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COMPETITION ADVOCACY AND THE PATENT SYSTEM: PROMOTING COMPETITIVE MARKETS FOR TECHNOLOGY

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ABSTRACT

Current efforts at patent reform, through vehicles such as legislation, regulation, and appellate caselaw, are often met with advocacy advancing competing concerns reflecting the interests of discrete and separate groups of market participants. These viewpoints may not necessarily align with the policy goal of promoting consumer welfare. Historically, competition advocacy by competition authorities has been one mechanism for advocating for reforms that advance consumer welfare. Competition authorities such as the Federal Trade Commission have a lengthy history of empirical research and policy advocacy regarding the patent system. This paper reviews that advocacy and examines the circumstances under which competition advocacy has been employed. It observes that advocacy has been directed to two markets in which the patent system impacts competition: patents influence competition in the market for goods that embody them and patents are also themselves articles traded in technology markets. Regarding the latter form of competition, advocacy has been used to address legal doctrines that give rise to transaction costs and market failures in the market for the trade and license of patent rights. Empirical research of conditions in such technology markets, such as the Federal Trade Commission's recent market study of patent assertion entity activity, can provide a basis to identify future areas of advocacy.

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I. INTRODUCTION

The patent system plays an important role in promoting innovation and fostering the commercialization of innovative technologies. It is comprised of many parts: patent examination governed by the regulations of the United States Patent and Trademark Office (USPTO), adjudication of patent disputes in federal courts pursuant to the Patent Act, and private licensing and transfer of patent rights. Over time, the passage of new legislation, rulemaking, and appellate court precedent all might improve the system; however, there are a number of conditions which might frustrate potential reforms. For instance, identifying proper reforms is often analytically challenging and there are divergent views on the merits of any particular reform. Further, when market participants have strong economic interests in promoting specific reforms, the policy debate can often drown out the interest of consumer welfare — an interest that competition authorities and the patent system both seek to further.

One voice representing the interests of the consumer in such debates is that of competition authorities — executive agencies that have institutional interests in promoting competition — using competition advocacy. Competition advocacy provides policymakers with a framework for understanding the impact of proposed reforms on competition and on consumer welfare. In the United States, both the Antitrust Division of the Department of Justice (DOJ) and the Federal Trade Commission (FTC or the "Commission") have been active in this role. Over the past fifteen years, the Commission has studied the patent system through hearings, workshops, and market studies. Relying on this empirical research, it has issued three significant reports addressing proposed reforms to the patent law and to procedures at the Patent and Trademark Office. Additionally, it has testified before Congress, filed *amicus curiae* briefs in federal court, and submitted public comments to executive agencies, including the Patent Office.

As advocates for consumer welfare, competition authorities will have continued opportunity to comment upon proposed reforms. This may provide effective advice by providing a framework for understanding how reforms impact the performance of a patent system as a whole, as opposed to merely advocating on behalf of a particular market participant or outcome. To do so effectively, such authorities must first identify manners in which the patent system promotes or impedes the function of competitive markets.

This paper examines the application of competition advocacy to the patent system, and asserts that competition advocacy has generally addressed competitive effects in two markets. First, the grant of a patent can alter competition in the market for products which embody the patent. In this regard, competition advocacy can offer advice on legal doctrines that govern the scope and strength of granted patents, balancing competition with the policy goal of providing incentives to innovate. Second, competition advocacy can provide an economic and empirical perspective on the function of technology markets as a forum for

sale and license of patents — offering guidance for reforms that reduce transaction costs and eliminate market failures. This paper examines several transaction costs that plague patent licensing and the advocacy efforts directed at addressing them.

II. PROMOTING CONSUMER WELFARE THROUGH COMPETITION ADVOCACY

Competition authorities, such as the DOJ and FTC, can offer a valuable perspective on the operation of the patent system.[2] Competition advocacy — whereby these authorities utilize their resources and expertise to "provide a framework for [policymakers] thinking about public policy issues from a competition perspective" — is one tool that the agencies use to share this perspective.[3] One goal of competition authorities is to promote consumer welfare, which is the interests of consumers in obtaining lower prices and improved product quality. Notably, consumer welfare reflects the interest of consumers and not of producers or other market participants.[4] Advocacy can be particularly valuable in promoting consumer welfare in the patent system because policy debates regarding the system are frequently driven by market participants and not by consumers.

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[2] Tara Koslov, *Competition Advocacy at the Federal Trade Commission: Recent Developments Build on Past Successes*, CPI ANTITRUST CHRON., Aug. 2012, at 2. Private groups have also engaged in competition advocacy regarding the patent system. *See, e.g.*, AM. ANTITRUST INST., IP COMPETITION PROJECT (2018), https://www.antitrustinstitute.org/wp-content/uploads/2018/09/IPCompetitionProject.2018-main.pdf [https://perma.cc/PM6K-K4Z2].

[3] *See* Org. for Econ. Cooperation & Dev. [OECD], *United States: Roundtable on Evaluation of the Actions and Resources of Competition Authorities*, at 2, DAF/COMP/WD(2007)72 (May 25, 2007) ("Through competition advocacy, the [competition agencies] inform policy makers at all levels of government of the likely competitive effect of proposed regulation."); James C. Cooper et al., *Theory and Practice of Competition Advocacy at the FTC*, 72 ANTITRUST L.J. 1091, 1091 (2005) ("Competition advocacy, broadly, is the use of FTC expertise in competition, economics, and consumer protection to persuade governmental actors at all levels of the political system and in all branches of government to design policies that further competition and consumer choice."); Andrew I. Gavil, *The FTC's Study and Advocacy Authority in Its Second Century: A Look Ahead*, 83 GEO. WASH. L. REV. 1902, 1911 (2015) ("The Commission and its staff consistently urge decisionmakers to integrate consideration of competition values and effects into their deliberations."); Koslov, *supra* note 2, at 2-3 ("[A]ll of our competition advocacy efforts share a common goal: to provide a framework for thinking about public policy issues from a competition perspective. In so doing, we seek to enhance understanding of the competitive process, and also to persuade decision makers to deliver the benefits of competition to as many consumers as possible.").

[4] *See* Steven C. Salop, *Question: What is the Real and Proper Antitrust Welfare Standard? Answer: The True Consumer Welfare Standard*, 22 LOY. CONSUMER L. REV. 336, 336-37 (2010); Timothy J. Muris, Remarks Before the Milton Handler Annual Antitrust Review: Looking Forward: The Federal Trade Commission and the Future Development of U.S. Competition Policy, (Dec. 10, 2002) (observing that "the Commission also can enhance consumer welfare by informing decision makers on the likely effects of proposed policies.").

The economic theory of regulation illustrates the benefits of competition advocacy.[5] The theory explains that small groups with similar interests, such as companies with similar business models, have greater incentives to invest in the political process than larger diffuse groups, such as consumers.[6] As a result, policy outcomes tend to reflect the interests of those small interest groups,[7] and may not maximize consumer welfare — which is often overlooked because consumers seldom collectively weigh in on policy debates.[8] Similarly, policymakers are prone to regulatory capture by interests in affected industries.[9] That is to say, because industry invests in advocacy whereas consumers tend not to, policy outcomes promoting the interests of market participants are overrepresented, to the detriment of consumers.[10] As competition advocates serve to promote consumer welfare, and not to benefit any particular group of competitors, they are well-suited to provide an unbiased framework for policymakers on issues with polarized groups of stakeholders.[11]

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[5] *See* Org. for Econ. Cooperation & Dev. [OECD], *supra* note 3, at 4. ("The economic theory of regulation posits that because of the relatively high organizational and transaction costs, consumers will be disadvantaged relative to businesses in securing favorable regulation.").

[6] *See e.g.*, *id*. *See also* Daniel Sokol, *Limiting Anticompetitive Government Interventions that Benefit Special Interests*, 17 GEO. MASON L. REV. 119, 127 (2009) ("Public choice explains that regulation is often a product of rent-seeking by interest groups. Consequently, laws and regulations will tend to benefit small, well-organized interest groups rather than society overall.") (parentheticals omitted); Cooper et al., *supra* note 3, at 1101 ("A practical consequence of this is that small groups with similar interests—like members of a particular industry—can organize political support more effectively than large diffuse groups—like consumers generally."); Gavil, *supra* note 3, at 1911 ("Industry participants are likely to be well organized, informed, funded, and focused on promoting regulation that will serve their interests. On the other hand, the impact of regulation on consumers can be diffuse but substantial in the aggregate, leaving them vulnerable to harm and less likely to have the information and incentives necessary to engage in advocacy themselves.").

