mark A. Lemley & Kimberly A. Moore, *Ending Abuse of Patent Continuations*, 84 B.U. L. REV. 63 (2004) (discussing the problems with abuse of continuations); Lemley & Sampat, *supra* note 2 (documenting substantial use of continuations in this decade).

28. Kimberly Moore's work has documented the high and increasing reversal rates in patent claim construction cases. See Kimberly A. Moore, *Judges, Juries, and Patent Cases—An Empirical Peek Inside the Black Box*, 99 MICH. L. REV. 365 (2000) [hereinafter Moore, *Black Box*]; Kimberly A. Moore, Markman *Eight Years Later: Is Claim Construction More Predictable?*, 9 LEWIS & CLARK L. REV. 231 (2005). Indeed, Dan Burk and I have suggested that this uncertainty is to a large extent inherent in the claim construction process. Dan L. Burk & Mark A. Lemley, *Quantum Patent Mechanics*, 9 LEWIS & CLARK L. REV. 29 (2005).

29. Cf. John F. Duffy, *Rethinking the Prospect Theory of Patents*, 71 U. CHI. L. REV. 439 (2004) (arguing that one advantage of patent races is to accelerate the discovery and disclosure of new inventions).

worked on a particular technology. If you believe, as I do, that the evidence suggests that competition is often a better spur to innovation than monopoly,<sup>30</sup> removing that contingent competition is a potentially significant cost.<sup>31</sup>

Third, and perhaps most important, a significant percentage—maybe as many as three-fourths<sup>32</sup>—of these patents turn out to be either invalid or not infringed. It is this probabilistic nature that most critically distinguishes patents from real property.<sup>33</sup> Under the current system in patent-ignoring industries, consumers benefit from competition during the time before those patents are invalidated or held not to be infringed. Under a real-property

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30. For a sense of the literature on this long-running economic debate, see Kenneth J. Arrow, *Economic Welfare and the Allocation of Resources for Invention*, in NAT'L BUREAU, ECON. RESEARCH, THE RATE AND DIRECTION OF INVENTIVE ACTIVITY: ECONOMIC AND SOCIAL FACTORS 609, 620 (1962) (concluding that "preinvention monopoly power acts as a strong disincentive to further innovation"). See also MORTON I. KAMIEN & NANCY L. SCHWARTZ, MARKET STRUCTURE AND INNOVATION 16 (1982) (discussing various theories of the effects of economic structures on the rate and form of innovation); F.M. SCHERER & DAVID ROSS, INDUSTRIAL MARKET STRUCTURE AND ECONOMIC PERFORMANCE 660 (3d ed. 1990) (criticizing Schumpeter's "less cautious" followers for advocating monopoly to promote innovation). In the specific context of IP, the canonical argument from both theory and empirical evidence is Robert P. Merges & Richard R. Nelson, *On the Complex Economics of Patent Scope*, 90 COLUM. L. REV. 839 (1990). See also Kenneth W. Dam, *The Economic Underpinnings of Patent Law*, 23 J. LEGAL STUD. 247, 252 (1994) (noting that in the computer industry, for example, companies coordinate improvements by broad cross-licensing because of "the pace of research and development and the market interdependencies between inventions"). For discussions of particular industries in which competition appears to spur innovation, see, for example, Mark A. Lemley & Lawrence Lessig, *The End of End-to-End: Preserving the Architecture of the Internet in the Broadband Era*, 48 UCLA L. REV. 925, 960-62 (2001) (the internet); Rai, *supra* note 22, at 709-10 (biotechnology); Howard A. Shelanski, *Competition and Deployment of New Technology in U.S. Telecommunications*, 2000 U. CHI. LEGAL F. 85, 85 (telecommunications). For an argument that part of the goal of antitrust law is to spur innovation, not merely static competition, see, for example, Jonathan B. Baker, *Beyond Schumpeter vs. Arrow: How Antitrust Fosters Innovation*, 74 ANTITRUST L.J. 575 (2007); Mark A. Lemley, *A New Balance Between IP and Antitrust*, 13 SW. J. L. & TRADE AM. 237 (2007).

