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Antitrust Limits on Targeted Patent Aggregation

Alan Devlin

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ANTITRUST LIMITS ON TARGETED PATENT AGGREGATION

*Alan Devlin**

Abstract

Patent-assertion entities (PAEs) are non-technology-practicing companies that aggregate and license patents under threat of suit. Their activities have drawn fire, including presidential condemnation, and spurred proposed legislation to protect operating firms against them. PAEs leverage flaws in the patent system to extort firms that independently invent and sell technological goods to consumers. Since PAEs tax innovators and appear to restrict rather than facilitate wealth transfer to original patentees, their worst rent-seeking practices almost certainly reduce net incentives to innovate and harm consumers. This result is more likely if the principal desirable incentive that PAEs create is to file patents rather than to commercialize technology.

The idiosyncratic nature of today's patent system facilitates PAE activity. Patents' numerosity, vague scope, widespread invalidity, and sometimes-functional claiming prevent even the most assiduous technology companies from securing guaranteed clearing positions before building products. These conditions ensure that a universe of potentially infringed patents of dubious validity exists in many industries *ex post*, especially in information technology. Fortunately, atomized ownership of intellectual property limits enforcement *ex post* because the unlikelihood of success in asserting few patents, the risk of countersuit, and high litigation costs make suing a negative value proposition. The result is a public-goods benefit in constrained enforcement that ameliorates hold-up potential. Even *ex post*, owners of disaggregated patents typically lack market power unless their intellectual property rights are both likely valid and infringed.

PAE accumulation changes all of that. By amassing hundreds or even thousands of patents, never building or selling goods, using shell companies to conceal the contents of their portfolios, and asserting patents in waves *ex post*, PAEs can realize immense hold-up power that atomized owners lack. This conclusion holds true even if the great majority of their patents are invalid or not infringed. Thus, many operating victims are vulnerable to threats of incessant litigation and are forced to pay tens or even hundreds of millions of dollars for licenses that are unnecessary to engineer successful products. Commentators

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increasingly—though not universally—accept that PAEs harm the economy. The solution, however, is less clear. Many propose reforming the patent system, such as by requiring losing patentees to pay the other side’s costs and forcing PAEs to disclose their portfolios. Some legislative reforms appear likely, and in 2014 the Supreme Court considered whether to invalidate certain computer-implemented inventions. Nevertheless, modest changes are unlikely to provide a significant remedy for PAE hold-up.

Lacking other means, some policy makers now look to antitrust law for solutions. Not everyone believes that competition rules proscribe PAE conduct or otherwise suitably constrain patent hold-up. Indeed, antitrust rules are not a cure-all. This Article argues, however, that antitrust law can viably limit certain abuses of the patent system by PAEs. Section 2 of the Sherman Act proscribes monopolization and Section 7 of the Clayton Act prohibits asset acquisitions that may substantially lessen competition or tend to create a monopoly. These provisions have sufficient teeth theoretically to catch the most egregious forms of hold-up founded on ex post patent aggregation and assertion. This Article explains how PAE activity can reduce social welfare and how PAEs’ targeted patent aggregation and assertion may violate competition rules.

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INTRODUCTION

The business world is abuzz about “patent trolls.”¹ More formally known as patent-assertion entities (PAEs), such companies amass and

1. See, e.g., William M. Bulkeley, *Aggressive Patent Litigants Pose Growing Threat to Big Business*, WALL ST. J. (Sept. 14, 2005, 12:01 AM), <http://online.wsj.com/news/articles/SB112666647063840131>.

license intellectual property under threat of suit, but they do not build technological goods for consumers.² Their *modus operandi* is to eschew ex ante technology-licensing markets where budding manufacturers of future products seek useful know-how.³ They focus on the ex post world where commercialized and potentially infringing goods already exist.⁴ PAEs lie silently in wait for manufacturers to invent and build valuable products, thus locking themselves into chosen technology.⁵ Only then do they threaten or file suit, holding up makers of popular, and hence valuable, goods.⁶ From the perspective of independent inventors whom PAEs approach, extravagant licensing demands based on threat of suit may be reminiscent of extortion rackets that sell protection against threats of their own creation.⁷

This phenomenon is possible due to shortcomings in today's patent regime. Ideally, one would see vibrant licensing markets that match upstream inventors and downstream innovators who develop and market technology.⁸ Such Coasian bargaining would diffuse know-how, reward inventors with royalties tied to their insights' incremental value over next-best-available technologies, and grant engineers access to cutting-edge knowledge in building the next generation of goods and services.⁹ Sometimes this process occurs, especially in the biopharmaceutical industries, but too often these ideal attributes are unobtainable.¹⁰ In settings ranging from telecommunications to

2. Colleen V. Chien, *From Arms Race to Marketplace: The Complex Patent Ecosystem and Its Implications for the Patent System*, 62 HASTINGS L.J. 297, 300 (2010) (coining the term "patent-assertion entity" to refer to "entities that use patents primarily to get licensing fees rather than to support the development or transfer of technology" and explaining PAEs' role within the patent system).

3. See *id.* See generally FED. TRADE COMM'N, *THE EVOLVING IP MARKETPLACE: ALIGNING PATENT NOTICE AND REMEDIES WITH COMPETITION* 31–72 (2011) [hereinafter *FTC, EVOLVING IP MARKETPLACE*] (discussing ex ante and ex post patent transactions).

4. See *FTC, EVOLVING IP MARKETPLACE, supra* note 3, at 50 (illustrating a situation where a firm has "invested in creating, developing or commercializing the patented technology" but "needs the ex post license to avoid liability even if it invented the technology independent of the patentee because patent infringement is a strict liability offense").

5. See Niels J. Melius, Note, *Trolling for Standards: How Courts and the Administrative State Can Help Deter Patent Holdup and Promote Innovation*, 15 VAND. J. ENT. & TECH. L. 161, 171 (2012).

6. See generally Mark A. Lemley & Carl Shapiro, *Patent Holdup and Royalty Stacking*, 85 TEX. L. REV. 1991 (2007) (explaining the economics of a patent hold-up and its consequences).

7. See Victoria E. Luxardo, Comment, *Towards a Solution to the Problem of Illegitimate Patent Enforcement Practices in the United States: An Equitable Affirmative Defense of "Fair Use" in Patent*, 20 EMORY INT'L L. REV. 791, 800 (2006).

8. See *FTC, EVOLVING IP MARKETPLACE, supra* note 3, at 32–45, 48.

9. See *id.*; see also Anna B. Laakmann, *An Explicit Policy Lever for Patent Scope*, 19 MICH. TELECOMM. & TECH. L. REV. 43, 50–51 (2012).

10. See Jay P. Kesan, *Transferring Innovation*, 77 FORDHAM L. REV. 2169, 2195 (2009).

financial services and in all manner of computer-implemented technologies, patents are not often the principal or even material driver of innovation.¹¹

The reasons for this unfortunate state of affairs are partially structural. For many products, such as those in the information-technology (IT) industry, one must combine numerous distinct technologies to create an end product.¹² Because many of these are patent-eligible, a vast universe of intellectual property rights (IPRs) exists. For instance, RPX Corp. has estimated that more than a quarter million patents read on smartphones alone.¹³ These factors, combined with rapid incremental innovation, competition-induced incentives to invent, lax disclosure requirements for obtaining a patent, vague claim language, limited scrutiny by the Patent and Trademark Office (PTO), and an overwhelmingly large field of prior art, render an efficient patent regime unrealistic in the software industry.¹⁴ Most importantly, many—perhaps most—patents are invalid.¹⁵ This is especially true of many computer-implemented and business-method patents that could not withstand scrutiny under *Bilski v. Kappos*,¹⁶ and of those using broad functional claiming that the prior art likely anticipates or renders obvious.¹⁷

11. See, e.g., Stuart J.H. Graham et al., *High Technology Entrepreneurs and the Patent System: Results of the 2008 Berkeley Patent Survey*, 24 BERKELEY TECH. L.J. 1255, 1262, 1279, 1292–94 (2009); see also Daniel R. Cahoy, *An Incrementalist Approach to Patent Reform Policy*, 9 N.Y.U. J. LEGIS. & PUB. POL'Y 587, 604–05 (2006). See generally Mark A. Lemley, *The Myth of the Sole Inventor*, 110 MICH. L. REV. 709, 750–52 (2012) (finding that inventors discover almost all significant new technologies simultaneously and concluding that, under an incentive-to-invent rationale for the patent system, society should grant far fewer patents).

12. See Brian Kahin, *Patents and Diversity in Innovation*, 13 MICH. TELECOMM. & TECH. L. REV. 389, 390 (2007).

13. RPX CORP., REGISTRATION STATEMENT (FORM S-1) 59 (2011), available at <http://www.sec.gov/Archives/edgar/data/1509432/000119312511240287/ds1.htm>.

14. See, e.g., Jonathan S. Masur, *Regulating Patents*, 2010 SUP. CT. REV. 275, 282; John S. Leibovitz, Note, *Inventing a Nonexclusive Patent System*, 111 YALE L.J. 2251, 2285 (2002); see also Saul Levmore, Essay, *The Impending iPrize Revolution in Intellectual Property Law*, 93 B.U. L. REV. 139, 155 (2013). See generally Dan L. Burk & Mark A. Lemley, *Policy Levers in Patent Law*, 89 VA. L. REV. 1575, 1619–24 (2003) (describing the innovation characteristics of the software industry and the property rights implications of cumulative innovation).

15. See John R. Allison et al., *Patent Quality and Settlement Among Repeat Patent Litigants*, 99 GEO. L.J. 677, 687 & tbl.3 (2011); Kimberly A. Moore, *Judges, Juries, and Patent Cases—An Empirical Peek Inside the Black Box*, 99 MICH. L. REV. 365, 385 (2000); see also John R. Allison & Mark A. Lemley, *Empirical Evidence on the Validity of Litigated Patents*, 26 AIPLA Q.J. 185, 205 (1998); Mark A. Lemley, *An Empirical Study of the Twenty-Year Patent Term*, 22 AIPLA Q.J. 369, 420 (1994).

16. 130 S. Ct. 3218 (2010).

17. See Mark A. Lemley, *Software Patents and the Return of Functional Claiming*, 2013 WIS. L. REV. 905, 912.

Consequently, technology companies cannot secure guaranteed clearing positions in designing tomorrow's products.¹⁸ This holds true even though the great majority of innovation taking place at the product-design level is independent.¹⁹ Copying is the exception rather than the norm.²⁰ Firms ameliorate the systemic patent threat by constructing defensive IPR portfolios,²¹ cross-licensing,²² joining patent pools,²³ eliciting the services of defensive patent-buying funds,²⁴ and purchasing licenses to valuable asserted IPRs ex ante. They generally ignore other patents in the design process to avoid future allegations of willful infringement.²⁵ This conduct is an imperfect solution, not least because some ex post lawsuits are inevitable, and patentees suing ex post can extract greater royalties than they would ex ante due to irreversible investment. It also denies some deserving inventors their due reward. Nevertheless, the state of affairs is workable to the extent that patentees in the ex post world have market power that does not materially surpass the power that they possessed in the ex ante world. This typically occurs where patents are disaggregated²⁶ and, potentially more often, where they lie in the hands of operating companies that are vulnerable to countersuit.²⁷

18. See Edith Ramirez & Lisa Kimmel, *A Competition Policy Perspective on Patent Law: The Federal Trade Commission's Report on the Evolving IP Marketplace*, ANTITRUST SOURCE, Aug. 2011, at 1, 4, available at http://www.americanbar.org/content/dam/aba/publishing/antitrust_source/aug11_fullsource.authcheckdam.pdf.

19. See Christopher A. Cotropia & Mark A. Lemley, *Copying in Patent Law*, 87 N.C. L. REV. 1421, 1424 & n.3 (2009).

20. *Id.* at 1424.

21. See *Apple, Inc. v. Motorola, Inc.*, 869 F. Supp. 2d 901, 917 (N.D. Ill. 2012) (Posner, J., by designation), *aff'd in part, rev'd in part*, 757 F.3d 1286 (Fed. Cir. 2014).

22. See U.S. DEP'T OF JUSTICE & FED. TRADE COMM'N, ANTITRUST ENFORCEMENT AND INTELLECTUAL PROPERTY RIGHTS: PROMOTING INNOVATION AND COMPETITION 59–64 (2007), available at <http://www.justice.gov/atr/public/hearings/ip/222655.pdf>.

23. See *id.* at 64–66.

24. See Allen W. Wang, *Rise of the Patent Intermediaries*, 25 BERKELEY TECH. L.J. 159, 171–77 (2010).

25. See Mark A. Lemley, *Ignoring Patents*, 2008 MICH. ST. L. REV. 19, 21–22.

26. *But see infra* Part III.

27. See Robert P. Greenspoon & Catherine M. Cottle, *Don't Assume a Can Opener: Confronting Patent Economic Theories with Licensing and Enforcement Reality*, 12 COLUM. SCI. & TECH. L. REV. 194, 195 (2011). One should not, however, exaggerate the countersuit threat as a constraint on patent assertion by operating companies. This is especially so given the increasing prevalence of so-called "privateering" arrangements in which such firms bypass that constraint. See Mark S. Popofsky & Michael D. Laufert, *Patent Assertion Entities and Antitrust: Operating Company Patent Transfers*, ANTITRUST SOURCE, Apr. 2013, at 1, 1, available at http://www.americanbar.org/content/dam/aba/publishing/antitrust_source/apr13_full_source.authcheckdam.pdf; see also Tom Ewing, *Practical Considerations in the Indirect Deployment of Intellectual Property Rights by Corporations and Investors*, 4 HASTINGS SCI. & TECH. L.J. 109, 111–15 (2012).

Even when firms have sunk capital into their marketed product lines, several attributes cabin atomized patentees' ability to hold up such technology implementers. The likelihood of an invalidity or non-infringement finding and the cost of litigation make bringing suit a negative value proposition except when the patent is strong.²⁸ Furthermore, if the patentee is a practicing entity, filing an action would likely attract an infringement countersuit.²⁹ The result is a public-goods benefit in less than complete ex post patent enforcement. This state of affairs is relatively desirable due to independent invention.³⁰ Although patented technology is an input in the design and manufacturing process, it is unlike physical inputs needed to build goods in the brick-and-mortar world. A technology firm can ask its engineers to solve a technical problem in designing a complex product, but a car producer cannot avoid purchasing metal. This difference matters. In a world of imperfect patent rights and high transaction costs, some patents should remain unenforced.

This reality is relatively desirable, but it is not optimal. The factors that constrain ex post market power by patentees also prevent some inventors of novel, useful, and nonobvious technologies from deriving a pecuniary sum befitting the nature of their insights. In the absence of copying, though, this shortcoming is modest. Insightful inventions with lucrative applications produce strong patents. Their enforcement, even in a disaggregated state, will often be a positive value proposition. In other words, strong patents will likely not be underenforced. For the majority of patents, however, the social-welfare calculus is different. These IPRs tax independent invention, and the net effect of that tax is negative. The norm today is clean-room invention—so pervasively so that most infringement complaints today do not even allege copying.³¹ If patent policy concerns itself with maximizing social welfare, particularly by spurring the creation and commercialization of new technologies, then it must do more than simply incentivize the filing of

28. See Fiona M. Scott Morton & Carl Shapiro, *Strategic Patent Acquisitions*, 79 ANTITRUST L.J. 463, 485 (2014), available at <http://faculty.haas.berkeley.edu/shapiro/pae.pdf> (“[I]f the patents have a high likelihood of being invalid or not infringed, the individual inventor may not find it profitable to initiate litigation to attempt to force potential licensees to pay royalties.”); see also Edward Van Gieson & Paul Stellman, *Killing Good Patents to Wipe Out Bad Patents: Bilski, the Evolution of Patentable Subject Matter Rules, and the Inability to Save Valuable Patents Using the Reissue Statute*, 27 SANTA CLARA COMPUTER & HIGH TECH. L.J. 403, 418 (2011).

29. See Greenspoon & Cottle, *supra* note 27, at 195, 217 n.58.

30. See Mark A. Lemley & A. Douglas Melamed, *Missing the Forest for the Trolls*, 113 COLUM. L. REV. 2117, 2122 (2013). See generally Samson Vermont, *Independent Invention as a Defense to Patent Infringement*, 105 MICH. L. REV. 475, 478–80 (2006) (discussing independent invention in patent law).

31. See Cotropia & Lemley, *supra* note 19, at 1424.

patents. Insights described in a published government document do not of themselves produce realizable gains;³² marketed goods and services embodying these insights do.

PAEs leverage these flaws in the patent system to amass and assert otherwise unenforced IPRs to hold up companies that have independently invented and are already marketing the claimed technologies.³³ This practice leads many to conclude that PAEs harm social welfare.³⁴ Unsurprisingly, PAEs contest this characterization, arguing that their aggregation strategies create an otherwise nonexistent market for individual inventors.³⁵ They justify their business model by claiming that it solves a real, though modest, shortcoming of the contemporary patent regime: a limited market for the sale of patent licenses. For instance, Intellectual Ventures, a prominent PAE, claims to have invented a new technology market aimed at covering an “inevitable Invention GapTM” that occurs in “today’s fast-paced, high-tech world—where companies are entering new markets and building products that contain upwards of thousands of patented inventions.”³⁶

Ultimately, the patent-troll problem is well known, but no comprehensive solution has emerged because the phenomenon is difficult to address within the framework of existing law. PAEs realize value for their investors and the original patentees from whom they acquire IPRs. Any larger problems are arguably a function of the legislative framework and patent milieu within which PAEs exist. In much the same way that intelligent tax planning is lawful even when it conflicts with the policy rationale underlying the tax code, PAEs’ patent-infringement suits might reflect the alienability, enforcement, and other property-right characteristics that Congress vested upon

32. See, e.g., FTC, EVOLVING IP MARKETPLACE, *supra* note 3, at 9.

33. See Jason Schultz & Jennifer M. Urban, *Protecting Open Innovation: The Defensive Patent License as a New Approach to Patent Threats, Transaction Costs, and Tactical Disarmament*, 26 HARV. J.L. & TECH. 1, 7 (2012).

34. See, e.g., Amy L. Landers, *Let the Games Begin: Incentives to Innovation in the New Economy of Intellectual Property Law*, 46 SANTA CLARA L. REV. 307, 345–46 (2006); Gerard N. Magliocca, *Blackberries and Barnyards: Patent Trolls and the Perils of Innovation*, 82 NOTRE DAME L. REV. 1809, 1810 (2007); Robert P. Merges, *The Trouble with Trolls: Innovation, Rent-Seeking, and Patent Law Reform*, 24 BERKELEY TECH. L.J. 1583 (2009) (discussing how patent trolls inhibit innovation, which fails to serve the social goal of the patent system and creates a need to reform the current patent system); Henry C. Su, *Invention Is Not Innovation and Intellectual Property Is Not Just Like Any Other Form of Property: Competition Themes from the FTC’s March 2011 Patent Report*, ANTITRUST SOURCE, Aug. 2011, at 1, 4–5, available at http://www.americanbar.org/content/dam/aba/publishing/antitrust_source/aug11_su_7_26f.authcheckdam.pdf.

35. See *infra* note 86 and accompanying text.

36. *How It Works*, INTELLECTUAL VENTURES, <http://www.intellectualventures.com/index.php/license/licensing-overview> (last visited Feb. 25, 2015).

patents,³⁷ even if enforcement of those rights inhibits net innovation and harms consumers.

Proposed antitrust solutions may appear unconvincing, in part because PAEs aggressively assert that they aggregate complementary, rather than substitutable, patents.³⁸ Moreover, it can be challenging to define an antitrust prohibition that targets only the precise characteristics that render PAEs subversive of innovation. This is because many important innovators such as universities, startups, and semiconductor-design houses share certain characteristics of PAEs—they do not manufacture technology goods and sometimes sue to vindicate their patent rights.³⁹ The solutions to date are instead modest and incremental, such as denying injunctive relief in cases of ex post hold-up,⁴⁰ limiting the entire-market-value rule,⁴¹ jettisoning the twenty-five-percent rule of thumb for reasonable royalty calculations,⁴² and determining damages by reference to hypothetical ex ante licensing agreements.⁴³ Private-ordering solutions in the form of defensive patent aggregators have also emerged.⁴⁴ These efforts, although welcome, remain incomplete.

This Article studies the economics of targeted patent aggregation and assertion by non-practicing entities (NPEs) and shows that the scrutinized behavior likely harms efficiency. It then explores the possibility that PAE hold-up implicates the antitrust laws and concludes that it does.⁴⁵ Appealing to the characteristics of a hypothetical industry subject to zero litigation costs and perfect information, the Article explains that patent aggregators could actually create value through

37. *E.g.*, 35 U.S.C. § 261 (2012) (“[P]atents shall have the attributes of personal property.”).

38. *See* Daniel A. Crane, *Intellectual Liability*, 88 *TEX. L. REV.* 253, 286 (2009) (observing that PAEs typically “aggregate portfolios of patents that are . . . , at most, complements,” thus concluding that “[p]atent trolls usually do not possess market power in a strong sense” and that “their aggregation does not confer market power in an antitrust sense”).

39. *See* FTC, *EVOLVING IP MARKETPLACE*, *supra* note 3, at 8 n.5; *see also* Mark A. Lemley, *Are Universities Patent Trolls?*, 18 *FORDHAM INTELL. PROP. MEDIA & ENT. L.J.* 611 (2008) (asserting that universities share some characteristics with patent trolls).

40. *E.g.*, *eBay Inc. v. MercExchange, L.L.C.*, 547 U.S. 388, 393–94 (2006).

41. *See* *LaserDynamics, Inc. v. Quanta Computer, Inc.*, 694 F.3d 51, 67–70 (Fed. Cir. 2012).

42. *Uniloc USA, Inc. v. Microsoft Corp.*, 632 F.3d 1292, 1317 (Fed. Cir. 2011).

43. *Lucent Techs., Inc. v. Gateway, Inc.*, 580 F.3d 1301, 1324–25 (Fed. Cir. 2009).

44. *See* FTC, *EVOLVING IP MARKETPLACE*, *supra* note 3, at 66–67.

45. Some commentators are skeptical that antitrust is an appropriate tool with which to address PAE activity. *See, e.g.*, Crane, *supra* note 38, at 286; Justin R. Orr, *Patent Aggregation: Models, Harms, and the Limited Role of Antitrust*, 28 *BERKELEY TECH. L.J.* 525, 554 (2013); Joshua Wright, *Comm’n, Fed. Trade Comm’n, What Role Should Antitrust Play in Regulating the Activities of Patent Assertion Entities?* 16–17 (Apr. 17, 2013), *available at* http://www.ftc.gov/sites/default/files/documents/public_statements/what-role-should-antitrust-play-regulating-activities-patent-assertion-entities/130417paespeech.pdf (arguing that patent and contract law best address PAE activity).

blanket licensing, particularly by ameliorating Cournot-complement, royalty-stacking problems while remaining subject to competition in the form of direct licenses from underlying patentees. In the real world, however, ex post under enforcement at the individual patentee level obscures the economic distinction between substitutable and complementary patents. The economics of modern patenting behavior in technology industries explain why PAEs vastly magnify the market power that IT patents bestow at the individual level, notwithstanding a lack of technological overlap between IP rights in a given portfolio.

These insights lead to a remarkable and thus-far unnoticed parallel: the U.S. Supreme Court's landmark opinion in *Broadcast Music, Inc. v. CBS, Inc.*⁴⁶ sheds light on many of the issues at play in trolling activity.⁴⁷ As PAEs magnify market power by combining patents that read on marketed devices while eliminating any prospect of direct licensing between downstream manufacturers and upstream patent-assignors, their activities may fail scrutiny under Sections 1–2 of the Sherman Act and under Section 7 of the Clayton Act. The rationale and sound precedential basis for this antitrust condemnation would simultaneously inoculate NPEs that serve a valuable economic function by engaging in ex ante technology transfer.

Part I introduces the PAE phenomenon. Criticism of “patent trolling” now exists across the political spectrum; nevertheless, a raucous debate is underway between policy makers and academics concerning the effects of NPEs' patent assertion on innovation and competition. After placing the PAE debate in context, Part I addresses the critical distinction between ex ante and ex post licensing. Observing that the economics of the patent system are so complex that one cannot infer that all patent accumulation and enforcement is inherently problematic, Part II outlines a series of hypothetical worlds in which competition variously flourishes with and without blanket or other forms of licensing by poolers of IPRs. This Article then explains how today's patent-licensing markets actually operate. That discussion expounds a theory of anticompetitive effect associated with PAE behavior. Part III adopts this theory and applies it to substantive antitrust law to explore viable limits on PAE hold-up.