[7] *See* sources cited *supra* note 6.

[8] Cooper et al., *supra* note 3, at 1099-1100 ("It has long been recognized that because of industry's superior efficiency in political organization relative to consumers, consumer interests often are subservient to industry interests in the regulatory process."); Org. for Econ. Cooperation & Dev [OECD], *supra* note 3, at 4 ("[T]asking a public entity with the responsibility of representing dispersed consumers is a way to correct this political market failure. Competition advocacy helps solve consumers' collective action problem.").

[9] Cooper et al., *supra* note 3, at 1092 ("This situation tends to results in regulations . . . that protect certain industries from competition at the expense of consumers.").

[10] *Id*. at 1102 (The economic theory of regulation "suggest that because consumers will be relatively ineffective at representing their interests in the political system, political outcomes may tend to restrict competition more than they otherwise would.").

[11] *See* Gavil, *supra* note 3, at 1915 ("The role of the FTC in such cases is not to 'take sides' as between the old and the new firms, but to encourage regulators to place their confidence in the competitive process—i.e., to resist the temptation to tilt the playing field in favor of one or another business model."); Koslov, *supra* note 2, at 6 ("Staff is careful to focus on potential

Policymaking in the patent system is subject to the sorts of challenges that proponents of the economic theory of regulation might have described. Some argue that because the Patent Office interacts primarily with inventors applying for patents, it may be prone to regulatory capture by firms with significant patent holdings.[12] Other aspects of the patent system further affect discrete groups with strongly aligned interests. Industry representatives of biotechnology firms have tended, for example, to disfavor reforms that might weaken patent rights, whereas industry representatives for computer hardware firms tend to support such reforms.[13] In such cases, the impact of proposed reform will tend to have a pronounced impact specific segments of an industry.[14] Faced with that detriment, groups respond through well organized advocacy campaigns.[15] The resulting policy debate may reflect the differing views of marketplace competitors, but would not necessarily take consumer welfare into account.

Competition agencies can offer policymakers a perspective on the patent system unique to public institutions.[16] While patents are granted by the Patent Of-

harm to competition and the competitive process, rather than the interests of individual competitors (especially those who may be well-represented by advocates and lobbyists").

[12] Carl Shapiro, *Patent System Reform: Economic Analysis and Critique*, 19 BERKELEY TECH. L.J. 1017, 1023 (2004) ("In the case of the USPTO, the theory of regulatory capture suggests that the USPTO is too inclined to issue patents, or to allow broad claims, without giving sufficient weight to the costs that these patents impose on parties other than patent applicants, namely other companies and final consumers."); Clarisa Long, *The PTO and the Market for Influence in Patent Law*, 157 U. PA. L. REV. 1965, 1992 (2009) ("The [US]PTO's attempts to woo the inventive community present the obvious danger of the [US]PTO being captured by the very group that it is supposed to regulate.").

[13] *See, e.g.*, Jay P. Kesan & Anders A. Gallo, *The Political Economy of the Patent System*, 87 N. C. L. REV. 1341, 1348 (2009) ("The design of the patent system . . . depends not only on objective technical or scientific characteristics that will promote optimal efficiency, but also on the political preferences of the economic actors with a stake in the matter to be regulated."); *id.* at 1353-54 (illustrating that "the type of technology a company produces will determine its stance toward the patent system," and that firms in the ICT sector "prefer a weaker patent system" relative to biotechnology and pharmaceutical companies.").

[14] *See id.* at 1349 (The grant of patents can "have an impact on markets and on the economy in general, resulting in gains for some groups and losses for others.").

[15] *Id.* ("The actors affected by these economic consequences will resort to their political influence in two different ways. Losers will use the political system to change the rules and reverse the negative economic results, while winners will resort to similar political influence in an attempt to sustain the status quo of the patent system."). *See also* Gregory Sidak, *Holdup, Royalty Stacking, and the Presumption of Injunctive Relief for Patent Infringement: A Reply to Lemley and Shapiro*, 92 MINN. L. REV. 714, 732-33 (2008) ("Do today's patent licensees expect to be tomorrow's patent licensors, and vice versa? If not, one will have the expectation that he will disproportionally be paying or receiving patent royalties. In that case, one's recommendations for changes to patent law will be biased in one direction or the other.").

[16] *See* Shapiro, *supra* note 12, at 1022 (observing that "there are legitimate policy reasons to listen carefully to the FTC's concerns and proposals. Put simply, the USPTO tends to focus

fice and enforced before the federal courts and the International Trade Commission, this paper asserts that patents are exploited by private actors contracting with one another for the transfer of patent rights and the commercialization of the goods that embody them.[17] The FTC's expertise lies in economics and an understanding of markets, which renders it well-suited to study this trade of rights in the marketplace.[18] As a result of this background, the FTC has a vantage point on how the design of patents and the legal and regulatory framework surrounding it influences private conduct. This is in contrast to the viewpoint of the courts and other agencies, which is focused on the adjudication of the contours of individual patent rights.[19]

Commentators and agency actors alike have recognized the value of the FTC's competition advocacy on the patent system. Regarding the FTC's 2003 *To Promote Innovation* report, Professor Carl Shapiro noted that, "[f]rom an economic standpoint, the FTC and DOJ have a legitimate and important role to play in the debate over reforming the patent system."[20] Former FTC Chairman Timothy Muris noted that this report "helped shape the legislative and judicial debate over the past 15 years."[21] Similarly, former Chairman William Kovacic has written that competition advocacy is "one of the most important contributions" of competition policy and that the questions posed to policymakers considering patent reform "require continual study" by expert agencies such as the FTC.[22] In its 2016 *Presidential Transition Report*, the American Antitrust Institute recommended that "[t]he Agencies should continue and expand their advocacy on patent policy to ensure that it promotes competition, innovation, and consumer welfare."[23] Similarly, the American Bar Association's Antitrust Division's most recent Presidential Transition Report observed that "[t]he Agencies have done

on the interests of its 'customers,' namely patent applicants and patentees, while the FTC and DOJ have an institutional interest in serving the interests of consumers and competition.").

[17] *See supra* text accompanying notes 103-104.

[18] *See* Koslov, *supra* note 2, at 4 ("Competition advocacy allows the Commission to leverage its generalized competition and economic expertise, as well as its substantive industry expertise gained via investigations and other activities. Working together, staff from throughout the agency can explore the links between legal and economic theory, apply theory to specific marketplace facts, incorporate the context of broader industry dynamics, offer predictions regarding likely effects, and translate that entire thought process into a framework to aid decision makers who are not necessarily steeped in competition policy."); *see also* William E. Kovacic, *Intellectual Property Policy and Competition Policy*, 66 N.Y.U. ANN. SURV. AM. L. 421, 422 (2011); Shapiro, *supra* note 12, at 1022.

[19] *See* Herbert Hovenkamp, *Antitrust and the Patent System: A Reexamination,* 76 OHIO ST. L.J. 467, 500 (2015) (noting that patent "courts receive little guidance from the economic literature," in part because "we have historically treated patents as 'property' rights rather than as an element of economic policy.").

[20] Shapiro, *supra* note 12, at 1022.

[21] TIMOTHY J. MURIS, BIPARTISAN PATENT REFORM AND COMPETITION POLICY 5 (2017).

[22] Kovacic, *supra* note 18, at 422, 434.

[23] AM. ANTITRUST INST., 2016 PRESIDENTIAL TRANSITION REPORT 2 (2016).

an effective job informing the [US]PTO, USTR, ITC, and others of their competition concerns in the SEP area", and that "[t]hose efforts should be continued."[24] Likewise, Acting Chairman Maureen Ohlhausen has noted that "the FTC is well positioned to offer its views and to advocate on the important issue of patent hold-up" addressed in its recent advocacy.[25]

While there has been support for the use of competition advocacy, there has sometimes been disagreement on the substantive positions that have been advocated. Perhaps the most notable example of such disagreement is advocacy regarding patent holdup. As discussed in more detail below in sections IV and V.C., competition authorities have advocated for reforms intended to minimize patent hold up, which refers to "a patentee's ability to extract a higher licensing fee after an accused infringer has sunk costs into implementing the patented technology than the patentee could have obtained at the time of design decisions."[26] Much advocacy has also focused on the specific case of patent hold up in the context of standard essential patents, which is "a more narrow sense . . . in which a patent owner fails to disclose his patents to a standard setting organization and attempts to license after an industry is locked into using the standard."[27] Commentary regarding advocacy in the latter context, in particular, reflects a divergence of views on the merits of promoting reforms with the aim or effect of addressing hold up.[28]

The reaction to the treatment of hold up in the FTC's 2011 *Evolving IP Marketplace* illustrates two arguments raised regarding this advocacy. One critique is that the report proffered reforms that would weaken patent rights, thereby diminishing incentives to innovate. Epstein, Kieff and Spulber argue that "the net impact from following the FTC Proposal's approach to determining IP value would be to reduce the rate of return to innovators."[29] Taffett and Wellford argue that "the FTC risks tipping the balance too far in the direction of the infringer-

[24] AM. BAR ASS'N SECTION OF ANTITRUST LAW, PRESIDENTIAL TRANSITION REPORT: THE STATE OF ANTITRUST ENFORCEMENT 47 (2017).