31. For a discussion of the importance of transaction costs in setting patent policy, see Paul J. Heald, *Transaction Costs and Patent Reform*, 23 SANTA CLARA COMPUTER & HIGH TECH. L.J. 447 (2007).

32. See Paul M. Janicke & LiLan Ren, *Who Wins Patent Infringement Cases?*, 34 AIPLA Q.J. 1, 1-6 (2006). Forty-six percent of patents litigated to judgment are invalid. John R. Allison & Mark A. Lemley, *Empirical Evidence on the Validity of Litigated Patents*, 26 AIPLA Q.J. 185, 205 (1998). And while patentees win most infringement and inequitable conduct issues, they lose some of those as well, even at trial. Moore, *Black Box*, *supra* note 28, at 390 tbl.4. Because the patentee must win on each of these issues to prevail, the total number of cases they win can be quite small.

33. See Mark A. Lemley & Carl Shapiro, *Probabilistic Patents*, J. ECON. PERSP. Spring 2005, at 75, 76. See also Sivaramjani Thambisetty, *Patents as Credence Goods*, OXFORD J. LEGAL STUD. 707, 708 (2007) (arguing that patents don't represent sufficiently clear exclusive rights to promote bargaining).

patent system, the owners of invalid patents can capture supracompetitive profits during the time before their patents are invalidated, profits made at the expense of consumers and that they will never have to disgorge.<sup>34</sup> That extra profit, in turn, would create significant incentives to obtain and enforce dubious patents. Indeed, the problem is even worse: in a title-search system in which researchers and manufacturers must clear rights before beginning work, accused infringers may be unlikely to take the chance of challenging the patent at all, agreeing to pay a license even for a weak patent.<sup>35</sup> I identified reducing patent litigation as a benefit of the real-property approach; the flip side is that ignoring patents promotes patent challenges. If you believe, as a number of scholars suggest, that challenges to bad patents are a public good that is undersupplied today,<sup>36</sup> the real-property approach will make that undersupply problem worse.

Finally, people usually build a house on a single plot of land, while as I have noted, there may be hundreds or thousands of rights that must be aggregated to build a multi-component product. As Carl Shapiro and I have argued elsewhere, this fact exacerbates the patent holdup problem and leads to systematic overpayments by manufacturing companies, because individual patent owners won't discount the royalty they charge to account for the complementary rights owned by others.<sup>37</sup> It's not that nothing of that sort ever happens with land; commercial builders often face a holdout problem when they need to buy numerous plots of contiguous land for a new building. But the problem is much, much worse in the patent system, because the number of rights that must be aggregated is greater, the scope of those rights (and therefore which ones need to be included) is less clear, and courts may be unable to grant injunctive relief tailored to protect only the patent in question without interfering with the non-infringing uses.<sup>38</sup> The result is that bargaining breakdown, already a risk in real property (and the justifica-

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34. For an economic explanation of why even antitrust claims against fraudulent patents won't permit the recovery of these gains, see Christopher R. Leslie, *The Role of Consumers in Walker Process Litigation*, 13 SW. J. L. & TRADE AM. 281 (2007).

35. See Joseph Farrell & Robert P. Merges, *Incentives to Challenge and Defend Patents: Why Litigation Won't Reliably Fix Patent Office Errors and Why Administrative Patent Review Might Help*, 19 BERKELEY TECH. L.J. 943, 968-69 (2004); Joseph Farrell & Carl Shapiro, *How Strong Are Weak Patents?*, 98 AM. ECON. REV. (forthcoming 2008). Cf. Christopher R. Leslie, *The Anticompetitive Effects of Unenforced Invalid Patents*, 91 MINN. L. REV. 101 (2006) (on the harms that even unenforced patents can do).

36. See John R. Thomas, *Collusion and Collective Action in the Patent System: A Proposal for Patent Bounties*, 2001 U. ILL. L. REV. 305, 333-36; Joseph Scott Miller, *Building a Better Bounty: Litigation-Stage Rewards for Defeating Patents*, 19 BERKELEY TECH. L.J. 667, 688-89 (2004); Farrell & Merges, *supra* note 35, at 946-47.