I. PAES AND THE ECONOMICS OF PATENT LICENSING

This Part proceeds in three Sections. The first outlines typical PAE behavior and the opposition mounting against it. The second Section explores a healthier model for the relationship between patent assertion

46. 441 U.S. 1 (1979).

47. See *id.* at 6; see also Thomas J. Horton, Robert H. Lande, *Should the Internet Exempt the Media Sector from the Antitrust Laws?*, 65 FLA. L. REV. 1521, 1537–38 (2013) (describing the “one-stop shop[] concept” that the Supreme Court applied in *Broadcast Music*).

and independent innovation. The third Section presents a competitive baseline for measuring the efficiency of outcomes in order to explain the relative efficiency of concentrated and atomized patent ownership.

A. *The Rise and Possible Fall of the “Patent Troll”*

Patent trolls have triggered a firestorm of protest that may be reaching a crescendo. Leading technology firms condemn PAEs’ rent-seeking behavior,⁴⁸ and countless newspaper articles criticize patent aggregation and assertion.⁴⁹ The President has opined that PAEs “don’t actually produce anything themselves. They’re just trying to essentially leverage and hijack somebody else’s idea and see if they can extort some money out of them.”⁵⁰ The Chief Judge of the Federal Circuit has referred to their business model as patent trolling.⁵¹

PAEs typically buy patents that would otherwise lie dormant on account of their probable invalidity, vague scope, and age.⁵² After amassing an arsenal of such IPRs, they hold up businesses that independently invent and market technological products that consumers

48. See, e.g., Comments of Google, Blackberry, Earthlink & Red Hat to the Federal Trade Commission and U.S. Department of Justice on Patent Assertion Entities (Apr. 5, 2013), available at <http://www.justice.gov/atr/public/workshops/pae/comments/paew-0049.pdf>; *Congress Must Rein in “Terrorist” Patent Trolls, Say Senior Executives*, MLEX, Mar. 14, 2013 (subscription required); David Ingram, *Corporate Counsel Push Antitrust Response to Patent Trolls*, THOMSON REUTERS, Mar. 15, 2013 (subscription required).

49. See, e.g., Stephanie Kirchgaessner, *Patent Wars Unite US Left and Right*, FIN. TIMES (Oct. 17, 2013, 12:14 AM), <http://www.ft.com/intl/cms/s/0/cfe0736e-2a9f-11e3-8fb8-00144feab7de.html#axzz3HPjTUoA9> (subscription required); Floyd Norris, *Extracting a Toll from a Patent “Troll,”* N.Y. TIMES (Oct. 17, 2013), <http://www.nytimes.com/2013/10/18/business/extracting-a-toll-from-a-patent-troll.html>; *Patent Reform in America: Trolls on the Hill*, ECONOMIST (Dec. 7, 2013), <http://www.economist.com/news/business/21591206-congress-takes-aim-patent-abusers-trolls-hill>; David Segal, *Has Patent, Will Sue: An Alert to Corporate America*, N.Y. TIMES (July 13, 2013), <http://www.nytimes.com/2013/07/14/business/has-patent-will-sue-an-alert-to-corporate-america.html>; see also Ashby Jones, *Patent ‘Troll’ Tactics Spread*, WALL ST. J. (July 8, 2012, 8:46 PM), <http://online.wsj.com/news/articles/SB10001424052702303292204577514782932390996>.

50. Gene Sperling, *Taking on Patent Trolls to Protect American Innovation*, WHITE HOUSE BLOG (June 4, 2013, 1:55 PM), <http://www.whitehouse.gov/blog/2013/06/04/taking-patent-trolls-protect-american-innovation> (quoting President Barack Obama’s February 14, 2013 “Fireside Hangout”) (internal quotation marks omitted).

51. Randall R. Rader, Colleen V. Chien & David Hricik, *Make Patent Trolls Pay in Court*, N.Y. TIMES (June 4, 2013), <http://www.nytimes.com/2013/06/05/opinion/make-patent-trolls-pay-in-court.html>.

52. See, e.g., Mark Liang & Brian Berliner, *Fee Shifting in Patent Litigation*, 18 VA. J.L. & TECH. 59, 94 (2013); Mark Liang, *The Aftermath of TS Tech: The End of Forum Shopping in Patent Litigation and Implications for Non-Practicing Entities*, 19 TEX. INTELL. PROP. L.J. 29, 34 (2010); Jennifer Kahalelio Gregory, Comment, *The Troll Next Door*, 6 J. MARSHALL REV. INTELL. PROP. L. 292, 295 (2007).

value.⁵³ The cost of litigation, uncertainty as to the outcome of judicial proceedings, and a nearly endless supply of patents available to PAEs induce many, perhaps most, innovators to settle for large amounts of money.⁵⁴ This Article demonstrates that PAEs routinely extract far greater royalties than the economically optimal amount.

An Intel executive coined the expression “patent troll” in 2001 to characterize these practices,⁵⁵ which bear “indicia of extortion.”⁵⁶ Since then, the problem of offensive patent assertion by NPEs has become increasingly acute. Between 2010 and 2012, the percentage of all patent-infringement lawsuits that PAEs brought rose from 29% to 62%.⁵⁷ The America Invents Act, which limited joinder,⁵⁸ introduced post-grant review,⁵⁹ and bolstered inter partes review,⁶⁰ may bear some responsibility for this uptick.⁶¹ Regardless, NPEs now file a majority of all patent-infringement suits, and the scale of PAE activity has risen sharply.⁶²

In most cases, PAEs do not actually need to file suit to extract lucrative sums. In 2012, for instance, PAEs may have threatened more than 100,000 firms with such proceedings.⁶³ An influential study—albeit one criticized for not estimating efficiency losses and for loosely defining NPEs—estimates that NPEs imposed \$29 billion of direct costs on U.S. businesses in 2011 alone.⁶⁴ Interestingly, when they prevail at

53. See, e.g., Brad A. Greenberg, *Copyright Trolls and Presumptively Fair Uses*, 85 U. COLO. L. REV. 53, 77–79 (2014); Sarah R. Wasserman Rajec, *Tailoring Remedies to Spur Innovation*, 61 AM. U. L. REV. 733, 744 (2012).

54. See, e.g., Phil Goldberg, Policy Brief, *Stumping Patent Trolls on the Bridge to Innovation*, PROGRESSIVE POLICY INST. 5–7 (Oct. 2013), http://www.progressivepolicy.org/wp-content/uploads/2013/09/10.2013-Goldberg_Stumping-Patent-Trolls-On-The-Bridge-To-Innovation.pdf.

55. Todd Klein, Comment, *eBay v. MercExchange and KSR Int’l Co. v. Teleflex, Inc.: The Supreme Court Wages War Against Patent Trolls*, 112 PENN ST. L. REV. 295, 296 (2007).

56. See *Eon-Net LP v. Flagstar Bancorp*, 653 F.3d 1314, 1326 (Fed. Cir. 2011).

57. EXEC. OFFICE OF THE PRESIDENT, PATENT ASSERTION AND U.S. INNOVATION 1, 5 (2013), available at http://www.whitehouse.gov/sites/default/files/docs/patent_report.pdf.

58. 35 U.S.C. § 299 (2012).

59. *Id.* § 321.

60. *Id.* § 311.

61. See, e.g., David J. Kappos, *Facts Show Patent Trolls Not Behind Rise in Suits*, LAW360 (Jan. 15, 2014, 12:39 AM), <http://www.law360.com/articles/501142/facts-show-patent-trolls-not-behind-rise-in-suits> (subscription required); Adam Mossoff, *GAO Report on Patent Litigation Confirms No “Patent Troll” Litigation Problem*, TRUTH ON MARKET (Dec. 17, 2013), <http://truthonthemarket.com/2013/12/17/gao-report-on-patent-litigation-confirms-no-patent-troll-litigation-problem/>.

62. See, e.g., James Bessen, *ALL the Facts: PAEs Are Suing Many More Companies*, PATENTLY-O (Jan. 28, 2014), <http://patentlyo.com/patent/2014/01/facts-suing-companies.html>.

63. EXEC. OFFICE OF THE PRESIDENT, *supra* note 57, at 1, 6.

64. James Bessen & Michael J. Meurer, Essay, *The Direct Costs from NPE Disputes*, 99 CORNELL L. REV. 387, 389 (2014). For criticism, see David L. Schwartz & Jay P. Kesan,

trial, PAEs tend to win larger damages amounts than practicing companies.⁶⁵ NPEs enjoy a lower success rate, however, at trial. A 2011 study concluded that NPEs won only 9.2% of cases litigated to judgment (including default judgments) compared to the approximately 40% success rate that practicing entities achieve at trial (not including default judgments).⁶⁶ Once an NPE files suit, it receives an award just 24% of the time.⁶⁷ These facts suggest that, on average, PAEs assert weaker patents.⁶⁸ Of course, PAEs are likely to handpick the best IPRs from their larger portfolios to assert in court.⁶⁹ Thus, these statistics suggest that PAEs often—though perhaps not always—aggregate weaker than average patents.

The growing scale of PAE assertion reflects the lucrative nature of the business model and the ease of entry into the business.⁷⁰ The fuel that sustains PAE assertion is an enormous universe of unenforced patents, which is disproportionately comprised of computer-implemented and business-method claims.⁷¹ Because IT products

Analyzing the Role of Non-Practicing Entities in the Patent System, Essay, 99 CORNELL L. REV. 425, 431–33 (2014).

65. Lemley & Melamed, *supra* note 30, at 2119–20.

66. Allison et al., *supra* note 15, at 693 tbl.8 & fig.4, 694.

67. See PRICEWATERHOUSECOOPERS, 2013 PATENT LITIGATION STUDY: BIG CASES MAKE HEADLINES, WHILE PATENT CASES PROLIFERATE—1995–2012, at 5 (2013), http://www.pwc.com/en_US/us/forensic-services/publications/assets/2013-patent-litigation-study.pdf.

68. See, e.g., Lemley & Melamed, *supra* note 30, at 2120; Arti K. Rai, *Improving (Software) Patent Quality Through the Administrative Process*, 51 HOUS. L. REV. 503, 505 (2013). But see David L. Schwartz & Jay P. Kesan, Essay, *Analyzing the Role of Non-Practicing Entities in the Patent System*, 99 CORNELL L. REV. 425, 451 (2014) (“There is some evidence that NPEs settle more quickly compared to other patent holders, which could indicate the possibility of nuisance settlements. . . . But there is also empirical evidence that the patents asserted by NPEs are similar to patents asserted by practicing entities.”).

69. See, e.g., J.P. Mello, *Technology Licensing and Patent Trolls*, 12 B.U. J. SCI. & TECH. L. 388, 394–95 (2006); cf. Malcolm T. “Ty” Meeks & Charles A. Eldering, *Patent Valuation: Aren’t We Forgetting Something? Making the Case for Claims Analysis in Patent Valuation by Proposing a Patent Valuation Method and a Patent-Specific Discount Rate Using the CAPM*, 9 NW. J. TECH. & INTELL. PROP. 194, 203 (2010) (opining that, as a general matter, “the strongest patents are less likely to make it into the litigation data pool” and that “[i]n contrast, patents with value just below the strongest of patents may find themselves in litigation more often”).

70. See, e.g., Jack Ellis, *A Game of Scale*, INTELL. ASSET MGMT., July/Aug. 2012, at 2, 2, available at http://acaciaresearch.com/wp-content/uploads/2013/09/IAM_54-Acacia_digital.pdf (observing that Acacia Research, a PAE, has been “a runaway success. In just three-and-a-half years, its market cap has shot up from around US\$90 million to a staggering US\$1.75 billion”); Pascal-Emmanuel Gobry, *Intellectual Ventures Generated \$700 Million in Revenues in 2010*, BUS. INSIDER (Mar. 7, 2011, 5:32 AM), <http://www.businessinsider.com/intellectual-ventures-2010-revenue-2011-3>.

71. See David A. Fitzgerald II, *Saving Alternative Dispute Resolution in Patent Law: Countering the Effects of the Patent Troll Revolution*, 23 OHIO ST. J. ON DISP. RESOL. 345, 348–49 (2008); Anna Mayergoz, Note, *Lessons from Europe on How to Tame U.S. Patent Trolls*, 42 CORNELL INT’L L.J. 241, 259–60 (2009).

combine thousands of discrete and potentially patent-eligible components, IT manufacturers are particularly vulnerable.⁷² Some commentators estimate that over two million patents are presently active in the United States.⁷³ Smartphone patents account for nearly 12% of them.⁷⁴ These features of today's system, coupled with the risk of treble damages for willful infringement,⁷⁵ make it infeasible for innovators to scour the prior art and to secure clearing positions before marketing next-generation devices.⁷⁶ A recent paper estimated that it would take two million patent attorneys working full time to compare every software patent issued in a year to every firm's products, costing \$400 billion—almost twice the value of the software industry.⁷⁷

Two factors are disproportionately responsible for this phenomenon. The first is a 1998 decision from the U.S. Court of Appeals for the Federal Circuit, *State Street Bank & Trust Co. v. Signature Financial Group*.⁷⁸ In *State Street*, the Federal Circuit held that software and business methods are patent-eligible if they produce “a useful, concrete and tangible result.”⁷⁹ That holding, combined with the “dot.com boom” that soon followed, resulted in the PTO's issuance of a deluge of such patents.⁸⁰ To make matters worse, examiners often failed to scrutinize the prior art surrounding such applications, causing many obvious or non-novel patents to issue.⁸¹ Compounding the problem, the Federal

72. See, e.g., Lemley, *supra* note 39, at 613.

73. E.g., Dennis Crouch, *How Many US Patents Are In-Force?*, PATENTLY-O (May 4, 2012), <http://patentlyo.com/patent/2012/05/how-many-us-patents-are-in-force.html> (calculating that about 2.1 million U.S. patents were in force as of May 1, 2012).

74. See RPX CORP., *supra* note 13.

75. The Federal Circuit, however, has ameliorated the risk of willful infringement when an innovator merely happens to see a patent before manufacturing what later transpires to be an infringing product. See *In re Seagate Tech., LLC*, 497 F.3d 1360, 1371 (Fed. Cir. 2007).

76. See, e.g., Kevin R. Davidson, *Retooling Patents: Current Problems, Proposed Solutions, and Economic Implications for Patent Reform*, 8 HOUS. BUS. & TAX L.J. 425, 454 (2008).

77. Christina Mulligan & Timothy B. Lee, *Scaling the Patent System*, 68 N.Y.U. ANN. SURV. AM. L. 289, 304–05 (2012).

78. 149 F.3d 1368 (Fed. Cir. 1998).

79. *Id.* at 1373, 1375 (quoting *In re Alappat*, 33 F.3d 1526, 1544 (Fed. Cir. 1994), *abrogated by In re Bilski*, 545 F.3d 943 (Fed. Cir. 2008), *aff'd sub nom. Bilski v. Kappos*, 130 S. Ct. 3218 (2010)).

80. See, e.g., Andrea Lynn Evensen, Comment, “Don't Let the Sun Go Down on Me”: An In-Depth Look at Opportunistic Business Method Patent Licensing and a Proposed Solution to Allow Small-Defendant Business Method Users to Sing a Happier Tune, 37 J. MARSHALL L. REV. 1359, 1364 (2004).

81. See, e.g., Katherine J. Strandburg, *What If There Were a Business Method Use Exemption to Patent Infringement?*, 2008 MICH. ST. L. REV. 245, 262 (citing sources for the proposition that the “low patent quality for business method patents may have resulted from PTO inexperience with the subject matter of business method patents, from the inaccessibility to

Circuit requires minimal disclosure for computer-implemented inventions.⁸² Many software patents now claim methods far broader than what their respective inventors actually invented, with several such patents claimed in functional terms.⁸³

These background conditions make large-scale patent aggregation and ex post assertion possible. As noted, the public backlash against what many perceive to be increasingly objectionable behavior by PAEs is growing loud. However, PAEs have not sat idly by in the face of this public criticism,⁸⁴ nor are they bereft of support, as some commentators have sought to justify offensive patent assertion by NPEs.⁸⁵ PAEs claim to build fluid technology-transfer markets by providing the necessary resources to assert deserving patents whose original owners could not afford to monetize them and by connecting those upstream inventions to their downstream uses.⁸⁶ Part II of this Article scrutinizes that justification and finds it wanting.

More generally, PAEs undermine their claim to legitimacy by engaging in questionable practices, including those that hinder transparency. Some PAEs positively invest in secrecy, a phenomenon most plausibly explained by an attempt to magnify hold-up of independent inventors and marketers of technology.⁸⁷ For instance,

examiners of business method prior art due to its relatively recent patentability, and from an overly relaxed nonobviousness standard”).

82. See DAN L. BURK & MARK A. LEMLEY, *THE PATENT CRISIS AND HOW THE COURTS CAN SOLVE IT* 120–21 (2009).

83. See Lemley, *supra* note 17.

84. See, e.g., Michelle Quinn, ‘Patent Trolls’ Launch a Lobbying Defense in D.C., *POLITICO* (Oct. 1, 2013, 5:05 AM), <http://www.politico.com/story/2013/10/patent-trolls-launch-a-lobbying-defense-in-dc-97592.html>.

85. See, e.g., 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, 190 (2006); Sannu K. Shrestha, Note, *Trolls or Market-Makers? An Empirical Analysis of Nonpracticing Entities*, 110 *COLUM. L. REV.* 114, 150 (2010).

86. See, e.g., *About Us*, ACACIA RESEARCH CORP., <http://acaciaresearch.com/about-us/> (last visited Feb. 25, 2015) (“An intermediary in the patent market, Acacia facilitates efficiency and delivers monetary rewards to the patent owner.”); *FAQ*, INTELLECTUAL VENTURES, <http://www.intellectualventures.com/about/faq> (last visited Feb. 25, 2015) (“Our mission is to energize and streamline the invention economy while producing a financial return for our investors.”); *Our Services*, CONVERSANT INTELLECTUAL PROP. MGMT., <http://www.conversantip.com/our-services/> (last visited Feb. 25, 2015) (formerly Mosaid Technologies) (“We’re in the business of making innovation more rewarding. Through our IP management services, sophisticated partnership models and innovative programs, we help our global partners realize the full value from their IP assets.”); *What We Do*, IPNAV, <http://www.ipnav.com/what-we-do/> (last visited Feb. 25, 2015) (“IPNav’s integrated, end-to-end solution turns idle IP assets into revenue streams. Using its proprietary Patent Monetization Platform, IPNav unlocks the value trapped in our clients’ IP portfolios . . .”).

87. See, e.g., *infra* Subsection II.A.3.c.ii (exploring this phenomenon through a hypothetical example).

Intellectual Ventures has reportedly created more than 1300 shell companies⁸⁸ to mask patent acquisitions from unsuspecting operating firms and, perhaps, to divorce the entities it uses to bring lawsuits from the companies it uses to hold other IPRs.

For all the harm that PAEs inflict on large technology companies, the last straw politically may have been their recent targeting of small businesses and individuals.⁸⁹ A prominent example is MPHJ Technology Investments, a PAE that sent threatening letters to more than 16,000 individuals and small businesses across America.⁹⁰ The conduct of MPHJ and other similar PAEs has triggered legislative action at the state and federal level.

Significant movement is now underway to arrest the most egregious PAE practices. In May 2013, Vermont became the first state to pass a law targeting PAEs.⁹¹ Its “Bad Faith Assertions of Patent Infringements” bill permits victims of illegitimate patent enforcement to sue the firm that asserted that IPR and authorizes the state’s Attorney General to bring civil actions against perceived trolls.⁹² In January 2014, New York’s Attorney General entered into a consent decree with MPHJ.⁹³ The decree, which followed on the heels of a lawsuit against MPHJ by the Vermont Attorney General, prohibited the company from using deceptive tactics against New York businesses.⁹⁴ Under investigation by the U.S. government but not content to stay on the defensive, MPHJ boldly sued the Federal Trade Commission (FTC) on January 13, 2014, in the U.S. District Court for the Western District of

88. See Tom Ewing & Robin Feldman, *The Giants Among Us*, 2012 STAN. TECH. L. REV. 1, 2, <https://journals.law.stanford.edu/sites/default/files/stanford-technology-law-review-stlr/online/feldman-giants-among-us.pdf>.

89. See, e.g., Jim Bessen, Op-Ed, *How Patent Trolls Doomed Themselves by Targeting Main Street*, ARS TECHNICA (Sept. 12, 2013, 9:57 AM), <http://arstechnica.com/tech-policy/2013/09/op-ed-how-patent-trolls-doomed-themselves-by-targeting-main-street/>.

90. Jan Wolfe, *Accused Patent Troll Takes Aim at FTC, Settles with N.Y. AG*, AM. LAW. (Jan. 14, 2014), available at <http://www.litigationdaily.com/id=1202638423763> (LexisNexis subscription required).

91. See, e.g., Eric Goldman, *Vermont Enacts the Nation’s First Anti-Patent Trolling Law*, FORBES (May 22, 2013, 2:22 PM), <http://www.forbes.com/sites/ericgoldman/2013/05/22/vermont-enacts-the-nations-first-anti-patent-trolling-law/>.

92. H. 299, 2013–2014 Gen. Assemb., Reg. Sess. § 6 (Vt. 2013), VT. STAT. ANN. tit. 9, §§ 4195–99.

93. See Press Release, N.Y. State Office of the Att’y Gen., A.G. Schneiderman Announces Groundbreaking Settlement with Abusive “Patent Troll,” (Jan. 14, 2014), available at <http://www.ag.ny.gov/press-release/ag-schneiderman-announces-groundbreaking-settlement-abusive-“patent-troll”>.

94. See *id.*; see also Dennis Crouch, *State of Vermont’s Demand Letter Case Against MPHJ Continues*, PATENTLY-O (Aug. 12, 2014), <http://patentlyo.com/patent/2014/08/vermonts-against-continues.html>.

Texas, seeking declaratory relief that the FTC was violating MPHJ's constitutional right to enforce its patents.⁹⁵

Several government studies of PAE activity exist. In 2011, the FTC released a report concluding that “[e]ven if PAEs arguably encourage invention, they can deter innovation by raising costs and risks without making a technological contribution.”⁹⁶ In summer 2013, the President published a report making recommendations aimed at limiting PAE hold-up.⁹⁷ Later that year, the FTC announced a Section 6(b) study on PAEs' effects on innovation and competition.⁹⁸ That action followed a public workshop on PAE activity that the FTC held in conjunction with the Justice Department's Antitrust Division on December 10, 2012.⁹⁹ On December 17, 2013, the Senate Judiciary Committee held a hearing regarding “Protecting Small Businesses and Promoting Innovation by Limiting Patent Troll Abuse.”¹⁰⁰ Congress is presently weighing legislative reform aimed at curbing the worst abuses. It may pass the “Innovation Act,” which would increase transparency and award prevailing defendants of patent-infringement suits their costs and attorneys' fees.¹⁰¹

The Supreme Court is also involved. The Court has issued at least fifteen patent opinions since 2004.¹⁰² Many of those decisions limit patent hold-up. The Court has limited the availability of injunctive relief;¹⁰³ made it easier to show that a claimed invention is obvious;¹⁰⁴ held that a licensee has standing to challenge the validity and infringement of a patent for which it pays royalties;¹⁰⁵ clarified that abstract inventions are unpatentable;¹⁰⁶ found that a product or method lacking an “inventive concept” does not claim patentable subject

95. Complaint at 2, 5, MPHJ Tech. Invs., LLC v. Fed. Trade Comm'n, No. 6:14-cv-11 (W.D. Tex. Jan. 13, 2014).

96. FTC, *EVOLVING IP MARKETPLACE*, *supra* note 3, at 9.

97. EXEC. OFFICE OF THE PRESIDENT, *supra* note 57.

98. Press Release, Fed. Trade Comm'n, FTC Seeks to Examine Patent Assertion Entities and Their Impact on Innovation, Competition (Sept. 27, 2013), *available at* <http://www.ftc.gov/news-events/press-releases/2013/09/ftc-seeks-examine-patent-assertion-entities-their-impact>.

99. *See Public Workshops: Patent Assertion Entity Activities*, U.S. DEP'T OF JUST., <http://www.justice.gov/atr/public/workshops/pae/> (last visited Feb. 25, 2015).

100. *Hearing on Protecting Small Businesses and Promoting Innovation by Limiting Patent Troll Abuse*, 113th Cong. (2013), *available at* <http://www.judiciary.senate.gov/meetings/protecting-small-businesses-and-promoting-innovation-by-limiting-patent-troll-abuse>.