[25] Statement of Comm'r Maureen K. Ohlhausen, Fed. Trade Comm'n., File No. 121 0081, In the Matter of Robert Bosch GmbH, at 2 (Nov. 26, 2012).

[26] EVOLVING IP MARKETPLACE, *infra* note 46, at 191 n.61.

[27] *Id.*

[28] *Compare, e.g.*, Letter from Jonathan Barnett, Prof. of Law, Univ. S. Calif. Gould Sch. of Law, to Makan Delrahim, Assistant Att'y Gen., Antitrust Division, U.S. Dep't of Justice (Feb. 13, 2018), https://cpip.gmu.edu/wp-content/uploads/sites/31/2018/02/Letter-to-DOJ-Supporting-Evidence-Based-Approach-to-Antitrust-Enforcement-of-IP.pdf [https://perma.cc/RZY2-5F4Y], *with* Letter from Michael A. Carrier, Prof. of Law, Rutgers Law Sch., et al., to Makan Delrahim, Assistant Att'y Gen., Antitrust Division, U.S. Dep't of Justice (May 17, 2018), https://www.competitionpolicyinternational.com/wp-content/uploads/2018/05/DOJ-patent-holdup-letter.pdf [https://perma.cc/EZW8-CKY7] (critiquing "Speeches on Patents and Holdup").

[29] Richard A. Epstein, F. Scott Kieff & Daniel F. Spulber, *The FTC, IP, and SSOs: Government Hold-Up Replacing Private Coordination*, 8 J. COMPETITION L. & ECON. 1, 3 (2012).

licensees, potentially damaging innovation incentives."[30] Brooks argues that the recommendations "would significantly weaken the strength and value of patents."[31] Abbott observed that "the 2011 IP Report advanced an agenda that, if adopted, clearly would reduce the expected returns to US patents."[32] A second critique is that the proposed reforms are not justified by empirical evidence. Epstein, Gilbert and Kieff argue that "the FTC Report does not offer . . . any empirical basis to . . . justify radical change to [the patent] system."[33] Taffet and Wellford argue that a "fundamental problem is that the FTC appears to have proposed solutions without first demonstrating that an actual problem exists."[34] Brooks argues that "there is no systemic patent hold-up problem—however that term is defined—that could justify the sweeping changes to patent remedies or the practices of SSOs recommended in the Report."[35]

In addition to diverging views offered by commentators, agency thinking on these issues can also change over time. The treatment of the USPTO and DOJ's *Policy Statement on Remedies for Standard-Essential Patents Subject to Voluntary F/RAND Commitments* is one example. In 2013, the USPTO and DOJ issued the statement, which provided considerations for adjudicative bodies assessing the grant of injunctive relief and exclusion orders in the context of infringement of a SEP with a FRAND commitment.[36] The statement noted concerns of hold up that could "generat[e] uwanted higher royalties," which could harm consumers when "those royalties are passed on to consumers in the form of higher prices."[37] In December 2018, Assistant Attorney General Makan

[30] Richard S. Taffett & Hill B. Wellford, *Questioning the FTC's incremental value test and claims of widespread hold-up in technology standards*, 57 ANTITRUST BULL. 161, 161 (2012).

[31] Roger G. Brooks, *Patent "Hold-Up," Standards-Setting Organizations, and the FTC's Campaign Against Innovators*, 39 AIPLA Q. J. 435, 438 (2011).

[32] Alden F. Abbott, *The evolving IP-antitrust interface in the USA: the recent gradual weakening of patent rights*, 2 J. ANTITRUST ENFORCEMENT 363, 371 (2014).

[33] Epstein, Kieff & Spulber, *supra* note 29, at 13 ("The FTC Report does not offer any quantitative estimate of value-destroying breakdowns on the present system, nor does it offer any empirical basis to conclude that such breakdowns are of a frequency and magnitude that could justify radical change to a system that has endured numerous successfully implemented standards.").

[34] Taffett & Wellford, *supra* note 30, at 169-70 ("[T]he IP Report does not attempt to make the case that hold-up . . . is wide-spread or, indeed, occurs at all in the real world, or has any disruptive effect on innovation, robust standardization or the benefits therefrom, or otherwise on the operation of efficient markets."); *see also* Sidak, *supra* note 15, at 735 ("Lemley and Shapiro have failed to establish a market failure in the patent law.").

[35] Brooks, *supra* note 31, at 437; *see also* Sidak, *supra* note 15, at 718 ("Despite Lemley and Shapiro's insistence to the contrary, there is little evidence of the holdup and royalty stacking problems that concern them.").

[36] U.S. DEP'T JUSTICE & U.S. PAT. & TRADEMARK OFF., POLICY STATEMENT ON REMEDIES FOR STANDARD-ESSENTIAL PATENTS SUBJECT TO VOLUNTARY F/RAND COMMITMENTS (2013).

[37] *Id*.

Delrahim rescinded the DOJ's endorsement of the Policy Statement.[38] In his remarks explaining the decision, Delrahim acknowledged the "careful balance that patent law strikes to optimize the incentive to innovate."[39] He further argued that the analysis of injunctive relief should address considerations of both patent hold up and patent hold out.[40] He concluded that the "[antitrust] enforcement agencies . . . should not place a thumb on the scale against an injunction in the case of FRAND-encumbered patents."[41]

III. OVERVIEW OF COMPETITION ADVOCACY REGARDING THE PATENT SYSTEM

An overview of the Federal Trade Commission and the Department of Justice's most significant advocacy efforts reveals that the agencies have a lengthy history of engaging in patent-focused competition advocacy. The FTC, in particular, has issued two significant reports on the patent system: the 2003 *To Promote Innovation* report and the 2011 *Evolving IP Marketplace* report. These reports broadly focused on three substantive issues: patent quality, notice, and remedies for patent infringement.

Note that these reports were examples of competition advocacy, which is distinct from the FTC and DOJ's other policy work involving the intersection of intellectual property and antitrust laws. For instance, the agencies have jointly issued two documents providing guidance regarding the application of antitrust law to business conduct involving intellectual property: the *Antitrust Guidelines for the Licensing of Intellectual Property* in 1995[42] and a 2007 joint report on *Antitrust Enforcement and Intellectual Property Rights*.[43] While such guidance may implicate policy considerations similar to those implicated by competition advocacy, its focus is different — rather than treating patent law, it treats antitrust. That is, rather than evaluating the law that establishes patent rights, it is

[38] Makan Delrahim, Assistant Att'y Gen., Antitrust Division, U.S. Dep't of Justice, Remarks at the 19th Annual Berkeley-Stanford Advanced Patent Law Institute: "Telegraph Road": Incentivizing Innovation at the Intersection of Patent and Antitrust Law 6-7 (Dec. 7, 2018), https://www.justice.gov/opa/speech/file/1117686/download [https://perma.cc/VS9W-X9L8].

[39] *Id*. at 6.

[40] *Id*. at 7.

[41] *Id*. at 6.

[42] U.S. DEP'T JUSTICE & FED. TRADE COMM'N, ANTITRUST GUIDELINES FOR THE LICENSING OF INTELLECTUAL PROPERTY (1995). The guidelines were reissued in 2017. U.S. DEP'T JUSTICE & FED. TRADE COMM'N, ANTITRUST GUIDELINES FOR THE LICENSING OF INTELLECTUAL PROPERTY (2017) [hereinafter 2017 Guidelines].