37. This is known as the Cournot complements problem. See Lemley & Shapiro, *supra* note 4, at 2013-16.

38. On this last point, see Mark A. Lemley & Philip J. Weiser, *Should Property or Liability Rules Govern Information?*, 85 TEX. L. REV. 783, 793-94 (2007).

tion for the use of eminent domain in support of private projects),<sup>39</sup> will be much more of a risk.<sup>40</sup> And in this hypothetical world, without successful bargaining no one will build products or engage in research.

There is, to be fair, one industry in which the patent system does bear some resemblance to the world of my thought experiment: the pharmaceutical industry. Patent owners in that industry identify all the patents they have covering a drug by listing them in the Orange Book.<sup>41</sup> Entry by generic pharmaceutical companies is strictly regulated by the FDA. Once the FDA grants approval, the generic must tell the patent owner it plans to enter and give the patent owner an opportunity to sue. If they do—and they essentially always do—patent owners are entitled to automatic preliminary injunctions pending the outcome of patent litigation.<sup>42</sup> Even once that automatic preliminary injunction expires, generic entrants are often afraid to enter “at risk” without a final determination that the patent is invalid or not infringed, just as people are afraid to build houses on land they don’t own. If a title-search system works in the pharmaceutical industry, why won’t it work just as well in other industries?

The answer is two-fold. First, the characteristics of the pharmaceutical industry are quite different than the component industries in which it is common to ignore patents. The need for strong patent rights is greater in that industry because of the cost and delay associated with FDA approval.<sup>43</sup> Virtually all patent owners in the industry are market competitors who rely on the exclusivity of the patent system coupled with the exclusivity that FDA approval provides.<sup>44</sup> The scope of the patents is generally quite clear, as they are defined in terms of chemical structure, and disputes over what the patent means are less common than in information technology. Pharmaceutical innovation is rarely cumulative, so the need for further research on

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39. See *Kelo v. City of New London*, 545 U.S. 469, 489 n.24 (2005).

40. Scott Kieff claims that “predictability is essential in facilitating private ordering.” F. Scott Kieff, *Coordination, Property, and Intellectual Property: An Unconventional Approach to Anticompetitive Effects and Downstream Access*, 56 EMORY L.J. 327, 418 (2006). But no one could argue that the validity and scope of patent rights is remotely predictable.

41. 21 U.S.C. § 355(b)(1), (c)(2) (2000).

42. 21 U.S.C. § 355(j)(2)(A)(vii)(I) to (IV) (certification and disclosure requirements); 21 U.S.C. § 355(j)(5)(B)(iii) (30-month stay).

43. See Dan L. Burk & Mark A. Lemley, *Policy Levers in Patent Law*, 89 VA. L. REV. 1575 (2003) (providing estimates of the cost and delay associated with regulatory approval, and arguing that they justify stronger patent protection in pharmaceuticals than in other industries).

44. This stands to reason, since patent owners who do not participate in the market would be unable to get revenue without licensing the patent up front to someone who would invest the time and effort of obtaining FDA approval. For a discussion of how FDA approval creates rents alongside the patent system, see William E. Ridgway, Note, *Realizing Two-Tiered Innovation Policy Through Drug Regulation*, 58 STAN. L. REV. 1221 (2006).

a particular drug after FDA approval, while not zero,<sup>45</sup> is not particularly high. Further, the patent owner identifies up front the patents that cover a particular product. It can do that because market entry is delayed for years and even decades by the FDA approval process, with the result that all parties involved will generally know what patent rights exist before the generic seeks to enter. All of these characteristics, particularly those that flow from the FDA regulatory structure, make the need for strong patent protection greater and the costs of that protection less.

Second, notwithstanding those characteristics, it is worth noting that the title-search approach creates significant problems even in the pharmaceutical industry. Patent owners have strong incentives to extend the life of their patents, whether by “evergreening”—obtaining multiple patents covering the same product<sup>46</sup>—or by “product-hopping”—changing the product they sell and restarting the regulatory clock once their patent on the existing product expires or is invalidated.<sup>47</sup> Because generic entry is regulated, they have significant incentive to enter into side deals with generics to keep them from competing, and indeed it is quite common for patent-owning pharmaceutical companies to pay their only possible competitors to stay out of the market.<sup>48</sup> And generic companies increasingly agree to such monopoly-sharing settlements, rather than invalidating the patents in question. As a result, we rarely see generic entry much before the natural expiration of an original patent on a drug, and in fact, generic entry often doesn’t even occur once that patent expires.