101. Innovation Act, H.R. 3309, 113th Cong. § 3(b)(1), § 8(a)(1) (2013).

102. John W. Cox & Joseph Vandegrift, *The Supreme Court Is Paying Attention to Patent Law Again*, LAW360 (Apr. 1, 2013), <http://www.law360.com/articles/425426/the-supreme-court-is-paying-attention-to-patent-law-again>.

103. *eBay Inc. v. MercExchange, L.L.C.*, 547 U.S. 388, 392–93 (2006).

104. *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 418 (2007).

105. *MedImmune, Inc. v. Genentech, Inc.*, 549 U.S. 118, 121–22, 137 (2007).

106. *Bilski v. Kappos*, 130 S. Ct. 3218, 3230 (2010).

matter;¹⁰⁷ clarified that a naturally occurring DNA sequence is unpatentable;¹⁰⁸ and held that patentees always have the burden of persuasion to establish infringement, even when they defend a declaratory-judgment action.¹⁰⁹ In the 2014 Term, the Court issued an important opinion holding that computer-implemented inventions based on intermediated settlement are abstract and therefore patent-ineligible.¹¹⁰ Given the extent to which PAEs rely on software patents, a ruling that materially cabins the patentability of such technologies could undermine the threat that many PAEs pose to business.

Such reforms would certainly ameliorate PAE hold-up; however, they would not be a panacea.¹¹¹ This Article explores whether an antitrust solution exists to counter the most extreme instances of PAE hold-up. If such a solution exists, it would also be an additional measure with which to counter large-scale, offensive patent aggregation. Such a limitation would be particularly valuable to many of today's most successful technology firms, which the largest PAEs tend to target. Nevertheless, legislative reform will not likely eliminate the threat that such comprehensive patent aggregation and assertion can pose.

B. *The Optimal Rate of Patent Assertion and Independent Innovation*

To understand the economics of patent aggregation, one must appreciate how the contemporary patent regime operates. The system's essential features are well known. A patent's defining characteristic is the right to exclude.¹¹² An inventor of a novel, useful, and nonobvious technology who sufficiently discloses his insight receives a twenty-year monopoly.¹¹³ This monopoly is rarely an economic one—enabling the sustainable and profitable raising of prices above competitive levels¹¹⁴—rather, it is an exclusive privilege to practice the claimed invention.¹¹⁵ Most patents have little to no value because they claim just one of many equally good alternatives to achieving a particular end or because they read on a product or process for which there is little or no

107. *Mayo Collaborative Servs. v. Prometheus Labs., Inc.*, 132 S. Ct. 1289, 1294 (2012).

108. *See Ass'n for Molecular Pathology v. Myriad Genetics, Inc.*, 133 S. Ct. 2107, 2119–20 (2013).

109. *Medtronic, Inc. v. Mirowski Family Ventures, LLC*, 134 S. Ct. 843, 846 (2014).

110. *Alice Corp. Pty. Ltd. v. CLS Bank Int'l*, 134 S. Ct. 2347, 2352 (2014).

111. *See, e.g., Timothy B. Lee, There Are Two Patent Troll Problems. The House Bill Only Fixes One of Them*, WASH. POST (Dec. 4, 2013), <http://www.washingtonpost.com/blogs/the-switch/wp/2013/12/04/there-are-two-patent-troll-problems-the-house-bill-only-fixes-one-of-them/>.

112. 35 U.S.C. § 154(a)(1) (2012).

113. *See id.* §§ 101–03, 154.

114. *See Ill. Tool Works Inc. v. Indep. Ink, Inc.*, 547 U.S. 28, 42–43 & 43 n.4 (2006).

115. *See Andrew Chin, Research in the Shadow of DNA Patents*, 87 J. PAT. & TRADEMARK OFF. SOC'Y 846, 866 (2005).

consumer demand.¹¹⁶ The owners of such patents lack market power because if they raise price significantly above marginal cost, consumers will be unwilling to pay for a license. Consequently, rightsholders have only litigated 1.5% of patents.¹¹⁷

Two nuances shape the patent right. First, a patent does not grant an absolute right to exclude as might exist if enforcement costs were equal to zero or if the state policed infringement on patentees' behalf. Instead, patents grant their owners the ability to ask a court to order another to stop practicing their inventions, to pay reasonable royalties, or (in the event of willful infringement) to fork up treble damages.¹¹⁸ This difference is important. The cost of litigating a patent to judgment hovers between \$5 million and \$8 million,¹¹⁹ which makes filing suit a loss-generating endeavor unless the exclusive right is sufficiently valuable. Second, even assuming that patentees have the means and inclination to enforce their rights, patents confer probabilistic rights to exclude only.¹²⁰ Although patents enjoy a statutory presumption of validity,¹²¹ many of them are in fact invalid.¹²² This is primarily because the PTO lacks the resources to scrutinize every application; thus, it routinely errs.¹²³ Empirical studies of validity show that courts strike down approximately half of all patents litigated to judgment.¹²⁴

These findings likely reflect selection bias because they apply to the less than 2% of patents that are ever litigated to judgment.¹²⁵ Whether

116. See U.S. DEP'T OF JUSTICE & FED. TRADE COMM'N, ANTITRUST GUIDELINES FOR THE LICENSING OF INTELLECTUAL PROPERTY 4, 20 ex. 8 (1995) [hereinafter IP LICENSING GUIDELINES].

117. See John R. Allison, Mark A. Lemley & Joshua Walker, *Extreme Value or Trolls on Top? The Characteristics of the Most-Litigated Patents*, 158 U. PA. L. REV. 1, 4 (2009).

118. 35 U.S.C. §§ 283–84 (2012).

119. See, e.g., STEVEN M. AUVIL & DAVID A. DIVINE, AM. INTELLECTUAL PROP. LAW ASS'N, REPORT OF THE ECONOMIC SURVEY 2011, at 35; Xuan-Thao Nguyen, *Dynamic Federalism and Patent Law Reform*, 85 IND. L.J. 449, 450 (2010); Wayne B. Paugh, *The Betrayal of Patent Reexamination: An Alternative to Litigation, Not a Supplement*, 19 FED. CIR. B.J. 177, 207 (2009).

120. See Mark A. Lemley & Carl Shapiro, *Probabilistic Patents*, 19 J. ECON. PERSP. 75, 75 (2005) (“[A] patent does not confer upon its owner the right to exclude but rather a right to *try* to exclude by asserting the patent in court. When a patent holder asserts its patent against an alleged infringer, the patent holder is rolling the dice.” (citation omitted)).

121. 35 U.S.C. § 282(a) (2012).

122. See Doug Lichtman & Mark A. Lemley, *Rethinking Patent Law's Presumption of Validity*, 60 STAN. L. REV. 45, 48 (2007).

123. See *id.* at 47.

124. Lemley & Shapiro, *supra* note 120, at 76; see also *supra* note 15.

125. See James Bessen & Michael J. Meurer, *Lessons for Patent Policy from Empirical Research on Patent Litigation*, 9 LEWIS & CLARK L. REV. 1, 3–6 (2005); Arti K. Rai, *Allocating Power over Fact-Finding in the Patent System*, 19 BERKELEY TECH. L.J. 907, 920 (2004); see also Shawn P. Miller, *Where's the Innovation: An Analysis of the Quantity and Qualities of Anticipated and Obvious Patents*, 18 VA. J.L. & TECH. 1, 19 (2013).

the effect of any such bias means that the roughly 50% invalidity rate is representative of the broader universe of patents is the subject of debate.¹²⁶ On one hand, parties are more likely to settle infringement claims founded on the strongest patents, such that empirical studies of IPRs subject to validity determinations may fail to account for high-end patents. On the other hand, the weakest patents are also unlikely to make it to a validity determination.¹²⁷ Absent the PAE phenomenon discussed in this Article or other strategic scenarios, firms are reluctant to spend millions of dollars asserting demonstrably invalid patents.¹²⁸ Furthermore, evidence shows that litigated patents are stronger on average than non-litigated patents.¹²⁹ Most recently, evidence has emerged that the most litigated patents, usually asserted by PAEs, are invalidated or held not infringed far more often than once-asserted patents.¹³⁰ Regardless, it is widely accepted that active patents are subject to chronic rates of invalidity.¹³¹ This seems particularly true of software patents that NPEs assert.¹³²

Is this phenomenon a good thing? The fact that the patent system serves an explicit constitutional mandate makes answering this question conceptually feasible. Specifically, the law recognizes patents “[t]o promote the Progress of Science and useful Arts, by securing for limited Times to . . . Inventors the exclusive Right to their respective . . . Discoveries.”¹³³ To judge the status quo, then, one might fruitfully ask whether less than complete enforcement is attractive from the perspective of spurring innovation. If (i) patents were valid and they disclosed cutting-edge technology at the time of invention; (ii) search, identification, and negotiation costs were absent; and (iii) the social and private costs of litigation were zero, then the optimal rate of patent assertion would indeed be 100%. However, the world operates differently today, which complicates the analysis. Due to imperfections in the patent system, the

126. See Bessen & Meurer, *supra* note 125, at 5–6.

127. See Shrestha, *supra* note 85, at 143.

128. *Id.* at 120.

129. See John R. Allison et al., *Valuable Patents*, 92 GEO. L.J. 435, 439–40 (2004) (arguing that “litigated patents tend to be much more valuable than others on average” and defining valuable patents as “individual patents that produce substantial economic benefit to their owners”).

130. See Allison et al., *supra* note 15, at 680, 687 tbl.3.

131. A 2006 study found that once courts consider validity, noninfringement, and enforceability, “accused patent infringers have been winning patent infringement suits at a rate of three to one.” Paul M. Janicke & LiLan Ren, *Who Wins Patent Infringement Cases?*, 34 AIPLA Q.J. 1, 3–4 (2006).

132. See Allison et al., *supra* note 15, at 680 (“NPEs and software patentees overwhelmingly lose their cases, even with patents that they litigate again and again.”).

133. U.S. CONST. art. I, § 8, cl. 8.

perfect rate of patent assertion is less than 100% (though, most assuredly, greater than 0%).

To start, copying is unusual rather than typical.¹³⁴ Only about 10% of patent-infringement complaints even *allege* copying.¹³⁵ This matters because if downstream implementers of technology routinely appropriate others' inventions, then one could justify incomplete enforcement based only on litigation costs and possible invalidity. Yet, to the extent that independent invention is responsible for marketed technology, limited patent enforcement offers public-goods benefits.¹³⁶ Independent invention coming hot on the heels of a patent can suggest that the claimed technology may have been obvious in light of the prior art.¹³⁷ An economic purpose of the § 103 condition is to deny protection to inevitable inventions.¹³⁸

In certain fields, patents often fail both to disclose technology in a meaningful way and to percolate knowledge.¹³⁹ Where a patent document spurs no further action—that is, where the patentee does not commercialize her technology or license it so that another can learn and put that invention into practice—it does not advance the constitutional foundation on which the patent system rests.¹⁴⁰ To the extent that these characteristics are present, underenforcement limits the “tax” effects of patents on downstream innovation, which is the principal source of social welfare.¹⁴¹

Less than total patent enforcement is desirable in certain industries. Conceived in an age when, “if you put technology in a bag and shook it, it would make some noise,”¹⁴² the patent regime now barely resembles

134. See Cotropia & Lemley, *supra* note 19, at 1424.

135. See *id.*

136. See INTERNATIONAL PUBLIC GOODS AND TRANSFER OF TECHNOLOGY UNDER A GLOBALIZED INTELLECTUAL PROPERTY REGIME 887 (Keith E. Maskus & Jerome H. Reichman eds., 2005).

137. See generally Peter E. Gratzinger, *Was the Telescope Obvious? An Inquiry into Simultaneous Invention*, 13 COLUM. SCI. & TECH. L. REV. 71 (2011) (exploring whether simultaneous invention suggests obviousness).

138. See 35 U.S.C. § 103 (2012) (providing that “[a] patent . . . may not be obtained . . . if the . . . claimed invention . . . would have been obvious”). For this author’s larger discussion of this point, see Alan Devlin & Neel Sukhatme, *Self-Realizing Inventions and the Utilitarian Foundation of Patent Law*, 51 WM. & MARY L. REV. 897 (2009). See generally Tun-Jen Chiang, *A Cost-Benefit Approach to Patent Obviousness*, 82 ST. JOHN’S L. REV. 39, 42–56 (2008) (discussing the history and development of the obviousness requirement for patentability).

139. See, e.g., Michael Abramowicz, *The Uneasy Case for Patent Races over Auctions*, 60 STAN. L. REV. 803, 839 n.140 (2007); Teresa M. Summers, Note, *The Scope of Utility in the Twenty-First Century: New Guidance for Gene-Related Patents*, 91 GEO. L.J. 475, 489 (2003).

140. See FTC, *EVOLVING IP MARKETPLACE*, *supra* note 3, at 9, 51.

141. See *id.* at 52–53 & n.13.

142. 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, 585 (1999).

its earlier incarnation. Gone are the days when a single patent covered a larger machine. Today, electrical inventions account for the lion's share of patents coming out of the PTO,¹⁴³ and the most litigated patents lie in the fields of software and telecommunications.¹⁴⁴ Mobile telephony is by far the largest field of patenting, possibly accounting for as much as one-quarter of all issued U.S. patents in 2013.¹⁴⁵ These modern developments have profound implications for how a patent system initially designed for physical devices should accommodate very different forms of invention.

Above all, innovation in industries like telecommunications, IT, and semiconductors takes place at the level of discrete subcomponents that one must combine in large numbers to create an end product.¹⁴⁶ This characteristic is of utmost importance because it triggers coordination problems.¹⁴⁷ Economists have long recognized that divided ownership of complementary goods creates inefficiencies in the form of royalty stacking or Cournot-complements effects.¹⁴⁸ If the builder of a telecommunications device must purchase 10,000 patents to avoid infringement and a different firm owns each patent, then it must identify the 10,000 relevant patents and their owners and conduct that many separate negotiation sessions. Additionally, each patentee has an incentive to hold out and to demand as the price of its blessing an amount trivially less than the expected value of the device.¹⁴⁹ As discussed below, the Supreme Court tempered this danger in its 2006 *eBay Inc. v. MercExchange, LLC* decision, which made injunctive relief in the event of holdout unlikely.¹⁵⁰ Nevertheless, strategic behavior can allow patentees to extract greater royalties than they could have

143. See Annette I. Kahler, *Examining Exclusion in Woman-Inventor Patenting: A Comparison of Educational Trends and Patent Data in the Era of Computer Engineer Barbie*, 19 AM. U. J. GENDER SOC. POL'Y & L. 773, 788 & 789 fig.3 (2011).

144. See Allison et al., *supra* note 117, at 3.

145. See CHETAN SHARMA, MOBILE PATENTS LANDSCAPE: AN IN-DEPTH QUANTITATIVE ANALYSIS 5 (2d ed. 2013), available at http://www.chetansharma.com/MobilePatentsLandscape_2013.htm.

146. See Kahin, *supra* note 12, at 390; see also WORLD INTELLECTUAL PROP. ORG., WORLD PATENT REPORT: A STATISTICAL REVIEW F.1 tb1.1 (2008), available at http://www.wipo.int/ipstats/en/statistics/patents/wipo_pub_931.html#f1 (noting a larger number of patent applications in these categories).

147. See, e.g., Rudy Santore et al., *Patent Pools as a Solution to Efficient Licensing of Complementary Patents? Some Experimental Evidence*, 53 J.L. & ECON. 167, 167–69 (2010), available at <http://www.jstor.org/stable/10.1086/600078?origin=JSTOR-pdf>.

148. *Id.* at 168–69; see also George S. Cary et al., *The Case for Antitrust Law to Police the Patent Holdup Problem in Standard Setting*, 77 ANTITRUST L.J. 913, 917–18 (2011).

149. See Lemley & Shapiro, *supra* note 6, at 1993, 1995.

150. See *eBay Inc. v. MercExchange, L.L.C.*, 547 U.S. 388, 391 (2006) (holding that a plaintiff must meet a four-factor test for the court to award injunctive relief); see also Lemley & Melamed, *supra* note 30, at 2141 (“The *eBay* decision raised the bar for the issuance of injunctions in infringement suits brought by both trolls and practicing entities . . .”).

commanded *ex ante*—before the firm implementing the technology began investing in its chosen product design.¹⁵¹ This suggests that, to the extent that patent enforcement promotes social welfare, aggregators of patents in these fields could enhance efficiency by internalizing positive externalities that would otherwise bias pricing decisions upward and by reducing transaction costs.¹⁵²

Three critical assumptions underlie that possibility. The first is that the price of the patented technology reflects both the licensee's design-around options and the claimed invention's incremental benefit compared to the next-best alternative. The royalty commanded must not be based on lock-in and hold-up. The second is that efficiency requires that every patent be asserted. The third is that such enforcement achieves royalties that flow to upstream patentees in a way that magnifies incentives to invent and commercialize new technologies. These assumptions are unlikely satisfied in many of today's patent-heavy industries outside of biopharmaceuticals and chemicals.

Collectively, the preceding account of today's patent regime sets the scene for this Article's analysis of patent aggregation. To emphasize, nothing in this Article means to convey skepticism as to the virtue of IPRs. Patents are often socially justified, and are important instigators of innovation, especially in the biopharmaceutical setting where the economic, public-goods justification for IPRs is compelling.¹⁵³ Similarly, it does not follow that increasing the scale or efficacy of patent enforcement will reduce welfare. To the contrary, building and licensing patent portfolios could advance social welfare in the right circumstances. This Article endeavors to show, however, that a particular brand of patent accumulation harms static and dynamic efficiency and that competition laws may serve a prophylactic role in constraining such aggregation. Accordingly, antitrust has long ensured that patentees do not usurp their time-limited exclusive rights to acquire market power beyond the grant of the original patent.

The critical insight is that the timing of patent licensing informs its desirability. *Ex ante* technology transfer—taking place prior to an implementer's design and introduction of an accused device—is presumptively efficient because it diffuses novel engineering insights in

151. Lemley & Melamed, *supra* note 30, at 2178.

152. *See id.* at 2157. This Article disagrees with Lemley and Melamed's conclusion that large-scale PAEs like Intellectual Ventures may be alleviating hold-up problems.

153. *See, e.g.*, FED. TRADE COMM'N, TO PROMOTE INNOVATION: THE PROPER BALANCE OF COMPETITION AND PATENT LAW AND POLICY 14 (2003); *see also* Michael A. Carrier, *Unraveling the Patent-Antitrust Paradox*, 150 U. PA. L. REV. 761, 764 (2002); Gregory N. Mandel, *Proxy Signals: Capturing Private Information for Public Benefit*, 90 WASH. U. L. REV. 1, 23 (2012); Rajnish Kumar Rai & Srinath Jagannathan, *Do Business Method Patents Encourage Innovation?*, 2012 B.C. INTELL. PROP. & TECH. F. 1, 10.

a manner that innovators can profitably use to build new products.¹⁵⁴ Most importantly, ex ante licensing ensures that market prices are competitive in that they reflect the technical virtues of the sold technology.¹⁵⁵ Ex post licensing, however, can be problematic¹⁵⁶ because of lock-in.¹⁵⁷

Once a firm has implemented and sunk capital into a new product design, a patentee can demand a royalty tied to the threat of shutting down the firm's operations rather than to the incremental value of the licensed patent.¹⁵⁸ The severity of this ex post threat depends on the injury that the patentee can inflict through the patent system. An injunction, for instance, can permit hold-up of this nature. *eBay* has made such relief an improbable remedy for PAEs, which is why the International Trade Commission has become a forum of choice for PAEs in light of its granting of exclusion orders comparable to injunctions.¹⁵⁹ As discussed below, PAEs may have means beyond seeking injunctive relief to impose outside threats on their targets ex post.

Nevertheless, the desirability of patent licensing is not as simple as “ex ante is good; ex post is bad,” nor are ex post royalties exceeding the ex ante price invariably inefficient. There are important subtleties to the appropriate economic analysis of such licensing. In particular, a patentee's ability to impose a hefty wallop on licensees in the ex post world does not in itself mean that monopolistic price extractions are inefficient. The law-and-economics literature addressing the effects of property, liability, and nonalienability rules shows that the law's chosen means of protecting ownership rights can impact the ex ante behavior of stakeholders.¹⁶⁰ Specifically, an injunction or a damages award exceeding the parties' subjective value of the property induces ex ante bargain rather than ex post damages proceedings.¹⁶¹ All else equal, ex ante negotiations are superior to those taking place after the fact; thus,

154. See FTC, EVOLVING IP MARKETPLACE, *supra* note 3, at 40.

155. See Scott Morton & Shapiro, *supra* note 28, at 471.

156. *E.g.*, FTC, EVOLVING IP MARKETPLACE, *supra* note 3, at 50–54; see also Scott Morton & Shapiro, *supra* note 28, at 487.

157. See, *e.g.*, *Broadcom Corp. v. Qualcomm Inc.*, 501 F.3d 297, 310 (3d Cir. 2007).

158. See FTC, EVOLVING IP MARKETPLACE, *supra* note 3, at 8.

159. See Mike Heins, *Selling Congress on eBay: Should Congress Force the ITC to Apply the eBay Standard?*, 22 FED. CIR. B.J. 589, 590–91 (2013); Xun (Michael) Liu, Note, *Joinder Under the AIA: Shifting Non-Practicing Entity Patent Assertions Away from Small Businesses*, 19 MICH. TELECOMM. & TECH. L. REV. 489, 507–08 (2013).

160. See generally Louis Kaplow & Steven Shavell, *Property Rules Versus Liability Rules: An Economic Analysis*, 109 HARV. L. REV. 713 (1996) (discussing the different economic effects of property and liability rules).

161. See *id.* at 756–57.

disproportionate ex post damages can be desirable.¹⁶² But that is not true when transaction costs preclude effective bargaining ex ante.¹⁶³ This is the case for many industries in which the patent system currently plays a material role.¹⁶⁴ Insurmountable bargaining costs result from the numerosity, ambiguity, and suspect validity of patents in certain sectors.¹⁶⁵

In short, ex post licensing that results in monopoly—greater than ex ante royalties—is desirable only if it incentivizes parties to bargain ex ante. The problem, however, is that such ex ante technology transfer is not feasible in certain industries.¹⁶⁶ PAEs have zeroed in on this infeasibility to achieve a lucrative business model founded on hold-up. The nature of an industry and the relationship between ex ante and ex post licensing in that setting help in understanding the economics of PAE aggregation.

This discussion sets the backdrop for understanding the economic ramifications of mass-scale accumulation and assertion of IPRs. As indicated above, if NPEs bought and licensed promising patented technologies that did not exist in commercialized products, they would almost certainly promote social welfare. PAE conduct, however, is the antithesis of such efficient aggregation and licensing. This Part concludes by extrapolating some key insights that inform the discussion that follows. Then, to illustrate the economic effect of PAE activities, the next Part explores the consequences of patent accumulation in distinct hypothetical universes.

C. *The Competitive Ex Ante Pricing of Proprietary Technology and Ex Post Hold-Up*

To explore the relative efficiency of concentrated and atomized patent ownership, one must first identify a competitive baseline for measuring the efficiency of outcomes. As applied to the licensing of IPRs, this identification is challenging. Typically, economists equate competitive outcomes with price equaling the marginal cost of a firm's production.¹⁶⁷ Applied to the licensing of technology, marginal cost may be modest once one identifies the relevant parties. When one introduces IPRs granting an exclusive right to practice a claimed

162. See, e.g., Richard A. Epstein, *A Clear View of The Cathedral: The Dominance of Property Rules*, 106 YALE L.J. 2091, 2096 (1997).

163. See, e.g., Guido Calabresi & A. Douglas Melamed, *Property Rules, Liability Rules, and Inalienability: One View of the Cathedral*, 85 HARV. L. REV. 1089, 1106–09 (1972).

164. See Ewing & Feldman, *supra* note 88, at 20.

165. See *id.* at 24.

166. See FTC, *EVOLVING IP MARKETPLACE*, *supra* note 3, at 54–56.

167. E.g., Daniel A. Crane, *The Paradox of Predatory Pricing*, 91 CORNELL L. REV. 1, 33 (2005).

invention, however, the marginal-cost baseline is no longer apt. In some—though by no means all—circumstances, that exclusive right grants the patentee the sustained ability to restrict output or to raise price in a relevant market.¹⁶⁸ In those settings, the “competitive” reference point is one in which the patentee exercises significant market power.¹⁶⁹ This quality complicates the comparison of pre- and post-patent aggregation.