[43] U.S. DEP'T JUSTICE & FED. TRADE COMM'N, ANTITRUST ENFORCEMENT AND INTELLECTUAL PROPERTY RIGHTS: PROMOTING INNOVATION AND COMPETITION (2007) [hereinafter the 2007 Report].

concerned with evaluating business conduct involving those rights.[44] Such guidance does not influence competition policy in the executive and legislative branches so much as it seeks to provide guidance to market actors regarding the enforcement of the antitrust laws.

In 2002, the agencies held a series of hearings regarding the patent system. These hearings culminated in two reports: the FTC's 2003 report, *To Promote Innovation: The Proper Balance of Competition and Patent Law and Policy*,[45] which provided guidance regarding the application of patent law, and the FTC and DOJ's joint 2007 report, *Antitrust Enforcement and Intellectual Property Rights: Promoting Innovation and Competition*, which provided guidance regarding the application of antitrust law. The *To Promote Innovation* report offers a number of recommendations related to patent quality, *i.e.*, the likelihood that a patent meets the legal standards of patent validity.[46] The report explains that "a poor quality . . . patent is one that is likely invalid or contains claims that are likely overly broad."[47]

Likewise, beginning in 2008, the FTC held a series of hearings on the interplay between the patent system and competition policy, which included a DOJ and USPTO cosponsored workshop.[48] As summarized in the FTC's 2011 report *The Evolving IP Marketplace*, those hearings identified issues with two aspects of the patent system: notice, or "how well a patent informs the public of what technology is protected,"[49] and remedies for patent infringement.[50]

Beyond these hearings, the FTC has engaged in independent empirical research, conducting a detailed study of patent assertion entity (PAE) behavior

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[44] The 2007 Report addresses "questions that arise when antitrust law is applied to conduct involving intellectual property rights." *Id.* at 3. Likewise, the 2017 Guidelines "state the antitrust enforcement policy of the U.S. Department of Justice and the Federal Trade Commission . . . with respect to the licensing of intellectual property." 2017 Guidelines, *supra* note 42, at 1 (parenthetical omitted). In contrast, *To Promote Innovation* and *The Evolving IP Marketplace* address patent law. *See, e.g.*, EVOLVING IP MARKETPLACE, *infra* note 46, at 1 (discussing To Promote Innovation, the 2007 Report, and the 1995 Guidelines); TO PROMOTE INNOVATION, *infra* note 45, Executive Summary, at 1 ("This report . . . discusses and makes recommendations for the patent system to maintain a proper balance with competition law and policy. A second joint report [the 2007 Report] will discuss and make recommendations for antitrust to maintain a proper balance with the patent system.").

[45] FED. TRADE COMM'N, TO PROMOTE INNOVATION: THE PROPER BALANCE OF COMPETITION LAW AND POLICY 7 (2003) [hereinafter TO PROMOTE INNOVATION].

[46] FED. TRADE COMM'N, THE EVOLVING IP MARKETPLACE: ALIGNING PATENT NOTICE AND REMEDIES WITH COMPETITION 2 (2011) [hereinafter EVOLVING IP MARKETPLACE].

[47] *Id.*

[48] *Id.*

[49] *Id.*

[50] *Id. See also* 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, 2.

through a 2012 joint workshop with the DOJ on PAE licensing practices[51] and a 2016 market study and report of PAE activity.[52] While the majority of this report focused on providing a detailed description of PAE licensing practices, it also included a number of recommendations intended to reduce the costs of patent litigation.[53]

In addition to these reports, the FTC and DOJ have utilized their expertise to engage in advocacy before the Patent Office and the courts. Examples of this include the agencies' 2013 joint comment before the Patent Office in support of a proposal to require patent applicants to disclose the real party in interest behind pending patent applications,[54] as well as their 2015 comment in support of Patent Office efforts to improve patent quality.[55] The DOJ has further included competition principles in *amicus curiae* briefs filed before the Supreme Court. For example, it cited the *To Promote Innovation* report in its amicus curiae briefs in both *eBay v. MercExchange*, which considered the grant of injunctive relief as a remedy for patent infringement, [56] and in *KSR v. Teleflex*, where it used the report's recommendation that the "teaching, suggestion, or motivation" test not be the exclusive test employed to determine patent obviousness.[57]

IV. COMPETITION POLICY AND THE PATENT SYSTEM

While there is support for efforts at competition advocacy regarding the patent system, there has sometimes been a divergence of view on the policy issues advanced. This section explores the nature of competition advocacy, drawing a distinction between advocacy directed towards product market competition and advocacy directed towards technology market competition.

As a threshold matter, it is helpful to return to the purpose of competition advocacy. Competition advocacy is a tool that agencies use to address govern-

[51] FED. TRADE COMM'N, PATENT ASSERTION ENTITY ACTIVITIES WORKSHOP (2012), https://www.ftc.gov/news-events/events-calendar/2012/12/patent-assertion-entity-activities-workshop [https://perma.cc/PSG4-EX8V].

[52] *See* FED. TRADE COMM'N, PATENT ASSERTION ENTITY ACTIVITY: AN FTC STUDY (2016) [hereinafter PATENT ASSERTION ENTITY ACTIVITY].

[53] *Id.* at 9.

[54] *See generally* U.S. Dep't Justice & Fed. Trade Comm'n, Comment Before the United States Department of Commerce Patent and Trademark Office in the Matter of Notice of Roundtable on Proposed Requirements for Recordation of Real-Party-in-Interest Information Throughout Application Pendency and Patent Term (Feb 1, 2013).

[55] *See generally* Fed Trade Comm'n & U.S. Dep't Justice, Comment Before the United States Department of Commerce Patent and Trademark Office In the Matter of Request for Comments on Enhancing Patent Quality (May 6, 2015).

[56] Br. for Resp't at 22-23, eBay Inc. v. MercExchange, LLC 547 U.S. 388 (2006) (No. 05-130).

[57] Br. for the United States as Amicus Curiae at 23, 25, KSR Int'l Co. v. Teleflex Inc., 550 U.S. 398 (2007) (No. 04-1350).

ment law or regulation that imposes restraints upon market competition. Effective advocacy is frequently grounded in the identification of a market and a regulation that imposes a restraint upon competition in that market; in order to do this effectively, it is helpful to articulate with specificity the nature of market competition being addressed.[58] In some instances, identifying regulations that restrain competition is simple, as the anti-competitive effect is evident on the face of the regulation itself. The most straightforward example of such a regulation is one that imposes a naked horizontal restraint — *i.e.*, a restraint which has the "purpose or likely effect of increasing price or decreasing marketwide output in the short run"[59] — often, such regulation will favor incumbents or other influential groups. The FTC has employed competition advocacy to address such restraints on a number of occasions, including in the contexts of occupational licensing, wherein it focused on regulations promulgating licensing requirements that serve as barriers to entry in the regulated industries.[60] Its advocacy regarding[61] direct-to-consumer auto sales concerned state laws that prevented car manufacturers from selling in direct competition to franchised dealerships.[62] Its advocacy regarding ridesharing addressed local laws that imposed barriers to entry upon ridesharing services offering competition to regulated taxicabs.[63]

The patent system, however, is dissimilar to these regulations. This is because the patent system can influence competition in multiple markets. This can be illustrated with reference to the principles that the FTC and DOJ articulated in

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[58] Maurice E. Stucke, *Better Competition Advocacy*, 82 ST. JOHN'S L. REV. 951, 964 (2008). In order to determine the avenues for competition advocacy, as professor Maurice Stucke notes, one must examine "what, exactly, are we advocating when we advocate competition." *Id*. To do so, one must first answer "how does one define competition," and then address "what are the goals of that competition policy." *Id*.

[59] 11 HERBERT HOVENKAMP, ANTITRUST LAW ¶ 1906a, 235 (2d ed. 2005).

[60] *See, e.g.*, Andy Gavil & Chris Grengs, *Getting around town in the share economy*, FED. TRADE COMM'N, (April 21, 2014), https://www.ftc.gov/news-events/blogs/competition-matters/2014/04/getting-around-town-share-economy [https://perma.cc/E6B9-G8NV].

[61] *See, e.g.*, Fed. Trade Comm'n, *Economic Liberty: Opening doors to opportunity*, https://www.ftc.gov/policy/advocacy/economic-liberty [https://perma.cc/XE4U-QHXB] (last visited Dec. 25, 2018) (addressing licensing requirements that serve as barriers to entry in the regulated industries).