In short, the real-property characteristics of pharmaceutical patents are a function of the FDA regulatory process. Even there, it is not clear that the costs of delayed competition are worth the candle. We might still get phar-

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45. See, e.g., 21 U.S.C. § 355a (providing for additional exclusivity to encourage clinical investigation of the safety of already-approved drugs for use by children).

46. See, e.g., Lara J. Glasgow, *Stretching the Limits of Intellectual Property Rights: Has the Pharmaceutical Industry Gone Too Far?*, 41 IDEA 227, 233-35 (2001) (pointing out the loopholes in the Hatch-Waxman Act that pharmaceutical companies exploit to extend the life of their patents); Christine S. Paine, Comment, *Brand-Name Drug Manufacturers Risk Antitrust Violations by Slowing Generic Production Through Patent Layering*, 33 SETON HALL L. REV. 479, 497 (2003) (defining the tactic of evergreening as a strategy to extend monopoly); 2 HERBERT HOVENKAMP ET AL., IP AND ANTITRUST § 33.9 (perm. ed. & Supp. 2008) (discussing cases involving this practice).

47. *Abbott Labs. v. Teva Pharms. USA, Inc.*, 432 F. Supp. 2d 408 (D. Del. 2006) (permitting an antitrust cause of action to proceed against product hopping); 1 HOVENKAMP ET AL., *supra* note 46, § 12.5 (analyzing the issue).

48. For disparate legal treatment of those cases, see, for example, *In re Tamoxifen Citrate Antitrust Litig.*, 466 F.3d 187, 212 (2d Cir. 2006) (treating exclusion payments as per se legal); *Valley Drug Co. v. Geneva Pharms., Inc.*, 344 F.3d 1294 (11th Cir. 2003) (inquiring into the validity of the underlying patent); *In re Cardizem CD Antitrust Litig.*, 332 F.3d 896 (6th Cir. 2003) (treating them as per se illegal); *In re Schering-Plough Corp.*, No. 9297, 2003 WL 22989651 (Fed. Trade Comm’n Dec. 8, 2003), *vacated*, 402 F.3d 1056 (11th Cir. 2005) (treating them as presumptively anticompetitive).

maceutical innovation if generic companies were permitted to ignore patents as well. But outside the regulated industry context, it seems likely that treating patents like real property would significantly delay entry and improvement without conferring many of the benefits asserted for the real-property approach. In those other industries, having patents but operating as if they don't constrain behavior may be better than treating the patent right as sacrosanct.<sup>49</sup>

That doesn't mean that ignoring patents is the best of all possible worlds either. In industries that ignore patents, patent owners can generally get paid only if they threaten to sue. In a real-property world, manufacturers can make products only if they pre-clear all the rights. There ought to be a middle ground between these extremes. Imagine a functioning, efficient market for patent licenses, one that incorporated the possibilities of patent invalidity and non-infringing alternatives and avoided licenses based on holdup, but which also inculcated in manufacturers norms of paying for the rights they use. Patentees could get paid a reasonable amount for their rights, but without the risks and uncertainty of the current system.<sup>50</sup> And companies interested in using innovations could seek out new ideas embodied in patents, rather than burying their heads in the sand and developing inventions entirely on their own.<sup>51</sup>

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49. One might reasonably question whether, if companies in many industries deal with the patent system by ignoring patents, we would be better off simply eliminating the patent system in those industries. While the argument has some appeal, I think that conclusion is unwarranted. Not only would it require industry-specific line drawing of the kind that creates problems for legislatures, see DAN L. BURK & MARK A. LEMLEY, *BEND OR BREAK: HOW OUR PATENT SYSTEM FOUND ITSELF IN CRISIS AND HOW INDUSTRY TAILORING CAN SAVE IT* (forthcoming 2009), but it wrongly assumes that the patent system has no effect merely because companies ignore particular patents. In fact, it may be that the existence of the patent system deters outright copying of inventions even if it doesn't prompt companies to search for patents that might cover their independently-developed inventions. And the current system does provide a reward and therefore an incentive to many patentees, though they may have to litigate to get it. That incentive may be particularly important for small inventors who could not otherwise commercialize their ideas.