The antitrust issue is whether the patentee can achieve a positive change in market power beyond the level that he enjoyed prior to the scrutinized restraint. The critical time period is prior to commercialization of the technology claimed in the relevant patent because of the absence of capital investment and hence lock-in by potential licensees. In implementing a chosen product design, a firm suffers nonredeemable costs that prevent it from substituting for an alternative design at the same cost that was available prior to investment. That lock-in enables the holder of an IPR to extract greater value than it could have before the potential licensee invested in building its chosen technology.

To explain why lock-in enhances the holder of a potentially infringed patent’s market power, this Article explores what limits exist before third parties implement their claimed technologies. Specifically, what constraints limiting patentees’ power over price *ex ante* cease to exist, or exist only in diluted form, *ex post*?

Several qualities limit patentee power *ex ante*. Envision a downstream innovator (the firm or potential licensee) that has not yet chosen and sunk capital into its next-generation product line. The price that each owner of a relevant patent can demand turns on the value of her claimed technology *vis-à-vis* the next best technological substitute. If a nonproprietary process is available to the firm’s engineers, then the owner of a patent claiming a different technology that performs the same function will have no market power and could not command a price greater than zero. However, even without a substitute for a proprietary technology, three factors limit the price that the patentee can demand.

First, the company may be able to design its planned good so that it does not implicate a particular technology.¹⁷⁰ The ease of its ability to “invent around” the patent limits the other’s value. If an alternative design would be equally appealing to customers and simple to achieve, the patentee could charge no more than a vanishingly small amount.

168. See *Ill. Tool Works Inc. v. Indep. Ink, Inc.*, 547 U.S. 28, 44–45 (2006); Chin, *supra* note 115, at 866.

169. See *Ill. Tool Works*, 547 U.S. at 44–45.

170. See, e.g., *State Indus., Inc. v. A.O. Smith Corp.*, 751 F.2d 1226, 1236 (Fed. Cir. 1985); *cf. Broadcom Corp. v. Qualcomm Inc.*, 501 F.3d 297, 313–14 (3d Cir. 2007).

Second, if an alternate design is either technically infeasible or not appealing to consumers, the patentee may have monopoly power.¹⁷¹ The amount of power depends on the anticipated market value of the new product line. The company would never pay more for a technology than the expected value of the product that features it.¹⁷² Third, the patentee's cost of enforcing its right to exclude limits market power. The average patent case now costs millions of dollars to litigate to judgment.¹⁷³ Where a reasonable royalty for a particular invention would be modest, litigation costs limit enforcement and constrain market power.

This is the *ex ante* world where patent licensing is efficient. Innovative companies building new goods can use state-of-the-art technologies, consumers benefit from superior products, and patentees derive pecuniary returns tailored to the incremental value of their claimed know-how over those of the next-best-available technology.

Still, this state of affairs is imperfect. The expense of realizing one's patent rights deprives some deserving inventors of a monetary reward. No less seriously, the patent system's many imperfections stymie downstream innovators' ability to identify and obtain technical solutions to problems. Many patents claim more than what their inventors actually discovered—especially for means-plus-function claims¹⁷⁴—and the pace of innovation quickly renders many claimed technologies defunct. Nevertheless, holders of outdated patents can, and regularly do, claim infringement. Furthermore, the number of IPRs makes identifying and negotiating with each owner of a patent that reads on a planned good infeasible. In an optimal system, manufacturers of technological products could quickly and affordably identify all patentees who claim technologies reading on their considered product designs, determine whether those patents are valid and would read on those designs, and bargain with each owner for a competitively determined royalty. That aspiration is a world apart from the reality of today's system. Nevertheless, even with today's flawed patent regime, some *ex ante* licensing takes place, and when it does, it is presumptively efficient.

II. PATENT AGGREGATION UNDER VARIOUS CONDITIONS OF OPTIMALITY: AN EXPLANATORY MODEL

This Part explores the economic consequences of patent accumulation. Using a hypothetical example subject to changing

171. See *Broadcom*, 501 F.3d at 314.

172. See Thomas F. Cotter, *Four Principles for Calculating Reasonable Royalties in Patent Infringement Litigation*, 27 SANTA CLARA COMPUTER & HIGH TECH. L.J. 725, 744 n.85 (2011).

173. See *supra* note 119 and accompanying text.

174. See Lemley, *supra* note 17, at 905, 907–08.

assumptions, it illustrates how the welfare effects of patent aggregation are circumstance-dependent.

Consider a downstream innovator, Alpha, which wishes to develop a new-generation product comprising 4000 discrete technical functions.¹⁷⁵ Alpha must combine all 4000 to create its desired good. The great majority—3900—of the requisite technologies are either known in the art or susceptible to independent invention by Alpha’s engineers.¹⁷⁶ One hundred of these functions, however, are cutting-edge and not easily solved in-house. Nevertheless, they are subject to patented solutions, “Tier A” patents, upon which Alpha could draw. If Alpha availed itself of those 100 technologies without securing licenses, it would infringe all of them. That conclusion holds true regardless of whether Alpha copied or successfully solved those technical challenges independently because there is no clean-room defense in patent law.¹⁷⁷ Alpha cannot alter its product design to avoid Tier A patents.

Each of the 3900 remaining technical functions is subject to a potential infringement claim, which may or may not be well-founded. Each of 2000 of those functions potentially implicates a “Tier C” patent, which is of suspect validity. Any Tier C patent has a mere 1% chance that it is valid and that it reads on Alpha’s planned design. Another 1000 of the 3900 functions may infringe “Tier B” patents, which arguably read on more novel aspects of the planned product line’s architecture. Each one has a 30% chance of validly reading on the chosen design.

Each of the 900 residual functions is subject to two competing patented solutions that, though technically distinct, perform perfectly interchangeable functions. No alternative technical solutions are available for those 900 operations. These patents are definitely valid, so in manufacturing its desired next-generation good, Alpha would necessarily infringe 900 patents if it did not obtain licenses.

Alpha could alter its product design to avoid the Tier B and C patents. In other words, it would be possible at modest cost for Alpha to “design around” any of those patents if asserted during the engineering

175. Many technological products combine thousands of discrete technologies, so this is a reasonable assumption. *See, e.g.,* Lemley & Shapiro, *supra* note 6, at 1992.

176. Again, this is a realistic assumption. Independent invention is the norm in most industries in which the patent system plays a material role. Research published in 2012 by the U.S. National Science Foundation shows that only a minority of innovators in all surveyed industries consider patents to be “very important” to their R&D efforts. JOHN E. JANKOWSKI, BUSINESS USE OF INTELLECTUAL PROPERTY PROTECTION DOCUMENTED IN NSF SURVEY 1–2 tbl.1 (2012), available at <http://www.nsf.gov/statistics/infbrief/nsf12307/nsf12307.pdf>.

177. *See* 35 U.S.C. § 271 (2012) (providing no defense for independent invention or unintentional infringement). *See generally* Vermont, *supra* note 30 (discussing whether this aspect of the patent regime makes economic sense).

phase. Alpha could not, however, avoid Tier A or competing patents. They are indispensable to realizing the product that Alpha envisions.

In short, Alpha's proposed future product implicates the following patented technologies:

Alpha's Product Design	
Total number of discrete technologies needed:	4000
Tier A Patents (100% valid) implicated:	100
Tier B Patents (30% valid) implicated:	1000
Tier C Patents (1% valid) implicated:	2000
Functions subject to two competing patents (100% valid):	900

The starting point for analyzing this hypothetical is a world of perfect patent disaggregation where a different patentee has licensing authority to each of the 4900 proprietary technologies. The expected value to Alpha of implementing its next-generation good, free of royalties or damages, is V . The efficient-baseline price for the relevant patents is $P_{A1E} \dots P_{A100E}$; $P_{B1E} \dots P_{B1000E}$; $P_{C1E} \dots P_{C2000E}$; $P_{COMP1E} \dots P_{COMP1800E}$. That sum reflects the price upon which Alpha and each patentee would agree ex ante, which accounts for factors such as the likelihood of invalidity and noninfringement, the expected value of the potentially infringing product, alternative technologies, and design-around feasibility. The royalty that Alpha actually pays each patentee is $R_1 \dots R_{4000}$, where $0 \leq R_1 \dots R_{4000} \leq V$.¹⁷⁸

A. Perfect Aggregation and Zero Enforcement Costs: The Royalty-Stacking Problem

The first step in this analysis is to chart the relative effects of aggregation and disaggregation under idealized circumstances and compare the outcome to the social-welfare optimum. As noted above, begin by assuming complete atomization. Courts unfailingly award damages equal to what the parties would have agreed upon ex ante.¹⁷⁹

Suppose that enforcement (i.e., litigation) costs are zero and that granting the owner of a valid, infringed patent a sum equal to the ex ante market price for that claimed technology enhances welfare.¹⁸⁰ Also

178. Alpha would never rationally pay more in royalties than what it expects to gain by manufacturing and selling the product for which it licensed technology.

179. See *Lucent Techs., Inc. v. Gateway, Inc.*, 580 F.3d 1301, 1324–25 (Fed. Cir. 2009).

180. In other words, assume away imperfections in the patent system that allow inventors to obtain twenty-year exclusive rights over inevitable inventions that were on the cusp of being realized anyway and that competition and other inducements drive independent of IPRs. This assumption also excludes the possibility that patents detract from dynamic efficiency by allowing inventors of quickly outdated technologies to lay claim to future technologies in

assume that Alpha can freely determine which patents are invalid and which, if valid, would read on its future array of goods.

In this zero-transaction-cost environment, Alpha can identify and negotiate with each of $P_1 \dots P_{4900}$ (i.e., all owners of all relevant patents) at no cost. Parties bargain in the shadow of law such that their expectation in eschewing negotiations in favor of litigation sets the range of terms upon which they will rationally agree.¹⁸¹ The only other factors establishing the parties' bargaining range are the parties' walkway prices. For Alpha, that price is $V - \epsilon - [R_1 + R_2 + \dots + R_{4000}]$ —i.e., the expected value of commercializing its desired product minus the royalties paid to other licensors minus epsilon (a vanishingly small amount representing the requisite *de minimis* profit). For each patentee whose opportunity cost in licensing is zero, the minimum price at which the patentee will license is ϵ . Assuming no judicial error, the court would award damages equal to what the parties would have agreed upon without litigation, thus making that “competitive” price the ceiling and floor for the parties bargaining before the fact.

That means that Alpha will acquire licenses to Tier C and B patents at a price less than or equal to its design-around costs, discounted by the probability of invalidity and noninfringement. Thus, the Tier B royalty rate will be thirty times larger than that for Tier C patents. Royalties for those IPRs will therefore be modest.

What of the 1800 “competitive” patents? As each pair of separately-owned competitive patents discloses equally effective solutions to the 900 differing functions, the model of Bertrand competition seems applicable.¹⁸² Price competition between each pair of fungible proprietary technologies will thus produce an equilibrium price equal to marginal cost.¹⁸³ Here, the cost of licensing is zero by assumption, so under disaggregation, Alpha will take its pick of competitive patents for free.

Prices for competitive and Tier A patents, however, will be significantly positive. Each such patent is indispensable. Alpha and each such patentee will negotiate a royalty reflecting V , the expected market value of the design product, and (to a degree) the number of other patents that Alpha must combine to obtain a clearing position for the future product. Because courts would award this amount *ex post*, the parties will be indifferent between contracting *ex ante* and letting the

environments of rapid cumulative innovation. See *supra* Section I.C. for a discussion of what the ideal or “competitive” price means in a market for the licensing of proprietary technology.

181. See Lemley & Shapiro, *supra* note 6, at 2021–22.

182. For a discussion of the Bertrand competition model, see MANFRED NEUMANN, COMPETITION POLICY: HISTORY, THEORY AND PRACTICE 59–61 (2001).

183. See *id.*

courts establish that price *ex post*. By assumption, both avenues are costless and produce the same royalty.

Yet, as explored in the prior Part, the “competitive” price in this environment is a range, rather than a point, due to the market power inherent in a valid patent that covers a valuable product or process. Even making the outlandish assumptions applied here—zero bargaining costs, zero litigation costs, and no judicial error—the ideal outcome will *not* ensue under disaggregation.

The economic relationship between the 4000 discrete technologies needed to make Alpha’s envisioned product is one of complementarity. That means that decreasing the price of any one technology increases the demand for all of the others, and vice versa—the reason being that, in the presence of a property rule or suitably draconian liability rule, Alpha needs licenses to all valid and infringed patents.¹⁸⁴

Economists have long recognized the monopoly problem that emerges when economic complements are subject to diffuse ownership.¹⁸⁵ Because each holder of a patent reading on Alpha’s design can veto the product’s introduction if a property or severe liability rule applies, each one has a monopoly.¹⁸⁶ In exercising that power, however, self-interested patentees will ignore the fact that they are charging higher than a competitive price, which harms all other holders of relevant patents.¹⁸⁷ Economists refer to this phenomenon as royalty stacking or the Cournot-complements problem.¹⁸⁸ Its presence is undesirable because it results in relatively low output and high prices.¹⁸⁹

Even in the absence of transaction costs, litigation costs, and judicial error, the result of diffuse patent ownership in this example is that the price of each of the 100 Tier A patents will exceed what it should be. The surcharge will have one of two negative effects. First, it may bestow a windfall on some or all patentees and cause allocative-efficiency losses in the downstream product market. Second, it may cause the collective price of Tier A patents to exceed the expected value of Alpha’s new product, resulting in a complete loss of value for all stakeholders.

The essential insight here is that there is a loss in net value under disaggregation, meaning that a Pareto improvement through free contract is possible. Specifically, complete vertical integration among

184. When the law protects ownership interests with a property rule, it awards injunctions in the event of an unauthorized incursion. In contrast, under a liability rule, courts will award monetary damages only. *See Mulligan & Lee, supra note 77, at 315.*

185. *Supra* note 148 and accompanying text.

186. *See Lemley & Shapiro, supra note 6, at 2009.*

187. *See id.* at 2010.

188. *Id.* at 2013.

189. *See id.*

the owners of Tier A patents would eliminate the royalty-stacking problem. Assuming the absence of transaction costs, the parties will avail themselves of the opportunity for mutually beneficial exchange. Thus, with free bargaining, it follows that each complementary Tier A patent, $P_{A1} \dots P_{A100}$, will reside under the ownership of a single patentee.

In this model, aggregation of Tier A patents is efficient because it lowers net price and increases output. Crucially, there is no possibility of ex post hold-up because of the assumed absence of judicial error and litigation costs. In other words, no patent aggregator could use the litigation process to impose asymmetric costs on recalcitrant users of technology, inducing them to pay more than the competitive price. Note that aggregating Tier B and C patents would have no effect here because no royalty-stacking problem arises from disaggregation of these patents. For the Cournot-complements problem to emerge, owners of the relevant property rights must have market power. For reasons discussed above, Tier B and C patentees have none under the assumptions of this ideal scenario.

Similarly, separate ownership of the 1800 competitive patents will not create royalty-stacking problems even though any pair of competitive patents may complement another pair of competitive patents reading on a different function because each holder of a competitive patent lacks market power.¹⁹⁰ Aggregating these substitute patents, however, would be anticompetitive. If one entity acquired those 1800 patents—or even just a single pair reading on one function—the price constraint posed by competition would evaporate. Prices would rise to the same level as those of Tier A patents, a price level appropriate only for proprietary technologies for which no substitutes exist. Between one entity holding all 1800 competitive patents and 900 entities each holding a pair of patents reading on one function, the former is preferable because the Cournot-complements problem is present in the latter setting.

In this example, the effects of patent aggregation depend on the economic relationship between the patents acquired. In the presence of patentee market power, aggregating complementary inputs needed to manufacture a downstream product enhances welfare, but combining substitute patents detracts from it. These basic principles explain why horizontal acquisitions generally attract antitrust scrutiny and vertical ones typically do not.

190. See IP LICENSING GUIDELINES, *supra* note 116, at 4.

B. *Introducing Modest Transaction and Litigation Costs*

In practice, one cannot expect costless bargaining, free litigation, and no judicial error. Moving away from the ideal case toward more realistic assumptions, this Article will introduce positive transaction and litigation costs but continue to suppose that courts can unfailingly determine the “competitive price.” Although the judiciary endeavors to calculate patent damages in a manner reflecting the ex ante technical contribution of the infringed patent,¹⁹¹ imputing perfection to that process goes too far. Nevertheless, adhering to that assumption isolates the role of transaction and litigation costs on the economics of patent aggregation.

Relaxing the assumptions of costless bargaining and free litigation profoundly affects the analysis. One effect is patentee undercompensation because the private cost of enforcement may exceed the expected value of filing suit.¹⁹² Patent accumulation may in theory ameliorate this shortcoming by achieving scale economies in litigation, thus reducing the average cost of patent enforcement. Aggregation, as before, could potentially reduce the royalty-stacking problem and diminish transaction costs required for the downstream firm to secure a clearing position. At the same time, the countervailing problem of patentee overcompensation and downstream hold-up is avoided by virtue of the assumed absence of judicial error and because litigation costs are symmetric. This Article will now explore the bases for these conclusions.¹⁹³

1. Patent Atomization and the Undercompensation Problem

Once more, the initial state of affairs is one of perfect disaggregation. Relax the assumption of zero transaction costs to the point that the cost of Alpha’s bargaining with any one patentee is modest—positive, but easily surmountable. Thus, Alpha can readily,

191. *E.g.*, *Ga.-Pac. Corp. v. U.S. Plywood Corp.*, 318 F. Supp. 1116, 1120 (S.D.N.Y. 1970) (calculating damages by reference to “[t]he amount that a licensor (such as the patentee) and a licensee (such as the infringer) would have agreed upon (at the time the infringement began) if both had been reasonably and voluntarily trying to reach an agreement”), *modified*, 466 F.2d 295 (2d Cir. 1971).

192. The conclusion that a patentee will file suit when the expected value of doing so is positive depends on the assumption that the patentee is risk neutral. If the patentee is risk averse, the undercompensation problem will worsen.

193. Two related matters are worthy of note. First, in a world with positive transaction costs but without litigation costs and judicial error, no private licensing contracts would take place. Downstream innovators would copy or independently invent, and the courts would efficiently set the price of use. Second, if litigation costs were positive (and symmetric) but transaction costs and judicial error were again absent, no litigation would take place, and the parties would efficiently reach terms. Neither of these situations exists outside of academic models.

albeit at positive expense, identify any relevant patent, its owner, and the likelihood of validity and infringement. The absence of judicial error remains, but litigation costs are now positive. Assume that the cost to a patentee of enforcing its IPR and the cost of defending such a lawsuit, “C,” is constant across the universe of patents. Litigation costs are therefore symmetric.

The expected damages in bringing suit are D_A , D_B , and D_C for Tier A, B, and C patents respectively. The expected damages in suing on any of the 900 competing patents are zero. $D_B = 30D_C$. The relationship between the return and private costs of suing is $D_A > D_B > C > D_C$. Thus, in the event that Alpha infringes these patents, only the owners of Tier A and B patents would sue. As the cost of enforcing their rights exceeds the expected damages, owners of Tier C patents will not sue. That fact makes the price of a license for Alpha to Tier C patents zero under disaggregation.

Under atomization, the first shortcoming is patentee undercompensation. In the hypothetical, Tier C patent owners as a group receive suboptimal rewards. At the individual level, twenty holders of valid and infringed Tier C patents are deprived of their due return, though the remaining Tier C patentees rightly get nothing. If patentees are risk neutral, it is irrelevant to social welfare whether (a) each Tier C patentee gets a sum equal to 1% of the inventive contribution or (b) the twenty holders of valid and infringed Tier C patents get 100% of the incremental technical benefit back, and the remaining 1980 receive nothing.

So, there is an under-reward problem. Litigation costs are to blame for this, not concentration of patent ownership. All manner of legal rights are underenforced due to real-world enforcement costs. Lower assertion of legal rights is generally desirable compared to what the proper rate of enforcement would be in an ideal universe of zero transaction costs because filing a lawsuit implicates all manners of social and private costs. This may render lesser enforcement and undercompensation more desirable than the first-best paradigm.

Yet, the cost of enforcement—C, in this hypothetical—is the average cost of asserting a patent only if litigants enforce one at a time. A patent aggregator may be able to achieve scale economies in assertion. Many of the activities involved in litigating a case on one patent can overlap with other patents, so pooling several patents into one case may eliminate duplicative expense. Suppose that adding more patents to a case does not add any costs beyond those involved in litigating the first patent. In other words, suppose that there are perfect scale economies in patent enforcement. The average cost of patent assertion in a case is then C/n , where n is the number of patents asserted in the case.

Although $C > D_C$, it does not follow that $C/n > D_C$ when $n > 1$. In this hypothetical, if a patent accumulator purchases ten Tier C patents, the average cost of enforcement may be less than the expected damages. It follows that aggregation in this situation may remedy undercompensation by holders of patents that were unprofitable to assert individually in light of the litigation costs implicated in doing so.

Note, however, that the problem of patent underenforcement in this hypothetical is modest—limited to patents of dubious validity and infringement. In this example, as in the real world, one is likely to assert strong IPRs when they read on valuable products, making the danger of inadequate inventor compensation modest.

2. Positive Litigation Costs and the Question of Patentee Overcompensation

In the simple case of no litigation costs and no judicial error, patentees could not extract more than the marginal technical contribution of their proprietary method or product over the next best alternative. Courts would not award them a larger amount of money in damages, and they could not inflict harm on a patentee separate from or beyond that damages amount. By assumption, the cost of defending a lawsuit was zero.

Assuming no judicial error, does the calculus change when one introduces positive litigation costs? The answer is no, due to the supposition that litigation costs are symmetric. The cost to Alpha of defending, and to a patentee of bringing, a lawsuit is C . However, if a patent aggregator's litigation costs were lower than Alpha's, Alpha would rationally settle for more than the ex ante competitive value of the patent. This is the first insight into the possibility of hold-up and patentee overcompensation.

3. Disaggregation and Wasteful Bargaining Costs

Now consider the transaction-cost question. Here, the shortcoming associated with dispersion of the relevant patents is plain. To secure licensing permission, Alpha must identify and bargain with each of 3100 patentees (Alpha needs to solve 900 technical functions as to each of which there are two competing patentees, but because courts would award reasonable royalties of zero for them, the patentees will not assert them). At that scale, even bargaining costs that are vanishingly small at the individual level quickly become preclusive. If " TC_m " represents the transaction costs of bargaining with a single patentee, m , it is a reasonable assumption that $TC_1 + TC_2 + \dots + TC_{3100} > V$. In other words, the transaction costs involved in securing licensing permission over the full universe of relevant patents exceed the expected value of marketing the next-generation product. If the relevant IPRs remain

subject to diffuse ownership, Alpha's choice is either to abandon the project or to infringe and deal with any lawsuits after the fact.

Here, the benefits of patent aggregation on reducing transaction costs are clear. By amassing complementary patents, a patent accumulator would reduce transaction costs by creating a one-stop shop for licensing. As in the simple hypothetical above, the aggregator would also eliminate the royalty-stacking problem.

Again, aggregating the competing patents would eliminate competition, creating market power where there was none. What if a single aggregator were to combine all of the 3100 complementary patents and only one patent covering each of the 900 functions subject to competing patents? Might there still be harm to competition? In offering a blanket license to its 4000-patent portfolio (i.e., by bundling), the aggregator might seem to eliminate the competitive constraint that the 900 patents it does not hold imposed on the pricing for the 900 interchangeable patents in its portfolio. Price theory suggests that such monopoly leveraging is impossible in fixed-proportions tying of this kind.¹⁹⁴ If anticompetitive effects nevertheless arose, a solution would be to impose a duty under the antitrust laws to preserve independent licensing. Such a solution might be to award discounts to the blanket license. This would preserve competition while facilitating the transaction-cost benefits of combining complements.

C. Real-Life Complications: Judicial Propensity to Err and High Litigation Costs

In the real-world case, patent aggregation is most complex and potentially problematic. The negative consequences associated with certain forms of IPR aggregation here flow from its interaction with three features that define the innovation process and technology-licensing markets: litigation costs in the millions of dollars; judicial error, specifically, unpredictable patent-infringement damages awards that exceed competitive, ex ante benchmark royalties;¹⁹⁵ and high bargaining costs.

194. See Daniel A. Crane & Joshua D. Wright, *Can Bundled Discounting Increase Consumer Prices Without Excluding Rivals?*, 5 COMPETITION POL'Y INT'L 209 (2009), available at http://ssrn.com/abstract_id=1632968 (arguing that monopolists cannot charge a higher price for a bundle simply because it contains a monopoly item, as a rational monopolist will already have charged the profit-maximizing price for the item). *But see* Einer Elhauge, *Tying, Bundled Discounts, and the Death of the Single Monopoly Profit Theory*, 123 HARV. L. REV. 397, 400–01 (2009) (arguing that fixed-proportions tying must combine with a strong positive demand correlation and a lack of substantial tied foreclosure in order for monopolists to lack leverage).