[62] *See, e.g.*, Marina Lao, Debbie Feinstein & Francine Lafontaine, *Direct-to-consumer auto sales: It's not just about Tesla*, FED. TRADE COMM'N (May 11, 2015), https://www.ftc.gov/news-events/blogs/competition-matters/2015/05/direct-consumer-auto-sales-its-not-just-about-tesla [perma.cc/X3H3-CRFM] (concerning state laws preventing car manufacturers from directly competing with franchised dealerships).

[63] *See, e.g.*, Andy Gavil & Chris Grengs, *Getting around town in the share economy*, FED. TRADE COMM'N, (April 21, 2014), https://www.ftc.gov/news-events/blogs/competition-matters/2014/04/getting-around-town-share-economy [https://perma.cc/E6B9-G8NV] (addressing local laws that imposed barriers to entry upon ridesharing services offering competition to regulated taxicabs).

their Antitrust Guidelines for the Licensing of Intellectual Property. The Guidelines, which provide a framework for the competition analysis of patent licensing arrangements, explain that business conduct involving patent rights can have an impact on three distinct types of markets: goods markets, technology markets, and markets for research and development.[64] The Guidelines define goods, or product, markets as "markets for final or intermediate goods made using the intellectual property."[65] Much advocacy has addressed the influence of patents on goods markets. This is consistent with the approach noted in the Guidelines, which explained that the agencies "will typically analyze the competitive effects . . . within the relevant markets for the goods affected by the arrangements."[66] However, advocacy can also address technology markets. The Guidelines define technology markets as "intellectual property that is licensed," which may be separately addressed "when rights to intellectual property are marketed separately from the products in which they are used."[67]

In the case of product market competition, the grant of a patent can itself be viewed as a restraint on competition imposed by the Patent Office.[68] A patent grants its holder the right to exclude others from practicing its protected ideas, thereby distorting competition in the market for goods that infringe the patent. One path for advocacy, therefore, would be to ensure that this restraint upon competition is sized appropriately to accomplish the policy goals of the patent system. Such advocacy addresses the interface of competition policy and patent policy which, according to the contemporary view, work towards consistent aims and can therefore be balanced.[69] Under this view, the patent system promotes innovation by addressing the public goods problem.[70] Absent patent rights, innovators could not prevent others from freely copying their ideas, thereby appropriating the value of the underlying innovations.[71] This would result in diminished incentives to innovate. Patents solve this problem by providing innovators with temporally limited exclusive rights. By doing so, the patent system promotes dynamic efficiency — the long-term gains that result from the

[64] 2017 Guidelines, *supra* note 42, at 8.

[65] *Id*. at 8-9.

[66] *Id*. at 8.

[67] *Id*. at 9.

[68] MURIS, *supra* note 21, at 2 ("Inherent in a patent's exclusivity is a potential limit on competition.").

[69] *See* Org. for Econ. Cooperation & Dev [OECD], *United States: Note for Roundtable on Competition, Patents and Innovation*, at 190, DAF/COMP(2007)/40 (2008); Mark A. Lemley, *A New Balance Between IP and Antitrust,* 13 SW. J. L. & TRADE AM. 237, 246 (2007); Christopher R. Leslie, *Antitrust and Patent Law as Component Parts of Innovation Policy*, 34 J. CORP. L. 1259, 1260 (2009).

[70] *Id*. at 248-50.

[71] *See generally* Louis Kaplow, *The Patent-Antitrust Intersection: A Reappraisal*, 97 HARV. L. REV. 1813, 1828 (1984); Mark A. Lemley, *The Economics of Improvement in Intellectual Property Law*, 75 TEX. L. REV. 989, 993-99 (1997).

development of entirely new ways of doing business.[72] However, the mechanism that the patent system uses, the grant of exclusive rights, can impede competition in the market for goods embodying the patented idea.[73] This can reduce static efficiency by leading to short-term price increases or reductions in consumer choice.[74]

A number of policy levers can influence this balance between static and dynamic efficiency, and competition advocacy has indeed spoken to achieving this balance.[75] For example, the *To Promote Innovation* report did so within the context of the "patent bargain"[76] — a concept which frames the grant of patent rights as *quid pro quo* for a patent holder's having disclosing their invention to the public.[77] The terms of this bargain are most directly set by the standards of patentability,[78] as expressed by doctrines such as subject matter eligibility,[79] novelty,[80] and obviousness.[81] The *To Promote Innovation* report addresses these legal standards, concluding that "the statutory standards of patentability appear largely compatible with competition," and, when "properly interpreted, they tend to award patents only when necessary to provide incentives for inventions."[82] Nevertheless, the report also raises "questions and concerns about [their] interpretation and application,"[83] and offers advocacy regarding the application of several standards, including the obviousness and written description requirements.[84]

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[72] *See* Org. for Econ. Cooperation & Dev [OECD], *supra* note 69, at 190.

[73] *Id*.

[74] *Id*.

[75] *See* TO PROMOTE INNOVATION, *supra* note 45, ch. 2, at 8 (stating that, "to the extent that the promise of patent protection is necessary to stimulate innovation . . . society accepts these costs as necessary to maximize long-term welfare. . . . " however "if the promise of patent protection is not necessary for these purposes . . . then the costs . . . may cause unjustified injury to consumers.").

[76] *See* TO PROMOTE INNOVATION, *supra* note 45, ch. 4, at 4.

[77] Bonito Boats, Inc. v. Thunder Craft Boats, Inc., 489 U.S. 141, 150-51 (1989) ("The federal patent system embodies a carefully crafted bargain for encouraging the creation and disclosure of new, useful, and nonobvious advances in technology and design in return for the exclusive right to practice the invention for a period of years.")

[78] *See, e.g*. Robert P. Merges & Richard R. Nelson, *On the Complex Economics of Patent Scope*, 90 COLUM. L. REV. 839, 845 (2014) (discussing how the doctrine of equivalents and the enablement doctrine influence patent scope); David Teece, Edward Sherry & Peter Grindley, *Patents & "Patent Wars" in Wireless Communications: An Economic Assessment*, 95 DIGIWORLD ECON. J. 85, 91 (noting the balance between the scope of protection and the scope of the inventive step).

[79] *See* 35 U.S.C. §101 (2012).

[80] *See* 35 U.S.C. §102 (2012).

[81] *See* 35 U.S.C. §103 (2012).

[82] TO PROMOTE INNOVATION, *supra* note 45, ch. 4, at 4.

[83] *Id*.

[84] *Id*., ch. 4 at 4-20.

The *Evolving IP Marketplace* likewise addresses this balance, providing advocacy on patent remedies.[85] As the degree to which a patent serves as incentive for innovation necessarily turns on an innovator's ability to recover the patent's value, the remedies available for patent infringement weigh in this balance. The *Evolving IP Marketplace* report explains that remedies that "either under or overcompensate patentees for infringement compared to the market" can have detrimental effects.[86] Under compensation "can undermine the patent system's incentives to innovate."[87] Overcompensation "can encourage speculation in patent rights and litigation," which can "deter innovation by raising the costs and increasing the risks of investment."[88]

Competition advocacy has not been limited to addressing product market competition. Rather, some successful advocacy has also addressed conditions in technology markets. Promoting the private trade of patent rights should be another goal of competition advocacy. Like other property rights, patents can be, and indeed are, traded in markets. As the FTC and DOJ have observed, these markets are often comprised of "rights to intellectual property . . . marketed separately from the products in which they are used."[89] The laws and regulations of the patent system have the potential to influence competition in such technology markets, and thus serve as fertile ground for competition advocacy.

A starting point for competition authorities is to study markets for the trade of patent rights in the same manner as they study other markets. Indeed, The FTC has taken this approach on several occasions. As its name suggests, the *Evolving IP Marketplace* report was based, in part, on a series of hearings studying licensing practices in various industries.[90] Prior to issuing recommendations on patent quality and notice, the report provides two chapters describing contemporary licensing practices.[91] Similarly, the FTC's *Patent Assertion Entity Activity* study was a market study of certain business practices in the secondary market for patent rights.[92]

While the study of product and technology markets is similar, there are fundamental distinctions between the two. For one, competition advocacy has seldom addressed laws that directly imposed naked restraints upon trade in technology markets.[93] Rather, advocacy has identified reforms that could reduce

[85] *See, e.g.*, THE EVOLVING IP MARKETPLACE, *supra* note 46, at 156-57.

[86] *Id.* at 4.

[87] *Id.*

[88] *Id.*

[89] 2017 Guidelines, *supra* note 42, at 9.

[90] THE EVOLVING IP MARKETPLACE, *supra* note 46, at 31-72.