50. James McDonough argues that patent trolls are good for society because they serve as efficient arbitragers, see 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, 204-20 (2006), but that is not true in a world in which patent owners can engage in holdup and capture a greater share of the value than they contribute. Amy Landers argues that increasingly sophisticated efforts to monetize patents are at odds with the public interest, see Amy L. Landers, *Liquid Patents*, 84 DENV. U. L. REV. 199 (2006), but I think that's true today only because existing patent rules encourage holdup. Change those rules so that what patentees can recover bears a reasonable relationship to what they contribute and McDonough's factually incorrect argument becomes correct: the monetization of patents becomes a good, not a bad, thing.

51. Several scholars have noted the importance of patents as signals. See, e.g., Heald, *supra* note 31, at 455; Clarisa Long, *Patent Signals*, 69 U. CHI. L. REV. 625 (2002). But the point here is more direct—patents are supposed to confer information to scientists,

What would it take to get to such a world? Patent law would have to change in significant respects. First, we would need greater certainty about the nature and scope of patent rights much earlier than we have it today. This would require the PTO to devote substantial additional resources to processing patent applications more quickly,<sup>52</sup> but it would also require strict caps on the ability of patentees to delay prosecution using continuation applications.<sup>53</sup> Requiring publication of applications in all cases, and encouraging it to occur earlier than eighteen months after filing, would help.<sup>54</sup> It might also be desirable to implement peer-review,<sup>55</sup> post-grant opposition,<sup>56</sup> gold-plating,<sup>57</sup> or some other mechanism for determining the scope

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but they can't do that if scientists ignore patents; cf. Benjamin Roin, Note, *The Disclosure Function of the Patent System (Or Lack Thereof)*, 118 HARV. L. REV. 2007 (2005) (noting that the patent system doesn't achieve this disclosure goal).

52. Despite PTO efforts to hire more examiners and speed the processing of applications, the time an application spends in the PTO has grown from an average of 2.23 years in the 1970s to 2.77 years in the 1990s to well over three years today. See John R. Allison & Mark A. Lemley, *The Growing Complexity of the United States Patent System*, 82 B.U. L. REV. 77, 98 (2002); Lemley & Sampat, *supra* note 2, at 4. That trend would have to be reversed—and reversed dramatically—if prior licensing of patents were not to unduly delay innovation.

53. For a variety of proposals along these lines, see Lemley & Moore, *supra* note 27. The PTO issued regulations that would limit applicants to three continuations (plus an unlimited number of divisionals) as a matter of right, a rule that would take a very modest step towards solving the problem. Changes to Practice for Continued Examination Filings, Patent Applications Containing Patently Indistinct Claims, and Examination of Claims in Patent Applications, 72 Fed. Reg. 46,716 (Aug. 21, 2007). At this writing it is far from clear that even these watered-down rules will go into effect, however; they are currently enjoined. See *Tafas v. Dudas*, 511 F. Supp. 2d 652 (E.D. Va. 2007).

54. 35 U.S.C. § 122(b) (2000) currently requires publication at eighteen months in some but not all cases. Our best estimate is that by 2004, about 86% of all U.S. applicants chose to publish their applications. See Lemley & Sampat, *supra* note 2, at 47 n.64. Patent reform efforts proposed in the last Congress would have required publication of all applications at eighteen months. See, e.g., Patent Reform Act of 2005, H.R. 2795, 109th Cong. (2005).

55. See Beth Simone Noveck, “Peer to Patent”: *Collective Intelligence, Open Review, and Patent Reform*, 20 HARV. J.L. & TECH. 123 (2006). The PTO has recently established a pilot project to implement peer review. See Dennis Crouch, *USPTO's Patent Peer Review Pilot Project*, PATENTLY-O: PATENT LAW BLOG, May 8, 2006, [http://patentlaw.typepad.com/patent/2006/05/usptos\\_patent\\_p.html](http://patentlaw.typepad.com/patent/2006/05/usptos_patent_p.html).