195. See Lemley & Melamed, *supra* note 30, at 2143–44.

1. Background Conditions Necessary to Understand the Effects of Aggregation

First, the private cost to a party of litigating patent claims to judgment is typically in the realm of \$5 million.¹⁹⁶ Enforcement costs of that magnitude create a de facto fair-use aspect to the modern patent system because it rarely pays for holders of weak (likely invalid) patents, which arguably read on peripheral aspects of an accused device, to file suit. The expected value of doing so is likely negative, except for strong patents that lay colorable claim to a lucrative product. This dynamic undercompensates some upstream patentees and permits a certain degree of free-riding downstream by those commercializing technology.¹⁹⁷

The extent to which this is problematic depends on the probable validity of the unenforced patents and the prevalence of independent downstream invention. Likely, a certain degree of underenforcement is socially desirable given many patents' chronic invalidity and that the lion's share of innovation that gives rise to marketed technology is not copied but independently realized. Today, there appears to be a public-goods benefit to incomplete enforcement of weak patents.

Second, damages awards for infringement fluctuate wildly, especially in front of juries.¹⁹⁸ Since *eBay*, courts award injunctions less often, and they are especially reluctant to grant such relief to NPEs.¹⁹⁹ Nevertheless, the probability that a court will enjoin a firm that an NPE sued for infringement is greater than zero.²⁰⁰ But a remedy need not be equitable to devastate a defendant's bottom line. The median damages

196. See AUVIL & DIVINE, *supra* note 119, at 35.

197. Cf. Peter Lee, *The Accession Insight and Patent Infringement Remedies*, 110 MICH. L. REV. 175, 208 (2011).

198. See, e.g., Christopher B. Seaman, *Reconsidering the Georgia-Pacific Standard for Reasonable Royalty Patent Damages*, 2010 BYU L. REV. 1661, 1665–66.

199. See *eBay Inc. v. MercExchange, L.L.C.*, 547 U.S. 388, 391, 394 (2006) (holding that injunctive relief is not automatic in the event of patent infringement, but it depends on the traditional four-factor test in equity). Lower courts quickly got the message. See also, e.g., *Amado v. Microsoft Corp.*, No. SA CV 03-242 DOC, 2007 U.S. Dist. LEXIS 96487, at *31 (C.D. Cal. Mar. 13, 2007), *aff'd in part and vacated in part*, 517 F.3d 1353 (Fed. Cir. 2008); *Paice LLC v. Toyota Motor Corp.*, No. 2:04-CV-211-DF, 2006 U.S. Dist. LEXIS 61600, at *17 (E.D. Tex. Aug. 16, 2006), *aff'd in part and vacated in part*, 504 F.3d 1293 (Fed. Cir. 2007); *z4 Techs., Inc. v. Microsoft Corp.*, 434 F. Supp. 2d 437, 439 (E.D. Tex. 2006).

200. Post-*eBay*, courts have sometimes awarded NPEs permanent injunctions. See, e.g., *Joyal Prods. v. Johnson Elec. N. Am., Inc.*, No. 04-5172, 2009 U.S. Dist. LEXIS 15531, at *43 (D.N.J. Feb. 27, 2009), *aff'd*, 335 Fed. App'x 48 (Fed. Cir. 2009); *Commonwealth Scientific & Indus. Research Org. v. Buffalo Tech. Inc.*, 492 F. Supp. 2d 600, 607–08 (E.D. Tex. 2007); see also *Callaway Golf Co. v. Acushnet Co.*, 585 F. Supp. 2d 600, 621 n.28, 622 (D. Del. 2008) (granting a permanent injunction even though the patentee was no longer making products incorporating the infringed technology), *aff'd in part, rev'd in part, and vacated in part*, 576 F.3d 1331 (Fed. Cir. 2009).

award from 2007 to 2012 was \$4.9 million, but there were three awards greater than \$1 billion in 2012 alone.²⁰¹ Many outlier judgments have little apparent relationship to the marginal benefit that the infringed patent offered over alternative technologies *ex ante*, but they often seem to track the infringing device's market value. Thus, although one of the *Georgia-Pacific* factors seems to track the efficient benchmark of *ex ante* licensing, awards deviate from that amount in practice. A particular oddity of the damages-calculation process responsible for this phenomenon is that, after finding that the patent is valid and infringed, the factfinder must assume that, in negotiating *ex ante*, the licensor and licensee would have presumed that the probability of validity and infringement was 100%.²⁰² That is an unrealistic account of real-life negotiations *ex ante* and an economic mistake.²⁰³

It should be no surprise to learn that juries and judges err. As the awards occupying the upper spectrum of damages represent a material portion of even successful companies' profits, the prospect of an uncertain damages sum is unnerving. It is not rare for leading innovators to settle pending patent litigation for eight- or even nine-figure amounts.

Third, transaction costs are not merely high but are often fatal to *ex ante* licensing.²⁰⁴ Outside of the biopharmaceutical and chemical industries, technology products typically implicate thousands of discrete technical functions. Such goods suffer a concomitant vulnerability to an equal number of separate claims of patent infringement. Illustratively, RPX Corp., a defensive patent-buying fund, has concluded that more than 250,000 active patents are relevant to contemporary smartphones.²⁰⁵

Factors beyond the sheer number of patents drive preclusive bargaining costs. Vague claims, indeterminate scope, and questionable validity characterize many patents outside of the life sciences.²⁰⁶ The sheer number and obscurity of patents in technology industries mean that innovators today typically ignore patents altogether in designing

201. PWC, 2013 PATENT LITIGATION STUDY: BIG CASES MAKE HEADLINES, WHILE PATENT CASES PROLIFERATE 3, 5, available at http://www.pwc.com/en_US/us/forensic-services/publications/assets/2013-patent-litigation-study.pdf. With respect to outlier damages on the high end, the Federal Circuit often reduces them on appeal or the parties settle for significantly less than the amount awarded. *Id.* at 3.

202. Lucent Techs., Inc. v. Gateway, Inc., 580 F.3d 1301, 1325 (Fed. Cir. 2009).

203. See Lemley & Shapiro, *supra* note 6, at 2019–20. But see Doug Lichtman, *Understanding the RAND Commitment*, 47 HOUS. L. REV. 1023, 1040–41 (2010) (arguing that the assumption of validity and infringement is necessary to compensate the patentee for incurring the risk of assertion).

204. See Lemley & Melamed, *supra* note 30, at 2149 n.140.

205. RPX CORP., *supra* note 13, at 59.

206. Lemley, *supra* note 17, at 930–31.

and developing new products.²⁰⁷ The transaction costs needed to secure freedom of operation *ex ante*—before firms devote capital to marketing a chosen product line—are prohibitive. Consequently, innovators today generally invent independently of IPRs and deal with any infringement claims after the fact.²⁰⁸ *Ex ante* patent licensing typically takes place only when a patent is prominent and indispensable to implementing a particular good or in the rare case where it offers a solution to an otherwise intractable problem.

That dynamic is crucial for understanding the effects of patent aggregation in the real world. Now, return to the hypothetical example of Alpha, incorporating the preceding three features of the contemporary patent system. The analysis begins, once more, with atomization. The welfare effects of patent accumulation in this realistic scenario depend heavily on the likelihood of patent validity, the presence of *ex ante* design alternatives, and the timing of the patent assertion. Recall that the key performance metric is the “competitive” deal that parties would strike *ex ante* in a low-transaction-cost setting, where the prospect of design-around, the expected value of the proposed new technology product, the downstream technology firm’s alternative investment options, competition from substitute patents, and countersuit risk between operating firms all cabin patentee market power.

2. Efficient Aggregation: Tier A Patents

A situation in which aggregation is not only efficient given realistic assumptions, but where the fact or threat of *ex post* hold-up can also serve a desirable function is illuminative: consider Tier A patents. These are not only valid; they can solve Alpha’s engineering challenges. Alpha can either copy their teachings or attempt to solve the problems that those patents solve independently. Either way, Alpha will infringe, though in the former case the lack of a license would translate into treble damages for willful infringement and a possible injunction.²⁰⁹ In the latter instance, outlier damages and a possible injunction are real dangers. Alpha thus has a powerful incentive to secure licensing authority *ex ante*.

a. The Problematics of Hold-Up and Disaggregation

In the event of infringement, each Tier A patentee could hold up Alpha. In securing an injunction or credibly threatening to obtain one, each patentee would lay claim to the value of Alpha’s entire product, not just the subcomponent on which the asserted patent reads. If the

207. *Id.* at 934.

208. *Id.* at 934–35.

209. 35 U.S.C. §§ 283–84 (2012).

court erroneously awarded excessive damages, the economic effect would be similar. In either event, the sum that Alpha will rationally pay no longer reflects the ex ante contribution of the infringed technology; rather, it reflects the harm that a Tier A patentee can inflict after the fact. As the latter amount exceeds the former, Tier A patentees can extract supracompetitive royalties—sums exceeding the efficient ex ante benchmark.

Note, however, that a single patentee cannot use litigation costs to inflate further the settlement amount that Alpha would pay ex post. If the plaintiff and defendant experience identical costs, “C,” then a Tier A patentee’s threat to impose a cost of C on Alpha carries an equal cost for the plaintiff, and thus simply expands the parties’ bargaining range. For instance, if the expected damages from going to trial on a Tier A patent are \$25 million and the costs of litigation are \$5 million for both the plaintiff and the defendant, a bargaining range exists between \$20 and \$30 million if the parties are risk neutral. The patentee is as likely to settle for less than the damages amount as Alpha is to settle for more. Furthermore, because IPR ownership is atomized, the Tier A patentee cannot threaten to inflict losses via serial assertion to punish Alpha for recalcitrance.

Nevertheless, the amount that Alpha is likely to pay each Tier A patentee ex post is greater than the ex ante benchmark amount. Is this problematic? Generally it would be, but not here. In this situation, economists typically recommend using a property rule to protect an entitlement. Tier A patents are definitely valid and infringed, but the courts have limited ability to calculate accurately the appropriate measure of damages. The parties have superior information about the value that they respectively place on the claimed invention and its role in the new downstream product. The law should therefore induce parties to bargain before the fact by imposing a disproportionately high penalty on an entity invading an entitlement without permission. An injunction or inflated damages award carries the same effect—either remedy makes it unprofitable for a party to appropriate unilaterally another’s property right, thus inducing ex ante bargain. Such voluntary contracts produce superior results.

But this conclusion raises three important issues. First, is ex ante bargain necessarily better here? The fact that Alpha will rationally seek permission ex ante does not ensure that the parties will actually agree to the idealized “efficient” or “competitive” benchmark price. That may seem counterintuitive since this Article defines that metric by the terms upon which the parties would have agreed ex ante as opposed to ex post. The complication lies in the feedback effect from the parties’ expectations in eschewing ex ante negotiations and instead litigating ex post. As mentioned, people bargain in the shadow of law.

If the courts will award the owner of each Tier A patent excessive damages of, say, \$100 million after the fact, does that mean that each such patentee will refuse to license *ex ante* for less than that amount? The answer is no because choices still exist *ex ante* that evaporate *ex post*. At the planning stage, Alpha is under no obligation to press ahead in its planned product design. It could invest its capital in an alternative product not implicating the Tier A patents, thus denying the owners of those IPRs a licensing opportunity. Alpha and Tier A patentees are both better off if they negotiate a mutually satisfactory deal. Even here, the choice constraint limits *ex ante* royalties.

Second, the conclusion that harsh *ex post* penalties efficiently induce *ex ante* bargaining only holds true if transaction costs are surmountable. In practice, they may not be, especially when patent ownership is atomized. If Alpha simply cannot identify and negotiate with the holder of every Tier A patent, then injunctive relief or damages greater than *ex ante* royalties would be inefficient—a form of undesirable hold-up. The point here is that injunctions and disproportionate damages awards are punitive—designed to deter wrongful conduct. But in the presence of high transaction costs, failure to obtain licenses *ex ante* is not wrongful, it is inevitable.

Third, the Cournot-complements problem discussed above still applies in the presence of disaggregation. The *ex ante* royalty for each Tier A patent, as agreed upon in a market, will be larger under atomization than under concentrated ownership. If a different firm owns every such patent, none of those companies will consider that insisting on higher royalties may, combined with other high prices charged by other patentees, scupper the entire project by rendering negative the expected value of the product design to Alpha.

b. Desirable Aggregation of Valid Patents

Under disaggregation, the transaction costs involved in identifying and negotiating *ex ante* with the 100 Tier A patentees may sully the entire project if Alpha perceives that the damages risk is too severe. The same may be true if, ignoring the positive externalities attendant upon its pricing decision, each Tier A patentee charges more than it should. Then, the total royalties obligation may swamp the benefits to Alpha of proceeding with its project, thus leaving Alpha and all Tier A patentees worse off.

Patent accumulation may solve both deficiencies. If an aggregator acquired all Tier A patents, the result would be reduced transaction costs for Alpha and a lower overall price due to the elimination of Cournot-complements effects. However, that positive conclusion rests on the critical assumption that Alpha must know or be realistically capable of learning about the Tier A patents and who owns them. If a

firm acquires all such patents and actively seeks to license them to downstream technology firms building next-generation products, an unambiguous increase in efficiency results. Conversely, if an aggregator combined patents and affirmatively invested in concealing them, it would aggravate rather than remedy the royalty-stacking problem and hold-up threat associated with IPR disaggregation in high-transaction-cost environments.

Issues of concealment and strategic hold-up aside, might there be an antitrust problem associated with the assignment of all Tier A patents to a single owner? The answer is no. By definition, every such patent is valid and infringed, and each is necessary to make Alpha's desired new product a reality. The Tier A patents are economic complements rather than substitutes, and by assumption, each would be enforced regardless of who owns it. Given those assumptions, a fixed amount of monopoly power flows from the original Tier A patentee to the assignee aggregator.

Thus, aggregation is generally desirable for complementary patents that are valid and infringed. Such IPRs are necessary inputs in the downstream commercialization process, so the public policy question is how to ensure their licensing at the lowest social cost and at a price reflecting their ex ante value. Dispersed ownership of such patents hinders that goal, while aggregation in the hands of a firm focused on licensing ex ante (albeit under threat of ex post suit) is desirable. This holds true under real-life assumptions of high transaction costs, judicial error, and expensive litigation. That conclusion, however, depends on assertion of the valid, infringed patents and on downstream implementers of technology identifying those patents in the design phase ex ante.

3. Problematic Aggregation: Tier B & Tier C Patents

In the real world, IPRs bearing the qualities of Tier A patents are in the minority. Many patents, and especially those involving business methods and computer-implemented processes, are of uncertain validity and scope. In the parlance of the hypothetical exercise of this Part, Tier B and C patents represent such IPRs. What does the disaggregated world of Tier B and C patents look like, given realistic assumptions of high transaction costs, judicial error, and multimillion-dollar litigation costs?

a. The Social-Welfare Benefits of Limited Weak-Patent Assertion

The answer is limited enforcement. Tier C patents, in particular, will sit dusty on shelves because no owner of such a standalone patent would rationally spend millions of dollars enforcing a dud right. After

all, each one has a 99% chance that the court will find it invalid or not infringed. From a public policy perspective, this might be somewhat problematic; however, when downstream innovators have no need to rely on such patents' teachings—when in-house engineers can readily solve the technical problem that the patent purports to address—the underenforcement has little to no effect on long-run consumer welfare. To the extent that certain patents neither result in consumable technology reaching the market nor inform follow-on innovation, they make a minimal contribution to society. That conclusion is magnified when the PTO should not have granted the patent on account of its obviousness, invalidity, nonutility, or insufficient disclosure.

What of the owners of Tier B patents? If such patentees tried to assert their rights *ex ante*, they would enjoy minimal pricing power because Alpha can, at modest cost, design around any asserted Tier B patent, thus avoiding any infringement claim. Informing Tier B patentees of that fact, Alpha will either take a license at a low royalty that properly reflects the *de minimis* contribution that the Tier B patents make *vis-à-vis* other technological designs or it will eschew a license and slightly alter its design.

Ex post, however, some Tier B patentees may more effectively assert their rights. One might question why Alpha would expose itself to this risk knowing the unpredictability of patent damages and the price of litigation. The answer lies in the realistic assumption that transaction costs are preclusive *ex ante*. It would make no economic sense for Alpha to identify and negotiate with 1000 Tier B patentees. While those Tier B patentees who do sue after the fact when Alpha's product is successful may be able to extract greater than *ex ante* royalties, three factors temper their ability to do so. First, each such patentee must spend \$5 million to assert its right with the knowledge that there is a 70% chance that it will recover nothing. Second, due to disaggregation, no such patentee can pool the risk of loss among a portfolio of patents whose risk profiles are not correlated, so they are likely risk averse. That makes Tier B patentees even less likely to file suit. Third, to the extent that a Tier B patentee competes in a product market with Alpha, filing suit would invite a patent-infringement countersuit from Alpha.

The combined effect of these features is to limit enforcement. Some lawsuits take place, and Tier B patentees as a group are technically undercompensated. Nevertheless, the absence of copying and failure of such patentees to license *ex ante* and thus to commercialize their patented insights makes this limited enforcement of mild concern at worst and socially beneficial at best. In short, disaggregation generates a public-goods benefit, taking the form of weak-patent underenforcement.

This leads to the central concern of this Article: strategic patent aggregation, followed by *ex post* assertion, founded on generating

substantial hold-up power. IPR accumulation can harm social welfare by allowing an aggregator to command substantially greater royalties than dispersed owners of the relevant patents could have obtained. As these patent acquisitions generate otherwise absent market power, causing prices to exceed the efficient ex ante benchmark, they may generate antitrust concerns without countervailing justifications. In certain cases of PAE hold-up, such justifications are likely elusive.

b. Anticompetitive Patent Aggregation of Extremely Weak Patents

This Subsection begins with the most extreme case: Could a PAE extract significantly greater than ex ante royalties by amassing IPRs as weak as the Tier C patents in this Part's illustrative example? It is important to begin with this hard question because the efficiency and antitrust cases against patent accumulation are strongest when an aggregator can realize monopoly power ex post that did not exist ex ante. This analysis demonstrates that a patent aggregator may amass individually worthless patents of dubious quality, yet command extraordinary sums for a license to its portfolio. How does this straw-into-gold alchemy work?

Envision a firm versed in the idiosyncrasies of today's patent system. It understands that ex ante licensing in technology-transfer markets, though efficient, has limited worth from a patentee's perspective because several factors limit an IPR-holder's power over price. These include licensee design-around options and investment alternatives. It knows that, ex post, a prospective licensee has locked into its new product line and thus abandoned those previously available choices. It also knows that this sunk investment infuses likely valid and infringed patents with considerable market power, but that its impact on individually weak patents is more modest because the cost of assertion is justifiable over a single IPR only if the odds of recovery are attractive. The firm appreciates further that the owner of a potentially infringed patent, be it strong or weak, may not sue if it competes in the same market as the alleged infringer. Defensive portfolios owned by operating companies and covering rivals' products abound in high-technology markets, so one suit begets another in response.

Out of this milieu, the firm eyes an opportunity. First, it bypasses any countersuit constraint by adopting a business model that does not practice any technology. Such companies, known as NPEs, are invulnerable to patent-infringement countersuit. They are also tailor-made for relatively cheap litigation because their exposure to discovery costs is modest. Second, the firm (now NPE) identifies existing or soon-to-be-realized products that are lucrative. These goods become its targets. Third, the firm amasses many weak patents that have some

tenuous relationship to those products. Because the ex ante market value of such IPRs is minimal, the NPE can buy those IPRs at low cost. Fourth and critically, the firm abstains from approaching prospective licensees until they are actively marketing the products that the NPE claims infringe on its patents. This quality transforms the NPE into a PAE. Indeed, some prominent PAEs invest in concealment.²¹⁰ Only then does the PAE threaten its targets with serial litigation and catastrophic damages unless they pay exorbitant amounts, typically many multiples of the sums that the PAE spent to acquire the asserted IPRs.

This account describes the approach that PAEs often take, but it does not explain how a PAE's threat is credible. *How*, precisely, can an aggregator of weak patents convince an operating company to part with tens or even hundreds of millions of dollars? The answer lies in subjecting a prospective licensee to a cost far exceeding the ex ante competitive baseline royalty. The essential condition for anticompetitive aggregation of non-substitute patents is the creation of an unavoidable threat. If PAEs credibly threaten prospective licensees with devastating costs, regardless of how the targeted firms conduct their business processes or from whom else they acquire patent licenses, then patent aggregation can facilitate hold-up, even with patents of nugatory individual worth.

This point raises a seeming contradiction. A patentee endangers an accused infringer's product if its patent is valid, infringed, and reads on so central a component of the product that the claimed technology is the basis for consumer demand. In that situation, a serious threat exists to the potential licensee because the legal process will give the IPR owner a potentially draconian remedy. Yet if a patent is invalid, pertinent if at all only to a peripheral aspect of an accused device, and ultimately not infringed, then the law entitles its holder to nothing. How, then, could a PAE get something by asserting it? The answer is that its hold-up ability emanates from judicial error, litigation costs, and above all obscurity. A PAE can achieve this ability by taking advantage of shortcomings in the patent system through aggregation, and exacerbating the problem by concealing the extent of its patent holdings.

The threat that the owner of many weak patents can present to a potential licensee takes the following forms: (i) an injunction; (ii) a catastrophic damages verdict; (iii) large litigation costs; and (iv) a combination of (i)–(iii). To inflict the first two forms of injury, a PAE must actually win, which is why the owner of a small number of patents cannot viably threaten a downstream technology company. But if a

210. See *infra* note 287 and accompanying text.

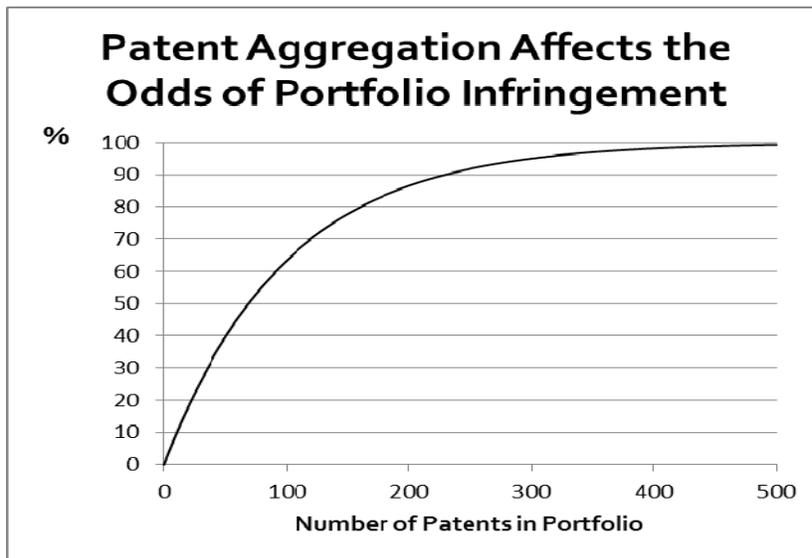
company can acquire a practically inexhaustible supply of such IPRs, it may impose a substantial hold-up threat.

Return to the Alpha hypothetical. A PAE only needs to enjoin the innovator, Alpha, once for Alpha to lose the entire value of its new product design. It is no solace that a PAE may lose on forty patent claims before ultimately prevailing on one. If the injunction's hold-up value exceeds the expected litigation costs in securing it, then it will be rational for a risk-neutral PAE to persevere in pressing losing patent claims until it finally hits big. Moreover, as PAEs are invariably repeat players, game theory suggests that it may be rational for them to litigate aggressively in the hope of eventually securing a goldmine judgment, even if the expected value of doing so with respect to one prospective licensee is negative. If that lost income translates into superior hold-up ability against other targets—if its investment in building an aggressive reputation is sufficiently valuable—a PAE would be justified in losing money to make an example of a prominent technology firm that refuses to play ball.

Suppose, then, that a PAE observes the space within which Alpha operates and takes note of the latter's profitability. It sees that Alpha is developing a promising, next-generation product line. At that stage, the PAE could acquire licensing authority to patents it considers relevant to the announced design, approach Alpha to present its proprietary technology, and negotiate an appropriate license. Instead of doing so, it waits until Alpha has built and is successfully marketing its new good. The PAE then springs into action, scouring the marketplace for cheap patents that arguably read on some element of Alpha's new product. It keeps its purchasing campaign secret from Alpha until it has acquired a critical volume of weak patents. To illustrate, suppose that it amasses one-quarter of all Tier C patents. Only then, having built a wall of individually shaky but collectively formidable IPRs around the new product, does the PAE approach Alpha. Instead of offering a price tied to the *ex ante* competitive benchmark— $P_{C1E} + \dots + P_{C500E}$ —it demands far more: say, half the market value of Alpha's product, V .