[91] *Id.*

[92] *See generally* PATENT ASSERTION ENTITY ACTIVITY, *supra* note 52.

[93] This is illustrated by reference to the *Evolving IP Marketplace*. In its introduction, the report explains that one aspect of competition policy is achieving "a proper balance between exclusivity and competition," referring to the analysis provided in *To Promote Innovation*. THE EVOLVING IP MARKETPLACE, *supra* note 46, at 1. In addition, the report introduces an

transaction costs or mitigate market failures. These market failures arise because patent rights are intangible rights that are given the features of property solely by operation of law, and markets for their trade are therefore not inherently as efficient as markets for tangible rights such as those in real property.[94] This discrepancy is not an inescapable aspect of the patent system, and competition authorities may be able to rectify it by advocating for changes in the laws that create and define the patent grant. Although such advocacy is directed towards increasing market efficiency and not rectifying a restraint upon competition *per se*, there is precedent for such advocacy. For example, the FTC has provided similar advocacy in other contexts regarding laws and regulations that shaped trade for intangible goods, such as copyright licenses and landing slots at LaGuardia airport and did not themselves impose horizontal restraints upon competition.[95]

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additional aspect of competition policy, informed by its study of technology markets and markets for the trade of patent rights. *Id*. at 2. This is preserving the market effect of competition between technologies in technology markets, which "helps generate lower prices, more choices, and higher quality products for consumers." *Id*. The Introduction explains that the policies advocated in the report are intended to minimize the extent to which patent law distorts this competition between technologies. *Id*.

[94] *See* Robert P. Merges, *Intellectual Property Rights and the New Institutional Economics*, 53 VAND. L. REV. 1857, 1871 (2000).

[95] One example is an advocacy before the Federal Aviation Administration which advocated for the adoption of a proposed auction to allocate landing slots at LaGuardia Airport as a market-based mechanism to limit congestion, replacing the administrative assignment of slots. Staff of Bureau of Econ., Fed. Trade Comm'n, Comment before the Federal Aviation Administration in the Matter of Congestion Management Rule for LaGuardia Airport (June 19, 2008), https://www.ftc.gov/sites/default/files/documents/advocacy_documents/ftc-staff-comment-federal-aviation-administration-concerning-proposed-congestion-management-rule/v080015comment.pdf [https://perma.cc/Q54A-XS42]. Another example is an advocacy before the Federal Communications Commission regarding proposed changes to the rules of auctions for advanced wireless services licenses. Staff of Bureau of Econ., Fed. Trade Comm'n, Reply Comment before the Federal Communications Commission in the Matter of Auction of Advanced Wireless Services Licenses Scheduled for June 29, 2006 (Mar. 10, 2006), https://www.ftc.gov/sites/default/files/documents/advocacy_documents/ftc-staff-comment-federal-communications-commission-matter-auction-advanced-wireless-services/replyoftheftcbureauofeconomicsonfccawsauctionaudocket06-30.pdf [https://perma.cc/YM5S-AT5H]. Other examples include rules regarding copyright licenses for the rebroadcast of local programing by satellite and radio spectrum. Staff of Fed. Trade Comm'n, Reply Comment before the Copyright Office, Library of Congress in the Matter of Satellite Carrier Compulsory License; Definition of Unserved Household (Mar. 1998), https://www.ftc.gov/sites/default/files/documents/advocacy_documents/ftc-staff-comment-copyright-office-library-congress-concerning-satellite-carrier-compulsory-license/v980004.pdf [https://perma.cc/T8BV-D32T] (supporting the extension of a compulsory copyright license to avoid the transaction cost of broadcasters having to negotiate with individual programming rights holders); *see generally* Letter from David T. Scheffman, Dir., to Mark S. Fowler, Federal Comm'cn Comm'n Chairman (Oct. 29, 1986) (supporting the adoption of auctions to allocate broadcast licenses).

Improving technology market efficiency can promote consumer welfare. A well-functioning technology market is a compliment to a granted patent.[96] When patent holders exploit their grant through licensing or selling their patent rights, the market reward from that transaction provides the financial incentive to innovate — furthering the patent system's purpose.[97] It is the expectation that such a reward is available that motivates inventors to invest in developing and patenting inventions.[98] In this manner, the amount of incentive to innovate that a patent holder receives should incorporate the market-determined value of that technology.[99]

One area in which competition advocacy can play a role is ensuring that patent value is determined through the private trade of patent rights, as opposed to by judicial or administrative means. In the most fundamental sense, a patent license is a release by the patent holder of its claims of patent infringement against a licensee. As such, were two parties to fail to consummate an otherwise desirable patent license transaction, the would-be licensee would either be unable to participate in the marketplace for the product that the patent embodies, or would produce a product that infringes upon the patent holder's rights.[100] In the latter case, the patent holder would have to resort to the legal system to enforce their rights against the would-be licensee. This is problematic, as judicially imposed remedies for patent infringement tend to be less accurate and efficient than price

[96] This is consistent with the guidance that the competition agencies have offered on the competition analysis of patent licensing arrangements, which explains that such arrangements are frequently procompetitive. 2017 Guidelines, *supra* note 42, at 5. Agencies note that "licensing can allow an innovator to capture returns from its investment in making and developing an invention through royalty payments from those that practice its invention, thus providing an incentive to invest in innovative efforts." *Id.* (citing THE EVOLVING IP MARKETPLACE, *supra* note 46, at 40).

[97] *See id. See also* James Bessen & Michael J. Meurer, *Do Patents Perform Like Property?*, ACAD. OF MGMT. PERSP., Aug. 2008, at 8, 9 ("In addition, patents provide security to license and sell technology. These incentives are held to promote innovation and economic growth.")

[98] Bessen & Meurer, supra note 97, at 9.

[99] Jonathan Barnett, *Has the Academy Led Patent Law Astray?,* 32 BERKELY TECH. L.J. 1313, 1313-80 (2017).

[100] Other consequences may also be undesirable. For example, if the would-be licensee would opt to refrain from producing an infringing product without a license, then consumers may be denied the benefits of the technology.

discovery in the market,[101] which should reflect private information regarding the value of the patented technology.[102]

Promoting private trade in patent rights is therefore an additional policy goal of the patent system, which compliments the goal of providing patent holders with an incentive to innovate.[103] Trade in the market for technology is influenced by the laws and regulations that govern the patent grant.[104] Proposed reforms can be viewed both in terms of how they impact the incentive provided to the patent holder, as well as how they influence this trade.[105] When addressing the latter consideration, studying the technology marketplace and identifying market failures is a means of identifying areas of advocacy.

V. INEFFICIENCIES IN TECHNOLOGY MARKETS

Competition authorities have used competition advocacy to address a number of reforms to the patent system. Analytically, these reforms can often be viewed as influencing competition in product markets, technology markets, or some combination of the two.

Competition policy regarding the influence of patent rights on product market competition often uses policy levers synonymous with patent strength: stronger

[101] The litigation process imposes costs upon the parties involved and is prone to erroneous results. *See* Jonathan Barnett, *Has the Academy Led Patent Law Astray?,* 32 BERKELY TECH. L.J. 1313, 1320 (2017) ("[C]ourts and regulators are inherently underinformed compared to market participants and are therefore unlikely to price assets appropriately."); Epstein, Kieff & Spulber, *supra* note 29, at 23 ("[C]ourts and regulators certainly lack the expertise and detailed technological knowledge, let alone the resources and time, to intervene and control the extensive private negotiations occurring at the technological frontier.").

[102] *See* SUZANNE SCOTCHMER, INNOVATION AND INCENTIVES 96 (2004) (discussing innovation reward systems).

[103] *See* Barnett, *supra* note 99, at 1320 ("[P]atents do not only operate to recover returns on innovation but supply legal 'envelopes' that enable transactions with parties that can most efficiently implement the commercialization process that is necessary for an innovation to reach market."); Daniel F. Spluber, *How Patents Provide the Foundation of the Market for Inventions*, 11 J. COMP. L. & ECON. 271, 274 (2015) ("[T]he key features of the patent system . . . increase *transaction efficiencies and stimulate competition* in the market for inventions."); *id*. at 276 ("The market foundation role of patents offers insights into public policy toward IP. With patent protections for IP, the market for inventions determines the market value of inventions and the returns to invention, innovation, and complimentary inventions.").

[104] *See* Richard E. Epstein & David J. Kappos, *Legal Remedies for Patent Infringement: From General Principles to FRAND Obligations For Standard Essential Patents*, 9 COMP. POL'Y INT'L 69, 70 (2013) ("The legal system . . . establish[es] standard modes of transacting that reduce the friction for voluntary transactions, in turn increasing the probability of their occurrence and the gains they generate.").