56. For a sense of the academic debate, see Mark D. Janis, *Rethinking Reexamination: Toward a Viable Administrative Revocation System for U.S. Patent Law*, 11 HARV. J.L. & TECH. 1 (1997); 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 (1999); Craig Allen Nard, *Certainty, Fence Building, and the Useful Arts*, 74 IND. L.J. 759 (1999); J. H. Reichman, *From Free Riders to Fair Followers: Global Competition Under the TRIPS Agreement*, 29 N.Y.U. J. INT'L L. & POL. 11 (1997); Thomas, *supra* note 36. Patent reform efforts proposed in the last two Congresses would have created a post-grant opposition procedure. See, e.g., Patent Reform Act of 2007, S. 1145, 110th Cong. (2007); Patent Reform Act of 2005, H.R. 2795, 109th Cong. (2005).

and validity of rights earlier rather than later. Second, we might want to implement an independent invention defense or at least some form of prior user right,<sup>58</sup> both as a matter of equity—manufacturers can reasonably object to paying for technology they developed themselves and did not copy—and because even with a quicker patent grant it will be hard to find and negotiate over patents in cases of simultaneous invention. Third, we would need to ensure that the rules that target willful infringement do not discourage people from reading patents.<sup>59</sup> Fourth, we need to change the patent remedy rules to reduce or eliminate the problem of holdup. The *eBay v. MercExchange*<sup>60</sup> decision is a significant step in this direction, but reform of the reasonable royalty calculation will also be necessary.<sup>61</sup>

Having restructured patent law in significant ways to reduce the need for component-industry manufacturers to keep their heads in the sand, two further changes in the law would be appropriate to discourage them from doing so. First, manufacturers in this world should be required or at least strongly encouraged to conduct a reasonable search for patents and to enter into good-faith negotiations to license patents that cover their technology. A failure to search and negotiate should trigger enhanced damages and perhaps other remedies, such as an award of attorneys' fees, or perhaps even incline the court to grant injunctive relief to non-manufacturing patent owners. Second, to facilitate an efficient market for patent licenses, the law should require the publication of patent license terms.<sup>62</sup> The goal would be a world in which manufacturers can find relevant patents and in which there is an efficient market for the licensing of such patents.<sup>63</sup> In such a world,

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57. See Doug Lichtman & Mark A. Lemley, *Rethinking Patent Law's Presumption of Validity*, 60 STAN. L. REV. 45 (2007).

58. For proposals for an independent invention defense, see Samson Vermont, *Independent Invention as a Defense to Patent Infringement*, 105 MICH. L. REV. 475 (2006); Carl Shapiro, *Prior User Rights*, AM. ECON. REV., May 2006, at 92, 95; cf. Mark A. Lemley, *Should Patent Infringement Require Proof of Copying?*, 105 MICH. L. REV. 1525 (2007) (noting the benefits of but also some potential problems with such an approach); Samson Vermont, *The Angel is in the Big Picture: A Response to Lemley*, 105 MICH. L. REV. 1537 (2007).

59. For a proposal along these lines, see Lemley & Tangri, *supra* note 7, at 1116-24.

60. 547 U.S. 388 (2006).

61. Lemley & Shapiro, *supra* note 4, at 2039-42; Mark A. Lemley, *Distinguishing Lost Profits From Reasonable Royalties* (Working Paper 2008).

62. For a defense of this proposal, see Mark A. Lemley & Nathan Myhrvold, *How to Make a Patent Market* (Stanford Law & Econ. Olin Working Paper No. 347, 2007), available at <http://ssrn.com/abstract=1012726>.

63. An efficient market for patent rights would require intermediaries that could provide information about market value and engage in arbitrage to smooth out purchases based on inadequate information. But such intermediaries are already starting to develop, see Peter N. Detkin, *Leveling the Patent Playing Field*, 6 J. MARSHALL REV. INTEL. PROP. L. 636, 642 (2007), and there is enough money at stake that I think if the legal prerequisites for a patent market existed, we would see even more.

patentees can get paid for their inventions, but would lose the ability to engage in holdup. Manufacturers would not be entitled to a free ride, but they would also be free from the significant risks of the patent anticommons.

The steps required to move from our world to this ideal one are radical, and it seems unlikely that they will happen. In the absence of fundamental changes, it is likely that companies will continue to muddle through. But they will do so in significant part by ignoring patents.