Surveying the quality of the patents that the PAE presents, Alpha asks why it should pay so much. The PAE threatens that the alternative is a series of lawsuits until it obtains an injunction, at which point it will demand $V - \epsilon$ as the price of allowing Alpha to continue marketing its good. Alpha realizes that, although it would have a 99% chance of prevailing against a single Tier C patent, its odds become less favorable as the number of patents-in-suit increases. Against an onslaught of ten Tier C patents, Alpha would face an almost 10% chance of being

enjoyed.²¹¹ The expected cost of defending that first wave alone would therefore be $C + V/10$,²¹² likely vastly larger than the competitive benchmark royalties for the respective patents in the portfolio. Crunching the numbers, Alpha realizes that it nearly certainly infringes at least one valid Tier C patent in the PAE's portfolio. The targeted patent aggregation, even of junk patents bearing an independent 1% chance of being valid and infringed, creates a real hold-up threat as indicated in the following graph:



The preceding conclusion assumed that a court would definitely enjoin Alpha if the PAE prevailed on an infringement claim. In the post-*eBay* world, it is difficult for PAEs to obtain injunctions, though it is not impossible.²¹³ The hold-up threat, however, is not contingent on the nuclear remedy of an injunction. That is merely the clearest case, and a sufficiently high damages amount—in this hypothetical, any amount equal to or exceeding V —carries the same effect.

If injunctive relief is unavailable, the hold-up threat depends on two contingencies: (i) the PAE must succeed on at least one Tier C patent claim and (ii) the factfinder must erroneously award damages significantly greater than the appropriate ex ante benchmark. How likely is it that the second event will materialize with respect to patents

211. To be precise, there is a 9.56% chance that Alpha will infringe at least one of the ten patents.

212. C is the cost of defending the lawsuit, which in the real world would be several million dollars.

213. See *supra* notes 199–200 and accompanying text.

as weak as the illustrative Tier C patents here? The answer is very likely.

Under the rules governing reasonable-royalty determinations, factfinders must assume that the *ex ante* probability of validity and infringement was 100%.²¹⁴ Applied to this hypothetical, a jury would have to assume that the Tier C patent was definitely valid and infringed before the fact, thus overstating the economic value of the IPR one-hundred fold. That overvaluation enables it, at a minimum, to stake a claim to a pecuniary sum from Alpha that exceeds the competitive *ex ante* royalty benchmark.

That level of damages inflation flows from a substantive flaw in the law governing the calculation of reasonable royalties. Juries and judges, however, are likely to err in identifying and accounting for the economic phenomena surrounding *ex ante* negotiation, including design-around, substitute technologies, the expected market value of the envisioned product design, and so on. The prospect of error in the damages calculation is particularly acute in this setting because the technological complexity of the claimed invention, its role in the accused device, and the idiosyncrasies and abstract nature of a hypothetical negotiation between warring parties combine to overwhelm many judges and juries.²¹⁵ Not surprisingly, factfinders often exaggerate the hypothetically-negotiated reasonable royalty. That is especially likely to occur when the infringed patent claims one of the many thousands of technologies that an innovator must combine to create a marketed product.²¹⁶

Some believe that juries and judges are more likely to overestimate damages.²¹⁷ Nevertheless, it is possible that factfinders are as likely to understate damages as they are to overestimate them, in which case the expected damages award may be the correct one. If that is the case, outlier awards will not trouble firms that commercialize technologies

214. See *Lucent Techs., Inc. v. Gateway, Inc.*, 580 F.3d 1301, 1325 (Fed. Cir. 2009).

215. See generally Scott Brewer, *Scientific Expert Testimony and Intellectual Due Process*, 107 *YALE L.J.* 1535 (1998) (discussing the difficulties juries and judges have with the technical nature of patent cases and criticizing their unjustified deference to indicia of scientific expertise).

216. Recently, the Federal Circuit wisely cabined the use of the “entire market value rule,” allowing a plaintiff to tie its damages claim to the market value of the accused device only when the patented technology is the basis for consumer demand for that product. *Uniloc USA, Inc. v. Microsoft Corp.*, 632 F.3d 1292, 1318–21 (Fed. Cir. 2011). That court has recognized that referring juries to the overall worth of the accused device can bias damages upward. *LaserDynamics, Inc. v. Quanta Computer, Inc.*, 694 F.3d 51, 68 (Fed. Cir. 2012).

217. See Lemley & Melamed, *supra* note 30, at 2144. But see David W. Opperbeck, *Patent Damages Reform and the Shape of Patent Law*, 89 *B.U. L. REV.* 127, 137 (2009) (finding the empirical evidence on whether patent awards are systemically excessive to be inconclusive and observing that outlier high awards “skew[] the data and the public debate”).

downstream. This only holds true if those firms are risk neutral. Faced with the prospect of potentially ruinous damages—jury awards on the high end reach ten figures,²¹⁸ and the Federal Circuit has upheld many awards in the nine-figure range²¹⁹—firms are likely to be highly risk averse. Conversely, PAEs can diversify risk by litigating several infringement suits with uncorrelated risk profiles, and they are more likely to be risk neutral. They may, in fact, be risk preferring in individual cases, especially high-profile ones, because a large award in one would facilitate more effective hold-up of other potential infringers. In short, even if the average damages award that judges and juries grant over time is “correct,” asymmetric appetite for risk will cause downstream technology companies to settle for amounts greater than the ex ante benchmark royalty. Because factfinders must assume that the likelihood of infringement and validity was 100% ex ante, damages awards are inherently biased upward vis-à-vis the appropriate economic yardstick. Some measure of ex post hold-up is always available to suitably motivated PAEs ex post, even when the constituent patents are weak.

In sum, a PAE in this hypothetical could hold up Alpha by acquiring a large number of Tier C patents. Investing in a predatory reputation with which to threaten other prospective licensees, the PAE credibly threatens to sue Alpha repeatedly with patents that bear just a 1% chance of being valid and infringed. No countersuit opportunity exists. Knowing that defending each lawsuit will cost several million dollars, that the PAE’s litigation costs are lower than its own, and that recurring suit carries an initially low but increasingly rising probability of an infringement finding and excessive damages award, Alpha will rationally pay a large sum to avoid this hold-up threat.

Ex ante, the Tier C patents would have commanded almost no value because of Alpha’s design-around options and the near-guaranteed invalidity or noninfringement of those IPRs. This is why the PAE could buy them at fire-sale prices. The difference in the PAE’s acquisition costs and the amount for which Alpha (and other licensees) settle ex post represents the change in market power realized by the strategic

218. See, e.g., *supra* note 201 and accompanying text.

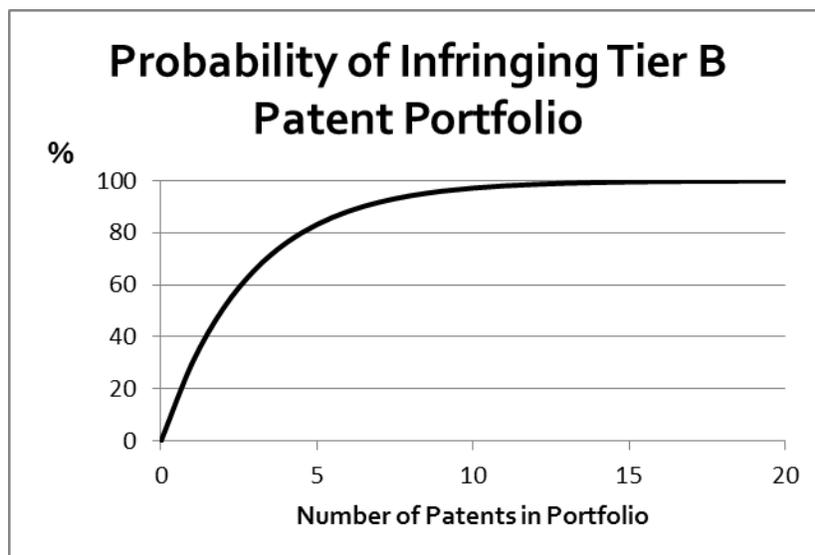
219. See, e.g., *Versata Software, Inc. v. SAP Am., Inc.*, 717 F.3d 1255, 1266–67, 1269 (Fed. Cir. 2013) (affirming a \$345 million damages award based on infringement of a software patent); *i4i Ltd. P’ship v. Microsoft Corp.*, 598 F.3d 831, 839 (Fed. Cir. 2010) (affirming a \$240 million damages award and injunction), *aff’d*, 131 S. Ct. 2238 (2011). In another case, the Federal Circuit affirmed a \$185.6 million jury verdict, doubled to \$371.2 million, which reportedly exceeded the defendant’s 2011 net income. *Bard Peripheral Vascular, Inc. v. W.L. Gore & Assocs., Inc.*, 670 F.3d 1171, 1178, 1193 (Fed. Cir. 2012), *aff’d in part and vacated in part*, 682 F.3d 1003 (Fed. Cir. 2012); Jonathan Stempel, *Court Upholds \$371 Million CR Bard Patent Award*, REUTERS (Feb. 10, 2012), <http://www.reuters.com/article/2012/02/10/us-crbard-gore-ruling-idUSTRE8191BH20120210>.

patent aggregation. Alpha could not have nipped this nascent threat in the bud by buying licenses *ex ante* to the 500 patents that the PAE later asserted *ex post*. Even if the transaction costs of identifying those IPRs and negotiating royalties were surmountable, a larger universe of 1500 Tier C patents remained for the PAE to purchase and assert *ex post*. Alpha cannot avoid this threat except by abandoning its future product designs or by acquiring licenses to every conceivable patent in the field that might ever conceivably be asserted *ex post*. For the many reasons discussed above, the latter avenue is wholly unrealistic and simply not an option.

c. Anticompetitive Patent Aggregation of Moderately Weak Patents

The preceding account explained that aggregating even the weakest imaginable patents into a sufficiently large portfolio, coupled with the credible threat of serial assertion, generates a hold-up threat due to judicial proclivity for error and high litigation costs. This Part concludes by briefly addressing an intermediate case. What are the potential ramifications of collecting IPRs bearing characteristics of Tier B patents?

The effects are similar to those recounted immediately above, save that the critical mass of patents needed to mount a viable threat is smaller. When each patent bears a 30% chance of being valid and infringed, the odds that a portfolio contains at least one such IPR is as follows:



The hold-up threat here is pronounced at a modest acquisition scale. To appreciate the welfare effects of aggregating such patents, focus first

on the ex ante world in which these IPRs are subject to atomized ownership. By assumption, Alpha could design around any asserted Tier B patent ex ante, and no such patent yields Alpha a solution that its engineers could not readily solve. In that situation, Tier B patents would command only a modest value at the product-design phase, made more modest still by the fact that a patentee asserting such a patent would face a 70% chance of recovering nothing.

Ex post, however, the design constraint limiting a Tier B patent's value evaporates. In suing ex post, the owner of a single such patent should get no more than the modest royalty it could have commanded before the fact. Judicial error is rife, however, so Alpha faces a risk that the factfinder will fail to credit the design-around alternatives that strip Tier B patents of economic value. Alpha also knows that the law requires that the factfinder must look past the probable invalidity or noninfringement of each such IPR and inflate the damages measure to a 330% recovery. Furthermore, Alpha knows it will suffer irrecoverable litigation costs of millions of dollars in defending a suit. It will therefore pay a much larger amount ex post than it would have paid ex ante. It cannot avoid such ex post hold-up by acquiring a clearing position ex ante due to preclusive transaction costs.

This leads to a startling conclusion: absent patent aggregation, the holder of even one patent bearing a colorable claim of reading on a lucrative product can engage in strategic hold-up by (i) refusing to approach a known implementer of technology; (ii) waiting for that firm to irreversibly invest in a potentially infringing product line; (iii) approaching that firm when it is actively selling its new product; and (iv) demanding greater than ex ante royalties based on threat of suit. Thus, the patentee's market power naturally evolves by virtue of changing market conditions and due to the presence of judicial error and high litigation costs. The patentee can realize gain in pricing power merely through inaction.²²⁰

A PAE, however, can do much more. The single patentee remains subject to real constraints ex post that a PAE can avoid. Those limitations on monopoly power include the likelihood of invalidity or noninfringement, litigation costs that may make suing a negative value proposition, and, potentially, countersuit and reputational constraints. Those factors prevent many Tier B-type patentees from suing, which is a desirable consequence on account of the hold-up possibility and the prevalence of independent invention. By amassing just thirteen Tier B patents, however, a PAE can subject Alpha to a greater than 99% chance of a finding of infringement. This high probability creates a

220. As the next Part explains, such a realization of market power likely falls outside the zone of antitrust scrutiny. Competition laws rarely impose affirmative duties but more typically prohibit active conduct that inefficiently produces monopoly power.

more distinct threat for Alpha than a standalone assertion of one Tier B patent, which Alpha has a 70% chance of successfully defeating. Such a PAE bypasses the other ex post constraints that limit individual assertion for the same reasons discussed above. Therefore, PAEs can magnify ex post holdup.²²¹

This analysis reveals why the oft-touted PAE argument that its business model promotes an active patent-licensing market by desirably rewarding upstream patentees and boosting innovation is wrong. Ex ante aggregation and licensing would carry those benefits, but ex post targeted patent accumulation is founded on extracting far greater amounts than patent holders could have realized during the product-design phase. Since the PAE itself acts not as a conduit for transferring wealth from downstream innovators to upstream patentees but as a bottleneck that captures much of the value for itself, it is unlikely that any benefit to patenting incentives outweighs the harm to downstream incentives to commercialize technology.²²² As the act of patenting carries little or no social value absent concomitant marketing or informing follow-on innovation, PAE wealth extraction through ex post hold-up almost certainly suppresses dynamic efficiency and harms consumers.²²³

The preceding account is just one of many species of patent aggregation, and it is of a particularly odious kind. The question that this Article explores, however, is whether there may be an antitrust case against extreme versions of hold-up founded on patent accumulation. The next Part explains that such a case indeed exists. Although there are challenges to establishing a Sherman Act violation based on targeted acquisitions of complementary IPRs, those difficulties stem from the novel context in which possible antitrust claims arise. The principles governing whether a cause of action may exist, however, are quite traditional.

III. TARGETED PATENT AGGREGATION AS MONOPOLIZATION

This Part explores how PAEs might fit into the antitrust model in a way that would permit control of their conduct and its costs. It explores concepts of harm, relevant market, monopoly power and exclusionary conduct to make the case that such control is appropriate.

221. In the real world, patents vary in quality from definitely valid and infringed to junk, rather than three distinct probability groups. The essential insights discussed through this Part, however, remain true.

222. Richard Posner, *Patent Trolls*, BECKER-POSNER BLOG (July 21, 2013, 5:12 PM) <http://www.becker-posner-blog.com/2013/07/patent-trollsposner.html> (“It is extremely difficult to discern any possible social benefit from trolls, and extremely easy to discern substantial social costs.”).

223. *See id.*

A. *An Introduction to the Practice*

PAEs can manipulate shortcomings in the patent system to acquire greater pricing power than would exist in either an atomized world or one in which licensing takes place *ex ante*.²²⁴ The net effects of PAE hold-up are almost certainly negative.²²⁵ Patentee returns exceeding the incremental value of the claimed technology *vis-à-vis* its closest substitute technology and/or non-infringing design alternative result in overcompensation and an incentive to engage in too much patent-eligible inventing.²²⁶ Simultaneously, the overcharge extracted from downstream technology firms comes at the cost of the more important incentive to develop and commercialize cutting-edge technologies. It also causes prices to rise and output to drop in the downstream market.²²⁷ Thus, there is sound reason to believe that at least some PAE conduct degrades welfare and efficiency.

A distinct question, though, is whether competition law has anything to say about PAE activity. Patent aggregation and *ex post* assertion by NPEs may be a public policy problem, but is it an antitrust problem? This Part concludes that, although antitrust rules are no panacea for strategic behavior in the patent space and their application in this setting requires treading new ground, they may be capable of addressing the most egregious forms of PAE hold-up. Specifically, if a PAE targets a lucrative product line, amasses and conceals individually weak patents until the firm has brought the targeted goods to market, and then threatens and files successive, predominantly losing lawsuits to extract royalties disproportionate to the prices at which the PAE bought those patents, a cause of action under the antitrust laws may exist.

A predicate for the antitrust suit is that the asset transfers giving rise to the PAE's ownership did not simply transfer a fixed amount of market power. Rather, the accumulation of patents must increase market power. In that respect, the case for antitrust condemnation for building a patent portfolio through IPR acquisitions is inversely related to the strength of the patents in the portfolio. As Part II explained, collecting and enforcing almost-certainly-valid and infringing patents creates little new market power—such actions simply transfer a monopoly from one entity to another. While a PAE could use such IPRs to hold up downstream innovators, the greater than *ex ante* royalties available flow from flaws in the patent system and could be equally taken advantage of by the original patentee or an assignee. By contrast, when a PAE

224. *See supra* Part II.

225. *See supra* Subsection II.A.3.c.

226. *See generally* Nicholas P. Chan, Comment, *Balancing Judicial Misvaluation and Patent Hold-Up: Some Principles for Considering Injunctive Relief After eBay*, 59 UCLA L. REV. 746, 763–69 (2012) (explaining the dangers of patentee overcompensation).

227. *See supra* note 168 and accompanying text.

strategically collects predominantly weak patents to create a hold-up threat, it seizes otherwise nonexistent monopoly power.²²⁸ It would seem that at least some aggregation in the PAE space is of the latter variety.²²⁹ Strong public policy grounds exist for limiting PAE accumulation and assertion of weak IPRs.²³⁰ But can antitrust perform this limiting function?

Some practices would raise concerns under traditional antitrust principles and are not the focus of this Article. For instance, if two competitors in a downstream product market conspire to raise their mutual rivals' costs by assigning their patents to a PAE that can sue on their behalf without fear of countersuit, it would likely violate Section 1 of the Sherman Act.²³¹ Separately, in a traditional technology-licensing market comprised of substitute patents that perform the same function, albeit in distinct and nonoverlapping ways, a PAE that acquired all of those patents would eliminate competition and monopolize that market under Section 2, absent countervailing efficiency gains.²³² Additionally, some courts have held that the holder of a standard-essential patent (SEP) can monopolize a technology-licensing market by reneging on or strategically avoiding a commitment to license on FRAND (fair, reasonable, and nondiscriminatory) terms, thus inducing a standard-setting organization (SSO) to adopt its proprietary technology.²³³ Should an SSO member/SEP-holder strategically conceal its patent in concert with a PAE, assigning that SEP to the PAE to hold up

228. See Scott Morton & Shapiro, *supra* note 28, at 470 (“Mass aggregation of related but weak patents may thus allow the PAE to achieve a rather novel type of scale economy.”).

229. See, e.g., William Thomashower, *Means to Control the Patent Trolls*, COMPUTER & INTERNET LAW, Dec. 2013, at 1, 2 (quoting Committee Chairman Bob Goodlatte during the “Abusive Patent Litigation” hearing who said that “PAEs . . . often times acquire weak or poorly-granted patents”); Jay Levine, *FTC Study on “Patent Troll” Behavior: Innovation Enhancers or Competition Killers? Part 2*, TECH. LAW SOURCE (Oct. 14, 2013), <http://www.technologylawsources.com/2013/10/articles/intellectual-property-1/ftc-study-on-patent-troll-behavior-innovation-enhancers-or-competition-killers-part-2/> (discussing the use of weak patents).

230. See, e.g., Erik N. Hovenkamp, *Predatory Patent Litigation: How Patent Assertion Entities Use Reputation to Monetize Bad Patents* (Aug. 5, 2013) (unpublished manuscript), available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2308115 (discussing the manner in which predatory patent litigation by PAEs hinders innovation and promotes questionable patenting).

231. See Fed. Trade Comm’n v. Actavis, Inc., 133 S. Ct. 2223, 2232 (2013) (citing United States v. Singer Mfg. Co., 374 U.S. 174 (1963)) (discussing how a conspiracy to exclude a mutual competitor can violate the Sherman Act); see also IP LICENSING GUIDELINES, *supra* note 116, at 25 ex. 9.

232. See, e.g., IP LICENSING GUIDELINES, *supra* note 116, at 8 & ex. 2.

233. See *Broadcom Corp. v. Qualcomm, Inc.*, 501 F.3d 297, 314 (3d Cir. 2007); see also *Apple Inc. v. Samsung Elecs. Co.*, No. 11-CV-01846, 2012 WL 1672493, at *4–8 (N.D. Cal. May 14, 2012); cf. *Rambus Inc. v. Fed. Trade Comm’n*, 522 F.3d 456, 468–69 (D.C. Cir. 2008) (noting the antitrust concerns present where patent disclosure policies require competitors to disclose trade secrets).

implementers of a standard after the fact, the PAE's actions could violate Sections 1–2 of the Sherman Act if the other elements of those causes of action were satisfied.²³⁴

This Article instead considers whether mass-scale aggregation of non-substitute but related patents can violate the antitrust laws within existing precedent.²³⁵ It begins by analyzing whether Section 2 of the Sherman Act condemns such accumulation. It concludes by considering whether a PAE's patent aggregation involves asset acquisitions that tend to create a monopoly or substantially limit competition in contravention of Section 7 of the Clayton Act. Additionally, this Article explains how a victim of PAE hold-up might best articulate these theories and addresses the major challenges to prevailing on these claims.

B. *Aggregating Complementary IPRs as a Section 2 Violation*

Section 2 of the Sherman Act has multiple provisions, including conspiracy and attempt, which may be relevant to firms that challenge various forms of PAE conduct. This Article focuses, however, on actual monopolization. A firm violates Section 2 in that manner when it willfully acquires monopoly power other than by means “of a superior product, business acumen, or historic accident.”²³⁶ To show that PAE patent accumulation violates this provision, a company would have to prove that (i) a relevant market exists; (ii) the PAE possesses monopoly power in that market; and (iii) the PAE willfully acquired that power through anticompetitive, exclusionary, or otherwise improper means.²³⁷

234. Courts have not yet addressed this question.

235. Until September 2014, only one case had analyzed whether a PAE's aggregation of patents violated antitrust law, and it had answered that question negatively. *See Intellectual Ventures I LLC v. Capital One Fin. Corp.*, No. 1:13-cv-00740, 2013 WL 6682981, at *1, *8 (E.D. Va. Dec. 18, 2013). This author appeared on behalf of Capital One in that case. This Article does not address that decision but instead focuses on analyzing the antitrust issues implicated by PAE patent accumulation from the perspective of precedential law. As noted below, however, two federal courts have since ordered discovery on monopolization allegations against a PAE for patent aggregation and concealment. *Intellectual Ventures I LLC v. Capital One Fin. Corp.*, No. 14-cv-00111-PWG, 2015 WL 898146, at *6–16 (D. Md. Mar. 2, 2015); *Intellectual Ventures I LLC v. Symantec Corp.*, No. 13-440-LPS, 2014 U.S. Dist. LEXIS 134255, at *13–14 (D. Del. Sept. 24, 2014). Some respected commentators suggest that the Eastern District of Virginia may have erred in dismissing Capital One's antitrust claims. *See Michelle D. Miller & Janusz A. Ordovery, Intellectual Ventures v. Capital One: Can Antitrust Law and Economics Get Us Past the Trolls?*, CPI ANTITRUST CHRON., Jan. 29 2015, at 6, available at https://www.wilmerhale.com/uploadedFiles/Shared_Content/Editorial/Publications/Documents/intellectual-ventures-v-capital-one.pdf.

236. *United States v. Grinnell Corp.*, 384 U.S. 563, 570–71 (1966); *see also United States v. Aluminum Co. of Am.*, 148 F.2d 416, 430 (2d Cir. 1945) (noting that a firm can lawfully acquire monopoly power through “superior skill, foresight and industry”).