[105] *See Id*. at 69 (observing that "patents live in two parallel universes:" and that they exist "as a creature of the state," granted subject to "certain conditions the state sets as part of the patent bargain;" but also that "they are part of a larger system of property."); Spluber, *supra* note 103, at 275 (observing that "[t]he market foundations role of patents stands in stark contrast to the common view that patents provide 'rewards' for inventors.")

rights will provide greater incentives to innovate to their owners than weaker rights, at the expense of greater distortion of static market competition.[106] The competing concerns of patent holdup and patent holdout, which are featured frequently in contemporary patent policy debates, are also diametrically opposed along this dimension.[107] As a general matter, proponents of the patent holdup theory argue that, for multiple reasons, the patent system confers too much leverage to patent holders.[108] In contrast, proponents of patent holdout theory argue that the system tends to provide patent holders with inadequate returns to serve its incentive function.[109]

Alternatively, competition advocacy has also spoken to reforms that reduce distortions to competition in technology markets without necessarily addressing the issue of patent strength. Although such advocacy may not always explicitly indicate that it is doing so, a number of proposed reforms have addressed recognized inefficiencies in such markets. Technology markets are often inefficient or illiquid.[110] A number of commentators have addressed the reasons for this inefficiency.[111] A review of this commentary identifies three transaction costs in

[106] Maureen K. Ohlhausen, *Patent Rights in a Climate of Intellectual Property Rights Skepticism*, 30 HARV. J. L TECH. 103, 116-22 (2016).

[107] Collen V. Chien, *Holding Up and Holding Out*, 21 MICH. TELECOM. & TECH. L. REV. 1, 5-6 (2014).

[108] *See id.* at 9.

[109] *See id.*

[110] Andrei Hagiu & David B. Yoffie, *The New Patent Intermediaries: Platforms, Defensive Aggregators, and Super Aggregators*, 27 J. ECON. PERSP. 45, 46 (2013) (observing that the market for patents is illiquid and inefficient).

[111] *Id.* at 46-48 ("First, patents are much more difficult to value than other goods. . . . Second, both sides of the patent market face high search costs. . . . Third, patent transactions always happen in the shadow of litigation, which exacerbates valuation problems and creates large transaction costs."). *See also*, Ajay Agrawal, Iain Cockburn & Laurina Zhang, *Deals Not Done: Sources of Failure in the Market of Ideas,* 36 STRATEGIC MGMT. J. 976, 981 (describing market failures that occur in three stages of technology licensing: "1) identifying a buyer/seller, 2) initiating negotiations, and 3) reaching an agreement"); Michael P. Akemann, John A. Blair & David J. Teece, *Patent Enforcement in an Uncertain World: Widespread Infringement and the Paradox of Value for Patented Technologies* 2 (Tusher Ctr. for the Mgmt. of Intellectual Capital, Working Paper No. 6, 2014) ("[F]uzzy boundaries, along with high litigation costs, often render patent licensing agreements inherently difficult to write, monitor, and enforce."); Ben Depoorter, *Property Rules, Liability Rules and Patent Market Failure*, 1 ERASMUS L. REV. 59, 66 (2007-2008) ("[S]uccessful patent license negotiations depend on an accurate assessment of (1) the value of innovation, (2) the boundaries of patents on the underlying innovations, and (3) externalities involved in patent license agreements."); Mark A. Lemley and Carl Shapiro, *Probabilistic Patents*, 19 J. ECON. PERSPECTIVES 75, 76, 80 (2005) (discussing uncertainty regarding scope and validity and observing that, "when patents are litigated, substantial uncertainty arises."); Carl Shapiro, *Navigating the Patent Thicket: Cross Licenses, Patent Pools, and Standard Setting,* INNOVATION POL'Y & ECON. 119, 144 (2000) (noting "significant transaction costs for those seeking to commercialize new technology based on multiple patents, overlapping rights, and holdup problems."); Spluber,

particular. The first relates to uncertainty associated difficulty valuing patents.[112] Part of this is due to the fact that it is often difficult to ascertain the exact scope and quality of a patent without recourse to litigation, which is costly and lengthy.[113] Second, finding trading partners — a necessary prerequisite to conducting a transaction — is often difficult, as patent holders may find it difficult to identify firms who might commercialize their patents.[114] Conversely it is difficult for those firms to determine which patents which are relevant to their products and therefore must be licensed.[115] Third, product complexity — which often results in multiple firms holding the patents required to bring a product to market — can distort the market pricing of individual patents when traded in isolation.[116] This can also result in high contracting costs, as manufacturers might need licenses from multiple patent holders.[117] This section illustrates how the Federal Trade Commission has addressed each of these issues through competition advocacy.

A. Transaction Costs Due to Uncertain Value

In order for parties to come to an agreement for the sale of any property, they must come to an agreement on its value. If there is uncertainty regarding that value, they must be able to contract around that risk. The patent system poses a

supra note 103, at 294 (noting that transaction costs include "search costs, bargaining costs, moral hazard, and contracting costs.").

[112] Depoorter, *supra* note 111, at 67 ("[R]esearch into patentable inventions entails a significant degree of *ex ante* uncertainty. It is unduly hard to predict inventions or estimate their value with any degree of success."); Hagiu & Yoffie, *supra* note 110, at 46-47 ("[P]atents are much more difficult to value than other goods. . . . What sets patents apart is that every patent is by definition unique: they lack 'comparables,' which are used in many markets to estimate a given asset's value.").

[113] Akemann et al., *supra* note 111, at 6; Depoorter, *supra* note 111, at 69; Hagiu & Yoffie, *supra* note 110, at 48 ("[P]atent transactions always happen in the shadow of litigation, which exacerbates valuation problems and creates large transaction costs.").

[114] Hagiu & Yoffie, *supra* note 110, at 47 (parentheticals omitted) (emphasis in original) ("For patent owners, it is prohibitively costly to find all current users and all *potential* applications of their patents. For potential patent buyers or users, it is very costly to find all prior art and patents that 'read on' their products").

[115] *Id*.

[116] *Id*. ("More importantly, patent value in many modern technologies is subject to strong complementarities and portfolio effects . . . As a result, the value of *individual* patents is heavily discounted. Potential buyers or licensees may not place much value on a given patent sold by itself unless it compliments a portfolio they already own.") (emphasis in original).

[117] Depoorter, *supra* note 111, at 71-72 ("If a subsequent innovator has to obtain several licenses, the successful negotiation of patent license agreements is further complicated by the existence of externalities among the different patent rights holders. If many different prior innovations play a role, a tragedy of the 'anticommons' may emerge, whereby patent rights are overpriced and consequently underused.").

challenge for private contracting. While laws providing for well-defined property rights are often a necessary precondition to market development,[118] patent rights may not always be well-defined.[119] Patents have been described as having "fuzzy boundaries,"[120] and as being "probabilistic rights," whose scope and validity may not be certain until adjudicated.[121] This poses a significant barrier to private patent licensing — because a patent license is in part a release from future patent infringement suits, its price — and thus the underlying patent's value — reflects the parties' expectations regarding the legal liability that a court would impose upon the would-be licensee if it is found liable for patent infringement. As some uncertainty is inherent in the litigation process, markets for technology reflect both the uncertainty regarding whether a court would find a patent valid and infringed and the uncertainty regarding the remedies that a court would grant.

This uncertainty can hamper both bilateral negotiation for licenses and the development of markets for technology.[122] When there is significant uncertainty regarding the scope or validity of patent rights, private parties may turn to the courts to adjudicate their rights.[123] Alternatively, when parties hold widely disparate views of the value of a license, this can in some cases lead to a breakdown

[118] Harold Demsetz, *Toward a Theory of Property Rights*, 57 AM. ECON. REV. 347, 347 (1967); Joshua S. Gans, David H. Hsu & Scott Stern, *The Impact of Uncertain Property Rights on the Market for Ideas: Evidence from Patent Grant Delays*, 54 MGM'T SCI. 982, 983 (2008); Jay P. Kesan & Anders A. Gallo, *The Political Economy of the Patent System*, 87 N. CAROLINA L. REV. 1341, 1347 (2009) ("In particular, well-defined and well-enforced property rights are some of the main instruments to minimize transaction costs, because the holders of property rights can readily dispose of their assets into the most productive activities. . . . [U]ncertainty and the high costs of enforcing property rights induce high levels of wasted resources spend validating the property rights of an asset, thereby reducing the level of investment in innovations."); *id.* (citing literature suggesting "economic growth will be maximized in societies where institutions minimize transaction costs and foster market exchange."); Mark A. Lemley, *The Economics of Improvement in Intellectual Property Law*, 75 TEX. L. REV. 989, 1055 (1997); Stewart E. Sterk, *Property Rules, Liability Rules, and Uncertainty about Property Rights*, 106 MICH. L. REV. 1285, 1296 (2008) ("[C]larity in property rights makes it possible to structure a market that efficiently allocates resources."); Harry Surden, *Efficient Uncertainty in Patent Interpretation*, 68 WASH. & LEE L. REV. 1737, 1755 (2011).