237. *See Grinnell*, 384 U.S. at 570–71; *Verizon Comm'ns Inc. v. Law Offices of Curtis V. Trinko, LLP*, 540 U.S. 398, 407 (2004) (“To safeguard the incentive to innovate, the possession

Importantly, an antitrust plaintiff would have to overcome three obstacles. Those challenges, however, are surmountable. Indeed, as this Article was going to print, two federal district courts recognized that a PAE may monopolize a technology market in aggregating and concealing patents to achieve monopoly power.²³⁸ The first obstacle is that a plaintiff would have to show that it is anticompetitive to amass patents that are related by virtue of being arguably relevant to a particular product line or industry. Since the owners of such IPRs do not necessarily compete with one another in the conventional sense, a PAE could argue that its acquisitions do not eliminate any competition and thus cannot be exclusionary as a matter of law. Second, a plaintiff would have to show that any monopoly power enjoyed by a PAE is not inherent in the patent grant. Because a valid patent grants its owner a lawful right to exclude,²³⁹ a plaintiff may have to demonstrate that a PAE's market power exceeds the total power of the individual IPRs in the challenged portfolio. Third, a party challenging a PAE's lawsuit under Section 2 may have to overcome the *Noerr-Pennington* doctrine, which immunizes certain conduct—even anticompetitive conduct—founded on petitioning the government.²⁴⁰ This Article shows that these challenges do not foreclose plausible antitrust claims.

1. A PAE's Patent Portfolio as the Relevant Market

In traditional cases challenging IPR accumulation, the plaintiffs compete in a product market with the patent aggregator.²⁴¹ They typically allege that the aggregator has a dominant position and is acquiring so many patents that it will monopolize the downstream market.²⁴² In such a setting, the relevant market is a conventional product market comprised of those goods that are reasonably

of monopoly power will not be found unlawful unless it is accompanied by an element of anticompetitive conduct.” (emphasis omitted)).

238. See *Intellectual Ventures I LLC v. Capital One Fin. Corp.*, No. 14-cv-00111-PWG, 2015 WL 898146, at *6–16 (D. Md. Mar. 2, 2015) (Intellectual Ventures, a PAE, plausibly violated Section 2 of the Sherman Act and Section 7 of the Clayton Act in aggregating and concealing 3,500 financial-services patents); *Intellectual Ventures I LLC v. Symantec Corp.*, No. 13-440-LPS, 2014 U.S. Dist. LEXIS 134255, at *13–14 (D. Del. Sept. 24, 2014) (finding that allegations of targeted patent aggregation sufficiently stated an affirmative defense of patent misuse founded on monopolization). Generally, courts may have overemphasized the importance of patent protection to antitrust analysis—a trend that the Supreme Court in *Actavis* may have reversed. See generally Robin Feldman, *Ending Patent Exceptionalism and Structuring the Rule of Reason: The Supreme Court Opens the Door for Both*, 15 MINN. J.L. SCI. & TECH. 61 (2014) (discussing the concept of “patent exceptionalism and explain[ing] how the Supreme Court decision in *Actavis* moves away from it”).

239. 35 U.S.C. § 154(a)(1) (2012).

240. *Infra* Subsection III.B.4.

241. See, e.g., *Berkey Photo, Inc. v. Eastman Kodak Co.*, 603 F.2d 263, 267 (2d Cir. 1979).

242. See, e.g., *id.* at 267–68.

interchangeable in consumers' eyes.²⁴³ The courts then scrutinize the impugned patent acquisitions' downstream effects on price and output.²⁴⁴

That approach is wrong with respect to PAEs, which by definition do not compete in downstream product markets. Indeed, "a firm cannot monopolize a market in which it does not compete."²⁴⁵ The role of market definition is to focus analysis on the economic milieu in which a challenged restraint takes place. Because PAEs operate exclusively in upstream technology markets, the focus must lie upstream.

However, market definition may not be a fruitful line of inquiry in the *ex post* technology-licensing space. When lock-in has occurred, previously available substitutes become unavailable, meaning that the only remaining market is one of unlicensed technology.²⁴⁶ No competition takes place; therefore, inferences from any market share have limited meaning. Traditional market definition identifies the universe of substitutes, thus allowing the factfinder to measure the defendant's share of that space and infer the firm's market power. In the *ex post* space, however, market share is not always as meaningful. To see the conceptual difficulties of market definition in this space, suppose that a product implicated 10,000 discrete proprietary technologies and 100 of them were minimally adequate to create a hold-up threat sufficient to extract greater than *ex ante* royalties. In an atomized world, no one patent would occupy its own market, but an aggregator might create an *ex post* market by acquiring 1000 of those IPRs. Yet, it would possess only 10% of the relevant patents reading on the accused device—far less than the market share typically required for proof of monopolization. Worse still, the accumulator could divide its portfolio by ten, keeping one share for itself and selling the others to nine different companies. Consequently, ten markets would exist where previously there was one.

Although market definition is the traditional starting point for monopolization analysis under Section 2, it may not be the best starting point in this setting. Instead, the proper focus might be on whether monopoly power exists, and, if so, whether that power exceeds the combined powers of the constituent patents in the portfolio. Some courts have recognized that one can forego market definition when

243. *See, e.g., id.* at 269.

244. *See id.* at 272.

245. *See, e.g.,* *Discon, Inc. v. Nynex Corp.*, 93 F.3d 1055, 1062 (2d Cir. 1996), *vacated*, 525 U.S. 128 (1998).

246. *See, e.g.,* *Apple, Inc. v. Motorola, Inc.*, 869 F. Supp. 2d 901, 913 (N.D. Ill. 2012) (Posner, J., by designation), *aff'd in part, rev'd in part, and vacated in part*, 757 F.3d 1286 (Fed. Cir. 2014).

direct evidence of monopoly power is available.²⁴⁷ That would be the ideal manner in which to approach the antitrust implication of PAE patent aggregation. Nevertheless, the predominant view is that a plaintiff must at least identify the contours of the relevant market that the defendant allegedly monopolized.²⁴⁸ Thus, some exploration of the relevant market will likely be necessary. The question, then, is what the relevant market is for PAE conduct of the kind scrutinized in Part II.

One approach is to define each discrete licensing market comprised of substitute technologies. Referring back to Part II's hypothetical, this approach would identify 4000 different markets. Nine hundred of them would be competitive with two interchangeable patents claiming equivalent but different methods of performing a particular function. For the remaining 3100 markets, each of the 3100 patentees would have 100% market share in its own market, though *ex ante* only the 100 Tier A patentees would have monopoly power due to Alpha's design-around options. Construed in this way, many relevant markets exist in which to analyze a PAE's targeted patent aggregation. To undertake the requisite antitrust analysis, a court would have to focus on the competitive effects within each market, ignoring externalities. This approach would suggest that anticompetitive consequences could ensue only with respect to the 900 technology markets subject to competitive choice because the remaining 3100 markets are and remain monopolized.

This methodology fails to encapsulate the full universe of competitive effects relevant to the analysis. It incorrectly suggests that each individual patent-licensing market comprised of substitute technologies is economically independent of other markets, when in reality those markets are closely interconnected and affect each other in ways that matter to the market effects of patentee behavior. For instance, combining many weak, non-substitute patents can dramatically increase the price of all of them. One can only account for this effect by adopting a broader market definition. Thus, it cannot be a correct market definition for analyzing PAE patent aggregation. An appropriate methodology must reflect the fact that the PAE targets downstream innovators' products and that the aggregated patents, though not substitutes, are related in their potential application to those products.

The best approach—or perhaps the least imperfect one—is to define the relevant market as the portfolio that the PAE has constructed through its patent-acquisition campaign.²⁴⁹ This definition reflects the

247. *See, e.g.,* *Broadcom Corp. v. Qualcomm Inc.*, 501 F.3d 297, 307 n.3 (3d Cir. 2007) (“[D]irect proof of monopoly power does not require a definition of the relevant market.”).

248. *See, e.g.,* *Spectrum Sports, Inc. v. McQuillan*, 506 U.S. 447, 459 (1993); *Republic Tobacco Co. v. N. Atl. Trading Co.*, 381 F.3d 717, 737 (7th Cir. 2004).

249. Illustratively, in 1979, the Supreme Court observed that a blanket license to a copyright aggregator's portfolio “is, to some extent, a different product” than licenses to “the

Supreme Court's instruction that consumer choice and commercial realities dictate the contours of the relevant market.²⁵⁰ When a PAE builds an inescapable portfolio to hold up a given downstream firm, that firm has no choice in licensing. No one other than the PAE can offer a license to its portfolio. No one else can sell protection against the PAE's hold-up threat. These features suggest that there may be a relevant market limited to the PAE's portfolio.²⁵¹

This market definition is imperfect because it is not stable over time. It originates only as a result of the PAE's acquisitions. This characteristic may strike some economists as odd; nevertheless, it reflects the reality in the marketplace. Intellectual Ventures, for instance, claims that it has "create[d] a new market from scratch."²⁵² A second oddity is that the relevant market is capable of giving birth to two or more separate markets if it is large enough to be subdivided into distinct portfolios, each capable of holding up downstream firms. Again, that feature reflects the reality of the economic phenomena studied in this Article.

2. Monopoly Power

To trigger scrutiny under Section 2, a PAE must either have monopoly power or a dangerous probability of acquiring monopoly power.²⁵³ One can prove monopoly power either directly by evidence that the defendant controls output or prices, or indirectly by drawing inferences based on the firm's possession of a certain share of the market and the presence of entry barriers and other supply-side constraints on market power.²⁵⁴ Importantly, it is both a legal and

individual compositions." *Broad. Music, Inc. v. Columbia Broad. Sys., Inc.*, 441 U.S. 1, 21–22 (1979). A very similar principle applies here.

250. *Eastman Kodak Co. v. Image Technical Servs., Inc.*, 504 U.S. 451, 481–82 (1992) ("The relevant market for antitrust purposes is determined by the choices available to [consumers]. . . . The proper market definition in this case can be determined only after a factual inquiry into the 'commercial realities' faced by consumers.").

251. *See, e.g., Meredith Corp. v. SESAC, LLC*, No. 09 Civ. 9177, 2011 U.S. Dist. LEXIS 24517, at *28, *31 (S.D.N.Y. Mar. 9, 2011) (holding that, although a performing-rights organization, SESAC accounted for a relatively small percentage of all copyrighted music, "plaintiffs have plausibly alleged that, because of the existence of SESAC songs in critical shows and commercials (as well the alleged difficulty in determining the full contents of the SESAC repertory), they cannot avoid music in the SESAC repertory," so the repertory constituted its own market); *see also Broadcom*, 501 F.3d at 315.

252. *Invention Marketplace*, INTELL. VENTURES, <http://www.intellectualventures.com/about/invention-marketplace> (last visited Feb. 25, 2015).

253. *Spectrum Sports*, 506 U.S. at 456; *see also United States v. Grinnell Corp.*, 384 U.S. 563, 570–71 (1966).

254. *See, e.g., United States v. Microsoft Corp.*, 253 F.3d 34, 51 (D.C. Cir. 2001).

economic mistake to infer monopoly power from the ownership of IPRs alone.²⁵⁵

Beginning with the inferential approach, one might observe that a PAE that has amassed a sufficiently large portfolio to create a hold-up threat accounts for all sales of licenses to IPRs in its portfolio. From that perspective, it would possess 100% of the market.²⁵⁶ Even a firm with 100% market share can lack monopoly power if entry barriers are absent.²⁵⁷ In this setting, however, the PAE exercises unfettered control over the licensing of the patents in its portfolio. Even if a determined entrant were to purchase a subset of the PAE's patents, a large universe of unenforced IPRs remains available for the PAE to acquire to bolster its portfolio.²⁵⁸ Ultimately, if a PAE has constructed an offensive patent portfolio to hold up downstream targets, the only limitation on the PAE's monopoly power is the cost that it can credibly threaten to inflict on the target through repeated litigation.

Therefore, if a PAE aggregates weak patents to eliminate choice and thus impose an inescapable threat on downstream innovators, direct evidence of monopoly power should exist. Discovery into the sum of the prices that the aggregator paid for the IPRs in its portfolio, the terms on which prior licensing, if any, by the assignor took place, and internal projections and cost-benefit assessments of acquired patents would shed light on the power that the aggregation realized. Differences between the net price that a PAE paid for its IPRs and the price at which the PAE sells those rights—if substantial—would indicate acquisition of otherwise absent monopoly power, and scale efficiencies in litigation alone would not plausibly explain them.

3. Exclusionary Conduct

Once a firm possesses monopoly power in a relevant market, the remaining question is whether the defendant willfully acquired that

255. See *Ill. Tool Works Inc. v. Indep. Ink, Inc.*, 547 U.S. 28, 43 n.4 (2006).

256. Some courts have concluded that possessing nearly 100% of the market is strong evidence of monopoly power. *Eastman Kodak Co. v. Image Tech. Servs., Inc.*, 504 U.S. 451, 452 (1992) (concluding that controlling 80% to 95% market share is sufficient evidence of monopoly power to survive summary judgment); *Meredith Corp.*, 2011 U.S. Dist. LEXIS 24517, at *48 (“Here, where SESAC holds nearly 100% of the relevant market, it is clear that they have established monopoly power.”).

257. See, e.g., *United States v. Syufy Enters.*, 903 F.2d 659, 664 (9th Cir. 1990).

258. One might argue that the right market definition should account for the larger universe of IPRs available to the PAE to bolster its portfolio. Nevertheless, one can fruitfully analyze this consideration outside the confines of market definition, as the law typically does with respect to supply-side substitution (entry), which is a critical determinant of monopoly power not usually considered in defining the market. See *Heerwagen v. Clear Channel Commc'ns*, 435 F.3d 219, 227 (2d Cir. 2006) (discussing the measure of a market's geographic scope).

position.²⁵⁹ This last step does not inexorably follow from the existence of dominance, and the Supreme Court has cautioned that “[t]he mere possession of monopoly power, and the concomitant charging of monopoly prices, is not only not unlawful; it is an important element of the free-market system.”²⁶⁰ The question is whether the firm achieved its dominant position in a procompetitive manner, thus promoting the goals that the Court has identified as justifying supracompetitive pricing. Specifically, “[t]he opportunity to charge monopoly prices—at least for a short period—is what attracts ‘business acumen’ in the first place; it induces risk taking that produces innovation and economic growth.”²⁶¹ Thus, dominance acquired pursuant to innovation or efficiency is not only lawful; it is laudable.²⁶² Conversely, when a firm acquires such power through anticompetitive conduct—not through “a superior product, business acumen, or historic accident”²⁶³—condemnation properly follows.

a. Analyzing PAE Aggregation and Hold-Up Under the Rule of Reason

Section 2 usually involves a rule-of-reason-type analysis where a plaintiff must first demonstrate that the accused firm’s conduct carries anticompetitive effect, thus harming consumers and not merely injuring competitors.²⁶⁴ If the complainant thus establishes a prima facie case, then “the monopolist [must] assert[] a procompetitive justification—a nonpretextual claim that its conduct is indeed a form of competition on the merits because it involves, for example, greater efficiency or enhanced consumer appeal.”²⁶⁵ In that event, the burden shifts back to the plaintiff to establish that the conduct’s net effect is anticompetitive.²⁶⁶ In weighing procompetitive and anticompetitive effects, courts focus “upon the effect of that conduct, not upon the intent behind it.”²⁶⁷

259. *See* *United States v. Grinnell Corp.*, 384 U.S. 563, 570–71 (1966).

260. *Verizon Commc’ns, Inc. v. Law Offices of Curtis V. Trinko, LLP*, 540 U.S. 398, 407 (2004).

261. *Id.*

262. *See, e.g., Berkey Photo, Inc. v. Eastman Kodak Co.*, 603 F.2d 263, 281 (2d Cir. 1979) (observing that because “a monopolist is permitted, and indeed encouraged, by § 2 to compete aggressively on the merits, any success that it may achieve through ‘the process of invention and innovation’ is clearly tolerated” (quoting *United States v. United Shoe Mach. Corp.*, 110 F. Supp. 295, 344 (D. Mass. 1953))).

263. *Grinnell*, 384 U.S. at 570–71.

264. *See, e.g., United States v. Microsoft Corp.*, 253 F.3d 34, 58–59 (D.C. Cir. 2001).

265. *Id.* at 59.

266. *Id.*

267. *Id.* That law does not make intent irrelevant, of course, to a Section 2 claim. *See, e.g., Times-Picayune Publ’g Co. v. United States*, 345 U.S. 594, 626 (1953).

In targeting existing lucrative products, not practicing any technology, and amassing weak patents to the point that its portfolio poses an outside threat, a PAE can acquire market power exceeding the total power of the constituent patents when disaggregated. This monopoly-power-producing conduct is intentional and involves neither business acumen nor a superior product. The conduct at issue is a classic form of strategic hold-up.²⁶⁸ It inflates IPR royalties above their appropriate ex ante benchmark levels, causing upstream patentee overcompensation, excessive taxation of independent downstream innovation, and increased prices, while reducing output in downstream product markets. These are classic anticompetitive effects.²⁶⁹ Subject to complications discussed below, these effects, if demonstrated through a developed record, should establish a prima facie case under Section 2.

A PAE would almost certainly proffer a procompetitive justification of facilitating a more liquid market for the monetization of IPRs, thus rewarding patentees and diminishing free-riding. This defense should not be immediately dismissed. As noted above, patent aggregation is not devoid of merit and, in some circumstances, can enhance welfare. In achieving litigation-scale economies, a PAE can provide a return for some upstream patentees for whom the cost of assertion, rather than the weaknesses of their IPRs, caused suboptimal rates of assertion.

This justification, however, will not suffice when a PAE combines weak patents ex post to achieve otherwise absent monopoly power. When the patent accumulation does not result in the dispersal of licenses to strong patents that are valid and infringed, and which are hence essential inputs in the downstream commercialization process, but instead creates a hold-up threat using patents that would not and should not have been asserted on account of their low quality, the welfare losses triggered by PAE aggregation and assertion swamp any countervailing benefits.

This conclusion follows for at least three reasons. First, PAEs do not engage in a zero-sum transfer. Every dollar lost by a downstream technology company to a PAE is not a dollar gained by an upstream patentee. The PAE acts as a monopolistic gateway, securing the majority of the wealth it extracts for its own purposes and sharing merely a fraction with upstream patentees. Money fueling hold-up rather than rewarding inventors of novel, useful, and nonobvious inventions will not promote social welfare. Even if upstream incentives

268. Courts have held that certain forms of hold-up in the patent setting resulting in monopoly power in a technology-licensing market constitute actionable anticompetitive behavior. *See, e.g.,* *Broadcom Corp. v. Qualcomm Inc.*, 501 F.3d 297, 315 (3d Cir. 2007); *see also* *Apple, Inc. v. Samsung Elecs.*, No. 11-CV-01846, 2012 WL 1672493, at *4–8 (N.D. Cal. May 14, 2012).

269. *See, e.g.,* *Reiter v. Sonotone Corp.*, 442 U.S. 330, 339 (1979).

to obtain patents were as important as downstream incentives to innovate, PAE royalty extractions reduce the latter more than they promote the former.

Second, from the perspective of social welfare, what matters most is not a notional technology disclosed in a document but the realization of that technology in a consumable form. A major problem with PAE activity is that, to the extent it generates licensing revenue that flows into the hands of upstream patentees, it magnifies incentives to patent but not to commercialize. Developing a technology from the conceptual stage to realization is often investment-heavy and risky. To promote social welfare, the right incentive is one to develop and market technology. PAE conduct suppresses that incentive.

Third, even if a PAE's behavior carried some procompetitive benefit, the harms that it inflicts on innovation incentives are greater than those necessary to achieve that benefit. Particularly, PAEs could provide licensing convenience without undermining price competition by acquiring nonexclusive licenses rather than assignments from upstream patentees. Doing so would allow downstream innovators confronted with excessive prices to negotiate potentially lower prices with the upstream patentees, thus limiting the patent aggregator's monopoly power. Interestingly, the Supreme Court has weighed in on this scenario. In 1979, the Court held that two copyright aggregators, ASCAP and BMI, did not commit a *per se* antitrust violation in amassing and licensing thousands of copyrighted musical works because consent decrees entered into with the Justice Department ensured that licensees enjoyed "a real choice."²⁷⁰ Specifically, they could negotiate direct licenses from the aggregators' affiliates.²⁷¹ PAE aggregation, by contrast, entails no such right. By acquiring outright ownership and exclusive licensing authority over a large patent portfolio targeting a lucrative firm's business or product, PAEs suffocate the escape-valve of direct licensing that the Supreme Court emphasized "must not be ignored" when analyzing antitrust principles.²⁷²

These combined effects suggest that a PAE that achieves monopoly power by aggregating weak patents and licensing them under threat of recurring suit causes net anticompetitive effects.

b. Can Patent Aggregation Constitute Exclusionary Conduct?

A threshold issue is whether patent accumulation can constitute anticompetitive behavior under Section 2. The little law that exists on this question pours cold water on bold claims that IPR accumulation

270. *Broad. Music, Inc. v. Columbia Broad. Sys., Inc.*, 441 U.S. 1, 10–11, 24 (1979).

271. *See id.* at 11, 24.

272. *See, e.g., id.* at 24.

naturally lends itself to monopolization. The Supreme Court declared in 1950 that the “mere accumulation of patents, no matter how many, is not in and of itself illegal.”²⁷³

Generally, patent aggregation is desirable in many scenarios; therefore, an overarching prohibition would be mistaken.²⁷⁴ *Automatic Radio Manufacturing Co. v. Hazeltine Research, Inc.* merely holds that IPR accumulation is not per se illegal. In any event, the theory of harm pertaining to PAE aggregation articulated in this Article does not simply rely on the sheer number of patents involved. The relationship among the patents infuses the accumulation with anticompetitive effect. Targeting a product comprised of thousands of discrete technological components and then amassing weak patents arguably reading on distinct elements of that good creates monopoly power in much the same way as—and, in some circumstances, even more effectively than—eliminating available substitutes reading on one component. Indeed, the ex post character of the challenged acquisition and assertion is a key element of PAE’s anticompetitive hold-up.²⁷⁵

IPR aggregation can be unlawful. “Patent *acquisitions* are not immune from the antitrust laws.”²⁷⁶ The U.S. Court of Appeals for the Ninth Circuit observed that “a patent holder may run afoul of the antitrust laws” by “expand[ing] [its] monopoly by misuse, agreement, or accumulation.”²⁷⁷ Perhaps most intriguingly, in its “no matter how many” pronouncement, the Supreme Court highlighted that the record before it did not support “charges that respondent uses its accumulation of patents ‘for the exaction of tribute’ and collects royalties ‘by means

273. *Automatic Radio Mfg. Co. v. Hazeltine Research, Inc.*, 339 U.S. 827, 834 (1950), *overruled on other grounds by* *Lear, Inc. v. Adkins*, 89 S. Ct. 1902 (1969) (overruling *Hazeltine*’s rule regarding the estoppel doctrine).

274. *See supra* Subsection II.A.3.b.

275. *Cf. SCM Corp. v. Xerox Corp.*, 645 F.2d 1195, 1205 (2d Cir. 1981) (supposing that a dominant firm’s acquisition of a patent targeting a competitor’s existing products would “[s]urely” violate § 2 because “in such a case the patented invention already has been commercialized successfully, and the magnitude of the transgression of the antitrust laws’ proscription against willful aggregations of market power outweighs substantially the negative effect that the elimination of that class of purchasers for commercialized patents places upon the patent system”).

276. *Id.*; *see also* 3 PHILIP E. AREEDA & HERBERT HOVENKAMP, *ANTITRUST LAW: AN ANALYSIS OF ANTITRUST PRINCIPLES AND THEIR APPLICATION* ¶ 704b, at 160 (2d ed. 2002) (“[W]hether accomplished by internal development or by acquisition, one firm’s aggregation of numerous patents, even less significant ones, can impair actual and potential competition.”).

277. *United States v. Westinghouse Elec. Corp.*, 648 F.2d 642, 647 (9th Cir. 1981); *see also In re Xerox Corp.*, No. 8909, 1975 WL 173245 ¶ 14(c), at *3 (F.T.C. July 29, 1975) (finding Xerox’s patent aggregation harmful to competition and specifically objecting to its “developing and maintaining a patent structure of great size, complexity, and obscurity of boundaries”), *modified*, 1982 WL 608326 (F.T.C. Sept. 10, 1982).

of the overpowering threat of disastrous litigation.”²⁷⁸ One wonders what the Court would make of mass-scale aggregation of the kind analyzed here if it had occasion to scrutinize a developed record of the practice. The Court’s phraseology seems tailored to describe the PAE business model.

Circuit-level precedent on point is lacking because even though the PAE phenomenon is not itself new,²⁷⁹ its current scale and harm to the U.S. economy certainly are. Nevertheless, three fruitful avenues exist to explore whether PAE patent aggregation might amount to actionable anticompetitive conduct in violation of Section 2.

First, the Supreme Court’s leading pronouncement on the law of monopolization holds that the “willful acquisition” of monopoly power is illegal except in three cases where the events responsible for generating that power are either independently salutary or not the doing of the monopolist.²⁸⁰ Therefore, it is not clear that only monopoly power acquired through the elimination of substitutes is actionable.²⁸¹ To the contrary, it is incumbent on a firm strategically securing otherwise nonexistent monopoly power that harms consumers to show that its behavior carries procompetitive justifications.²⁸² For reasons explored in Part II, a PAE achieving hold-up power by aggregating weak patents could not make such a showing.

Expanding on this point, it makes little sense to speak of eliminating “competition” in the ex post world where PAEs operate. Irreversible investment in a product line obviates substitute technologies that were once viable alternatives to the technical solutions that the innovator ultimately chose to adopt. By waiting until lock-in occurs, a PAE ensures that sunk capital expenditures remove prior competitive constraints. In the ex post world, competition consists of IPR holders striving for the greatest possible share of the profit stream generated by the infringing device. Like competition to obtain a monopoly, this can be socially inefficient, specifically when it results in hold-up payments

278. *Hazeltine*, 339 U.S. at 834.

279. Some say that the first patent troll was George B. Selden, who engaged in submarine patenting by sitting on his patent application for sixteen years until he thought the patent was most valuable, at which point he patented the automobile concept and later sold the patent to a financier who sued the Ford Motor Company. See Richard Snow, *The Father of All Patent Trolls*, FORBES (July 30, 2013), <http://www.forbes.com/sites/forbesleadershipforum/2013/07/30/the-father-of-all-patent-trolls/>. However, the Ford Motor Company eventually prevailed. *Id.*

280. See *United States v. Grinnell Corp.*, 384 U.S. 563, 570–71 (1966) (finding “a superior product, business acumen, or historic accident” to be justifications for attainment or preservation of market dominance).

281. See generally Mark S. Popofsky, *Defining Exclusionary Conduct: Section 2, the Rule of Reason, and the Unifying Principle Underlying Antitrust Rules*, 73 ANTITRUST L.J. 435 (2006) (espousing the view that monopolization standards should and do flex in light of the distinct nature of the conduct challenged in a particular case).

282. See *supra* notes 264–65.

exceeding the *ex ante* benchmark. PAEs compound this inefficiency. They seize monopoly power not by eliminating substitutes but by magnifying hold-up founded on lock-in. PAEs' strategic patent aggregation seeks to remove constraints on monopoly power that exist *ex post*, thus generating otherwise absent monopoly power. Such monopolization has powerful anticompetitive effects. PAEs are not the rare species of business that operates in an antitrust-free zone with freedom to acquire monopoly power and inflict serious losses on consumers without limitation.

Second, exploring the few circuit decisions addressing patent acquisitions by operating companies can explain whether acquiring and asserting IPRs can itself be anticompetitive. If the effects of amassing patents dictate the outcome, then there is no categorical rule that IPR aggregation is always or never anticompetitive. Consequently, one can legitimately tie a PAE's patent accumulation to the monopoly power that follows and condemn it on that basis. In other words, if IPR aggregation is just a form of commercial conduct like many others—often benign, sometimes beneficial, and occasionally anticompetitive—then all that remains in scrutinizing PAE aggregation under Section 2 is to judge the conduct by its effects alone. Again, any such analysis is most unlikely to be favorable to a PAE engaging in *ex post* hold-up using weak patents.

Some famous cases illuminate this discussion. In *Kobe, Inc. v. Dempsey Pump Co.*,²⁸³ the U.S. Court of Appeals for the Tenth Circuit addressed a situation in which a firm targeted a market for hydraulic pumps used in deep oil wells.²⁸⁴ The firm acquired as many patents reading on those pumps as it could, licensed them on the condition that the licensees not compete with it, brought infringement actions, and publicized its enforcement campaign.²⁸⁵ The Tenth Circuit affirmed a Section 2 violation, holding that the aggregation and assertion of patents, some of which were valid and infringed, constituted actionable exclusionary conduct.²⁸⁶

Kobe's context was distinct from that explored in this Article. PAEs do not compete in downstream product markets; thus, they do not direct their infringement actions against horizontal competitors. But that is an inconsequential distinction. An antitrust objection to PAE conduct goes not to a downstream product market but to an upstream technology-licensing market. The sole question presently of interest is whether patent aggregation and assertion may be exclusionary behavior under

283. 198 F.2d 416 (10th Cir. 1952).

284. *Id.* at 418.

285. *See id.* at 419–22.

286. *See id.* at 418, 425, 427, 430.

Section 2. *Kobe* says yes.²⁸⁷ The Chief Judge of the District of Delaware found likewise in 2014, holding that Intellectual Ventures' alleged aggregation and concealment of patents required discovery to determine whether they constituted patent misuse due to monopolization.²⁸⁸

In *United States v. Singer Manufacturing Co.*,²⁸⁹ the Supreme Court condemned manufacturers of household zigzag sewing machines for assigning their patents to the conspirator in the best position to enforce the patents against their mutual rivals.²⁹⁰ The Court noted that it would be one thing for a firm to acquire patents to protect its own product, but another thing altogether to do so for the benefit of its coconspirators.²⁹¹ Observing that “[b]y aggregating patents in one control, the holder of the patents cannot escape the prohibitions of the Sherman Act,” the Supreme Court held that the agreed acquisition and enforcement of patents violated Section 1.²⁹²

Again, the facts in *Singer* are distinct from those surrounding PAE hold-up, which does not generally involve horizontal rivals in a product market conspiring to exclude their mutual competitors. That is merely to say that *Singer* was a Section 1 case, while the strategic patent aggregation considered here attracts Section 2. The question is not whether *Singer* is on all fours with the practices under scrutiny here but whether the decision sheds light on whether patent aggregation that does not eliminate competition between substitute patents may nevertheless be exclusionary for the purposes of Section 2. *Singer* answers this question in the affirmative. Importantly, the anticompetitive effect was not that the arrangement eliminated substitute-licensing opportunities for the nonconspiring sewing machine producers. Rather, it was that the agreement increased the likelihood and scale of IPR enforcement. *Singer* was better able to assert IPRs than its foreign coconspirators so the patent threat faced by the nonconspirators was greater when the patents were combined under its control rather than dissipated among many patentees whose enforcement efforts would be less effective.

287. *Id.*; see also *In re Great Lakes Chem. Corp.*, No. 9155, 1984 WL 565323 ¶ 29(a)–(f), at *4 (F.T.C. May 23, 1984) (concluding that “[t]he effect of [a] proposed acquisition may be substantially to lessen competition or tend to create a monopoly” in the relevant market).

288. *Intellectual Ventures I LLC v. Symantec Corp.*, No. 13-440-LPS, 2014 U.S. Dist. LEXIS 134255, at *13–14 (D. Del. Sept. 24, 2014) (discussing *Kobe*, 198 F.2d 416).

289. 374 U.S. 174 (1963).

290. *Id.* at 193–95.

291. *Id.* at 194.

292. *Id.* at 197 (quoting *United States v. Line Material Co.*, 333 U.S. 287, 308 (1948)).

c. *Federal Trade Commission v. Actavis, Inc.*

Ultimately, the most important decision governing whether and how to subject PAE aggregation to scrutiny under the antitrust laws is the Supreme Court's decision in *Federal Trade Commission v. Actavis, Inc.*²⁹³ *Actavis* fundamentally altered U.S. law governing the relationship between patents and antitrust. At first blush, the subject matter of that opinion seems esoteric, concerning pay-for-delay arrangements in which a patent-owning pharmaceutical company pays a generic-drug producer seeking to enter its market to stay out and not challenge the patent.²⁹⁴ That may appear to be leagues apart from strategic patent aggregation by PAEs. Upon closer examination, however, the parallels are close, and the Court's espoused principles in *Actavis* suggest the answer in the PAE setting as well.

Actavis held that reverse exclusionary payments are subject to the rule of reason and suggested that they will fail to withstand that scrutiny where the sums paid in settlement exceed the probable litigation costs thus avoided.²⁹⁵ To reach this decision, the Court had to look past the fact that any anticompetitive effect attendant upon the pay-for-delay agreement fell within the scope of a presumptively valid patent.²⁹⁶ Traditionally, antitrust was understood to patrol the borders of a patent's scope, but it had no bearing on anticompetitive effects lying within the patent's claims. The Supreme Court once said that a patent was "an exception to the general rule against monopolies and to the right to access to a free and open market."²⁹⁷

In contrast, *Actavis* holds that "patent and antitrust policies are both relevant in determining the 'scope of the patent monopoly'—and consequently antitrust law immunity—that is conferred by a patent."²⁹⁸ From now on, an inquiry into whether a restraint "'fall[s] within' the legitimate 'scope' of the patent's 'exclusionary potential'" does not control the outcome.²⁹⁹ Rather, one answers "the antitrust question by considering traditional antitrust factors such as likely anticompetitive effects, redeeming virtues, market power, and potentially offsetting legal considerations present in the circumstances, such as . . . those related to patents."³⁰⁰

293. 133 S. Ct. 2223 (2013).

294. *Id.* at 2227, 2229.

295. *See id.* at 2236–37.

296. *See id.* at 2234.

297. *Blonder-Tongue Labs., Inc. v. Univ. of Ill. Found.*, 402 U.S. 313, 343 (1971) (quoting *Precision Instrument Mfg. Co. v. Auto. Maint. Mach. Co.*, 324 U.S. 806, 816 (1945)).

298. *Actavis*, 133 S. Ct. at 2231.

299. *Id.* (quoting *Fed. Trade Comm'n. v. Watson Pharm., Inc.*, 677 F.3d 1298, 1309, 1312 (11th Cir. 2012), *rev'd sub nom.* *Federal Trade Comm'n v. Actavis*, 133 S. Ct. 2223).

300. *Id.*

Actavis clarified that conduct tending to secure patents against invalidation carries anticompetitive effects. Since patents carry probabilistic rights to exclude only, it is not their “exclusionary potential” that matters but their “actual preclusive scope.”³⁰¹ The Court emphasized that “the patent-related policy of eliminating unwarranted patent grants so the public will not ‘continually be required to pay tribute to would-be monopolists without need or justification.’”³⁰² Consequently, a restraint is anticompetitive if it bolsters an invalid patent because “the public interest in granting patent monopolies’ exists only to the extent that ‘the public is given a novel and useful invention’ in ‘consideration for its grant.’”³⁰³

These observations shed much light on PAE aggregation. As explained above, that practice is most problematic from an antitrust policy standpoint when it facilitates hold-up by using patents that are likely invalid or not infringed. Certain PAEs engage in mass-scale aggregation that transforms IPRs that are individually of nugatory value into a collective whole that is impervious to invalidation and allows the patent aggregator to extract tens or even hundreds of millions of dollars in licensing fees. Not even the richest technology company can afford to litigate *thousands* of patents in a portfolio to demonstrate that all or almost all were improvidently granted. Forcing licensees to pay large royalties for invalid patents runs contrary to both the patent and antitrust policies emphasized in *Actavis*. In short, PAEs can no longer maintain that the anticompetitive effects of their accumulation are invulnerable to antitrust scrutiny because they fall within the “scope” of the patents.

Finally, in exploring whether PAE aggregation yields problematic monopoly power, one must distinguish innocuous from malign forms of patent accumulation. Even a monopolist may properly build imposing portfolios via internal research and development and by prosecuting its own inventions. The calculus is different, however, when reaching out to acquire others’ IPRs to exclude existing products.³⁰⁴ Potential anticompetitive effects are pronounced when a dominant firm targets its competitors’ existing goods and purchases IPRs that arguably read on them.³⁰⁵

In none of these situations is patent aggregation inherently anticompetitive—its effects depend on the competitive dynamics of the

301. *Id.* at 2230–31 (quoting *Watson Pharm.*, 677 F.3d at 1312).

302. *Id.* at 2233 (quoting *Lear, Inc. v. Adkins*, 395 U.S. 653, 670 (1969)).

303. *Id.* at 2232 (quoting *United States v. Singer Mfg. Co.*, 374 U.S. 174, 199 (1963) (White, J., concurring)).

304. *SCM Corp. v. Xerox Corp.*, 645 F.2d 1195, 1205 (2d Cir. 1981) (“Surely, a § 2 violation will have occurred where . . . the dominant competitor in a market acquires a patent covering a substantial share of the same market that he knows when added to his existing share will afford him monopoly power.”).

305. *Id.*

industry in which the IPR acquisitions take place. Modern technology markets invite many situations in which patent accumulation facilitates commercialization of technology. The so-called Rockstar Consortium of Apple, Microsoft, BlackBerry, Ericsson, and Sony outbid Google for bankrupt Nortel's portfolio of some 6000 "4G" telecommunications patents in June 2011 for \$4.5 billion.³⁰⁶ Less than a year later, Google responded by paying \$12.5 billion to acquire Motorola Mobility, specifically Motorola's 17,000-patent portfolio claiming wireless technology.³⁰⁷ The implications of these massive acquisitions remain to be seen, but they may result in a mutual clearing position. By contrast, when the context surrounding patent aggregation is not one of relative stability between downstream competitors but one of unilateral dominance, the competitive dynamics shift.

These observations do not control the antitrust implications of targeted PAE patent aggregation, but they are illuminative nevertheless. Defensive patent acquisitions designed to achieve equilibrium between similarly situated rivals are unlikely to be anticompetitive because their aim and effect are to clear positions to market technologies downstream. Conversely, dominant-firm acquisitions conducted for offensive reasons and likely to produce asymmetric hold-up positions are categorically different.

4. *Noerr–Pennington* Doctrine

The *Noerr–Pennington* doctrine impedes much antitrust scrutiny of patentee conduct, and it poses a potential obstacle to a litigant who wishes to demonstrate that an IP holder commits actionable exclusionary conduct in filing lawsuits.³⁰⁸ In its most recent decision on the matter, *Professional Real Estate Investors, Inc. v. Columbia Pictures Industries, Inc.*,³⁰⁹ the Supreme Court explained that "[t]hose who petition government for redress are generally immune from antitrust liability," except when the petition "is a mere sham to cover . . . an attempt to interfere directly with the business relationships of a competitor."³¹⁰ As a result, the Court explained, a litigant loses immunity only if its lawsuit was "objectively baseless in the sense that

306. Chris V. Nicholson, *Apple and Microsoft Beat Google for Nortel Patents*, N.Y. TIMES (July 1, 2011, 4:58 AM), <http://dealbook.nytimes.com/2011/07/01/apple-and-microsoft-beat-google-for-nortel-patents/>.

307. David Goldman, *Google Seals \$13 Billion Motorola Buy*, CNN (May 22, 2012, 10:20 AM), <http://money.cnn.com/2012/05/22/technology/google-motorola/>.

308. For an illuminative discussion of how *Noerr–Pennington* may impede antitrust scrutiny of patentee misconduct, see Robin Feldman, *Intellectual Property Wrongs*, 18 STAN. J.L. BUS. & FIN. 250, 301–05 (2013).

309. 508 U.S. 49 (1992).

310. *Id.* at 56 (quoting *E. R.R. Presidents Conference v. Noerr Motor Freight, Inc.*, 365 U.S. 127, 144 (1961)) (internal quotation marks omitted).

no reasonable litigant could realistically expect success on the merits” and if “the baseless lawsuit conceals ‘an attempt to interfere *directly* with the business relationships of a competitor’ through the ‘use [of] the governmental *process*—as opposed to the *outcome* of that process—as an anticompetitive weapon.”³¹¹

As a preliminary observation, no immunity would attach where a PAE asserts patents that are weak to the point of being objectively baseless. In the hypothetical explored in the preceding Part, a PAE combining and asserting Tier C patents would thus fall outside the scope of the immunity recognized in *Professional Real Estate Investors*. To make things more interesting, however, assume that the patents at issue are of suspect validity but would nevertheless allow their owner to surpass the *Professional Real Estate Investors* standard.

This doctrine should not immunize the form of PAE conduct analyzed in this Article for several reasons. First, the anticompetitive behavior at issue lies primarily in aggregating patents that are related in arguably reading on distinct features of a profitable, existing product. Private market transactions of that nature “have traditionally been objects of antitrust scrutiny” and do not involve petitioning the government or courts in any way.³¹² Thus, *Noerr–Pennington* immunity does not attach to the asset acquisitions through which PAEs build their portfolios and achieve otherwise absent monopoly power.³¹³ The means through which PAEs realize the power so achieved is by threat and fact of filing a lawsuit. If that alone immunized PAE conduct, however, it would mean that many Supreme Court and Circuit decisions recognizing antitrust violations by patentees are wrong. When competitors pool their patents to exclude their common rivals through lawsuits, for example, they commit an actionable violation of Section 1 even if the patents asserted are valid and infringed.³¹⁴ As in the case of PAEs, the only way to give effect to the anticompetitive conduct is by

311. *Id.* at 60–61 (quoting *Noerr*, 365 U.S. at 144, and *City of Columbia v. Omni Outdoor Adver., Inc.*, 499 U.S. 365, 380 (1991)) (citation omitted).

312. *Allied Tube & Conduit Corp. v. Indian Head, Inc.*, 486 U.S. 492, 500–01 (1988).

313. This observation has two consequences. First, *Noerr–Pennington* would not impede a § 7 challenge alleging that PAE’s acquisitions of patents. *See, e.g.*, *Gold Cross Ambulance v. City of Kan. City*, 538 F. Supp. 956, 969 (W.D. Mo. 1982), *aff’d*, 705 F.2d 1005 (8th Cir. 1983). Section 7 of the Clayton Act prohibits transactions, “the effect [of which] . . . may be substantially to lessen competition, or to tend to create a monopoly.” 15 U.S.C. § 18 (2012). Patents are “assets” for the purpose of § 7. *See, e.g.*, *United States v. Columbia Pictures Corp.*, 189 F. Supp. 153, 181–83 (S.D.N.Y. 1960) (recognizing IPRs as asset acquisitions under § 7). The theory addressed in this Part would apply equally to a § 7 action, which would be more straightforward because *Noerr–Pennington* immunity would not be an issue. Second, an antitrust violation is complete before filing suit, even if filing an infringement suit were protected.

314. *Fed. Trade Comm’n v. Actavis, Inc.*, 133 S. Ct. 2223, 2232 (2013) (citing *United States v. Singer Mfg. Co.*, 374 U.S. 174 (1963)).

filing suit. Some courts have held that a member of an SSO that either fails to disclose or discloses but fraudulently agrees to license on FRAND terms, and later asserts its SEP, can violate Section 2.³¹⁵ Again, the only means of holding up implementers of the standard and thus willfully acquiring the prohibited monopoly power is by filing or threatening to file suit. In short, a patentee cannot immunize independently unlawful behavior simply by filing a nonobjective baseless lawsuit.³¹⁶

Noerr–Pennington ought not to apply to PAE hold-up founded on serial patent assertion for another reason. The *Professional Real Estate Investors* standard discussed above applies to a single act of filing suit. The Supreme Court’s earlier *California Motor Transportation Co. v. Trucking Unlimited* decision holds, however, that a litigant can also lose its immunity in filing “a pattern of baseless, repetitive claims . . . [to] produce[] an illegal result.”³¹⁷ Every U.S. Circuit that has addressed the question demonstrates that *Professional Real Estate Investors* did not *sub silentio* overrule *Trucking Unlimited*.³¹⁸ Consequently, a PAE that files suit several times using weak patents should not enjoy immunity, even if it happens to prevail on a small percentage of its claims.³¹⁹ In that situation, the PAE is not seeking reasonable royalties as to the patents-in-suit; rather, it is using the legal process itself as a weapon to

315. See *Broadcom Corp. v. Qualcomm, Inc.*, 501 F.3d 297, 315 (3d Cir. 2007); see also *Apple, Inc. v. Samsung Elecs. Co.*, No. 11-CV-01846, 2012 WL 1672493, at *4–8 (N.D. Cal. May 14, 2012).

316. See, e.g., *Cal. Motor Transp. Co. v. Trucking Unlimited*, 404 U.S. 508, 513–14 (1972) (“It is well settled that First Amendment rights are not immunized from regulation when they are used as an integral part of conduct which violates a valid statute.”); *Premier Elec. Constr. Co. v. Nat’l Elec. Contractors Ass’n*, 814 F.2d 358, 376 (7th Cir. 1987) (“There is no such thing as the lawful enforcement of a private cartel. . . . The first amendment does not protect efforts to enforce private cartels, in court or out.”); *Clipper Exxpress v. Rocky Mountain Motor Tariff Bureau, Inc.*, 690 F.2d 1240, 1264 (9th Cir. 1982) (“If Clipper can prove that the defendants engaged in activities which violated the antitrust laws, those violations do not become immune simply because the defendants used legal means . . . to enforce the violations. We find significant support for our holding in Supreme Court and circuit court decisions.”); see also *In re Burlington N., Inc.*, 822 F.2d 518, 526 (5th Cir. 1987) (“*Noerr-Pennington* provides immunity only for the narrow petitioning activity . . . and . . . this immunity does not provide overall immunity to other violations.” (citations omitted) (internal quotation marks omitted)).

317. *Trucking Unlimited*, 404 U.S. at 513.

318. See *Waugh Chapel S., LLC v. United Food & Commercial Workers Union Local 27*, 728 F.3d 354, 363–64 (4th Cir. 2013); *USS-POSCO Indus. v. Contra Costa Cnty. Bldg. & Constr. Trades Council*, 31 F.3d 800, 810–11 (9th Cir. 1994); see also *Primetime 24 Joint Venture v. Nat’l Broad. Co.*, 219 F.3d 92, 100–01 (2d Cir. 2000).

319. See *Waugh Chapel*, 728 F.3d at 364–65; *Primetime*, 219 F.3d at 101; *USS-POSCO*, 31 F.3d at 811.

coerce the prospective licensee into paying greater than *ex ante* royalties on the much larger portfolio of patents not in litigation.³²⁰

CONCLUSION

Most commentators agree that mass patent aggregation and assertion by PAEs are problematic.³²¹ Public policy action now seems inevitable. Congress may pass legislation that would significantly impede low-scale PAE activity, and the Supreme Court in *Alice Corp. v. CLS Bank*³²² has already narrowed the circumstances in which inventors can legitimately patent computer-implemented technologies.³²³ Nevertheless, the largest PAEs will likely continue to hold up leading innovators by amassing hundreds or thousands of patents ostensibly reading on different elements of a firm's successful products and services. Accordingly, the question is whether any other tools beyond patent reform are available to victims of PAE hold-up. This Article argues that an antitrust objection is at least theoretically sound.

To be sure, crafting a viable antitrust theory in this space poses challenges. The IPRs underlying PAEs' patent portfolios are rarely comprised of substitute technologies that would otherwise compete with one another in the absence of aggregation. Rather, the lion's share of such IPRs are economic complements, which would usually suggest that combining such rights should enhance rather than diminish efficiency. The *Noerr-Pennington* doctrine generally permits a patentee to file nonfrivolous lawsuits. Furthermore, much patent aggregation is procompetitive. A great deal of IPR accumulation takes place within the economy on the part of manufacturing entities, defensive patent aggregators, or others. A workable antitrust theory against PAEs must lend itself to a suitable limiting principle.

These concerns are surmountable. This Article seeks to debunk those objections by presenting a comprehensive theory of anticompetitive effect. In doing so, it has both explained the unique economic factors

320. Some of the largest PAEs file multiple lawsuits against their targets, thus potentially triggering the *Trucking Unlimited* line of cases. Intellectual Ventures, for example, has filed multiple infringement actions against Symantec, Capital One, Canon, and others. *E.g.*, *Intellectual Ventures I LLC v. Capital One Fin. Corp.*, No. 1:13-cv-00740, 2014 WL 1513273, at *1 (E.D. Va. Apr. 16, 2014); *Intellectual Ventures I LLC v. Canon Inc.*, No. 11-792-SLR, 2014 WL 1392568, at *1 (D. Del. Apr. 10, 2014); Adrienne Kendrick, *Intellectual Ventures Brings Second Patent Infringement Lawsuit Against Symantec*, IPWATCHDOG (Mar. 27, 2013, 7:45 AM), <http://www.ipwatchdog.com/2013/03/27/intellectual-ventures-patent-infringement-lawsuit-symantec/id=37947/>.

321. *See, e.g.*, Posner, *supra* note 222. *But see* Lemley & Melamed, *supra* note 30; Adam Mossoff, *The Myth of the "Patent Troll" Litigation Explosion*, TRUTH ON MARKET (Aug. 12, 2013), <http://truthonthemarket.com/2013/08/12/the-myth-of-the-patent-troll-litigation-explosion/>.

322. 134 S. Ct. 2347 (2014).

323. *Id.* at 2352.

that cause the accumulation of complements to undermine efficiency and outlined the legal principles on which an innovator might base a monopolization claim. In the right circumstances, PAE hold-up based on amassing weak patents should be actionable.