[119] *See, e.g.,* Depoorter, *supra* note 111, at 69 (noting that "the real-property rule analogy to patents . . . operates based on the assumption that patent rights are relatively well-defined," but that "this assumption does not hold true.").

[120] JAMES BESSEN & MICHAEL J. MEUER, PATENT FAILURE: HOW JUDGES, BUREAUCRATS, AND LAWYERS PUT INNOVATION AT RISK 54 (2008); Akemann et al., *supra* note 111, at 2.

[121] *See* Lemley & Shapiro, *supra* note 111, at 76.

[122] *See* Joshua S. Gans & Scott Stern, *Is there a Market for Ideas?*, 19 IND. & CORP. CHANGE 805, 822 n.16 (2010); Gans, Hsu & Stern, *supra* note 118, at 983; Hagiu & Yoffie, *supra* note 110, at 48.

[123] Mark A. Lemley & Philip J. Weiser, *Should Property or Liability Rules Govern Information?*, 85 TEX. L. REV. 783, 794 (2007); Akemann et al., *supra* note 111, at 2 ("The fuzzy

of license negotiations altogether.[124] This can impose unnecessary costs, as litigating a case to resolution is costly and time-consuming.[125]

One frequent area of uncertainty is uncertainty as to the scope of patent claims — which lay out the metes and bounds of the patent grant.[126] Ambiguous claim language and differing approaches to claim interpretation can result in uncertainty regarding the scope of granted patents.[127] The *Evolving IP Marketplace* addresses some of the transactional challenges that stem from this uncertainty.[128] It notes that an effective notice system, in which parties can "ascertain applicable patent rights at reasonable cost and with reasonable certainty, is essential for patents to operate as a property system."[129] The report observes that clear notice promotes technology transactions by enabling parties to contract efficiently.[130]

The *Evolving IP Marketplace* provides recommendations to address the "lack of clarity around patent rights," which lead to "difficulties in interpreting the boundaries of issued claims"[131] The report cites representatives of the IT and telecommunications industries who indicated that patents are "difficult to interpret."[132] In response to the "central obstacle" of imprecise claim language —the unavoidable challenge of expressing technical concepts in words[133] — the report

boundaries of IP rights, therefore, become sharpened or clarified only as litigation and/or licensing activities build a legal and market-based picture of those boundaries. These fuzzy boundaries, along with high litigation costs, often render patent licensing agreements inherently difficult to write, monitor, and enforce."); Depoorter, *supra* note 111, at 71 ("The difficulties inherent in determining the boundaries of patents obviously drive up the costs of license negotiations."); Surden, *supra* note 118, at 1752.

[124] Depoorter, *supra* note 111, at 68 ("these high levels of uncertainty regarding the value of a patent make a prospective licensee more cautious and less generous when negotiating a price for a patent license. When both parties' expectations diverge too widely, no licensing agreement will be reached."); Gans, Hsu & Stern, *supra* note 122, at 983-85 (noting that uncertainty over patent scope and market value and the outcome of the litigation process can raise barriers to market exchange); Lemley, *supra* note 118, at 1056 (noting that uncertainty regarding both whether a license is necessary and what its value should be could undermine license negotiations).

[125] *See* Stewart E. Sterk, *Property Rules, Liability Rules, and Uncertainty about Property Rights*, 106 MICH. L. REV. 1285, 1299 (2008) (noting "the notorious difficulty in assessing the breadth and coverage of patent claims"); Depoorter, *supra* note 111, at 70 (noting the "notoriously high costs of patent litigation" needed to determine the exact scope of a patent).

[126] Surden, *supra* note 118, at 1737.

[127] Depoorter, *supra* note 103, at 70.

[128] THE EVOLVING IP MARKETPLACE, *supra* note 46, at 92-135.

[129] *Id*.

[130] *Id*. at 74 ("[T]echnology transfers . . . are most effective when patents provide clear notice of their boundaries. . . . [T]his enables parties to contract efficiently . . . facilitating both collaboration . . . and competition among inventions in technology markets.").

[131] *Id*. at 81-86.

[132] *Id*. at 81-82.

[133] *Id*. at 83-84.

offers recommendations regarding both the standard for claim definiteness, as well as the content of the patent application's public record.[134]

Uncertainty regarding claim scope is not merely a function of ambiguity in the claims themselves — it is a function of the legal procedures and rules used to interpret claim language.[135] During patent litigation, federal courts hold a pre-trial "Markman hearing" on the proper construction of the claims, normally issuing an order defining the claim scope.[136] This process can create more uncertainty — both regarding the underlying facts and evidence which the court will consider as well as the court's application of the law.[137] Adjusting the legal rules governing claim construction so as to more effectively lead different parties to the same understanding of claim scope could mitigate this uncertainty.[138]

Claim construction is just one example of uncertainty resultant from the operation of legal doctrines. In addition to claim scope, patents are also of uncertain validity.[139] Like claim construction, the laws governing standards of patentability such as anticipation and obviousness make tradeoffs that influence the complexity and predictability of adjudication.[140] These doctrines balance tradeoffs between operating as bright line rules, thus providing clarity to the market, and operating as standards that may provide greater accuracy after lengthy factfinding and analysis.[141] The *To Promote Innovation* report recognizes the role that

[134] *Id*. at 94.

[135] *See* Greg Reilly, *Completing the Picture of Uncertain Patent Scope*, 91 WASH. U. L. REV. 1353, 1355-56 (2014); Surden, *supra* note 118, at 1759-60.

[136] *See* Depoorter, *supra* note 111, at 70 (noting that the initial determination regarding the scope of patent claims made by the Patent Office is reevaluated by the court in the event of litigation); Reilly, *supra* note 135, at 1356.

[137] Peter S. Menell, Matthew D. Powers & Steven C. Carlson, *Patent Claim Construction: A Modern Synthesis and Structured Framework*, 25 BERKELEY TECH. L.J. 711, 774 (2010) ("Determining the standards for according deference to prior Markman orders, as well as the application of such standards, has proven to be complicated in practice. Parties, sometimes uncritically, invoke a variety of doctrines. . . . The intermediate nature of Markman rulings makes it all the more complicated to apply such doctrines. Markman rulings are . . . not final judgments . . . are not always vital to the outcome and might be vacated as part of a settlement agreement. An additional complicating factor is the characterization of Markman rulings as questions of law. As a result, determining the preclusive effect of such orders requires navigation of overlapping and not entirely cohesive civil procedure doctrines.")

[138] Reilly, *supra* note 135, at 1357 ("Claim construction's impact on uncertain patent scope depends on how effective its rules are at leading different observers to reach the same conclusion on claim meaning, which in turn depends both on whether the rules for claim construction are well-established and indisputable and whether the substance of those rules is likely to generate a single meaning, rather than a range of possible meanings.").

[139] *See* Lemley & Shapiro, *supra* note 111, at 76.

[140] *See* David O. Taylor, *Formalism and Antiformalism in Patent Law Adjudication: Rules and Standards*, 46 CONN. L. REV. 415, 423, 435 (2013)

[141] *See id*. (noting that while adopting clearer rules will provide better guideposts for private actors to value patent rights, there are tradeoffs promoting the adoption of bright-line rules over more flexible standards)*; see id*. at 423.

uncertainty could play on private contracting. It cites "numerous panelists" who described "massive uncertainty . . . as characteristic of the patent system," including uncertainty as to scope and validity, which "often is subject to question and not resolved until the end of litigation."[142] This uncertainty "disrupts the working out of licenses."[143] The report recommends that "legal systems also should consider the extent to which they create or minimize costs or business uncertainty through the use of specific procedures and presumptions."[144] It notes that "trade-offs may be necessary among the accuracy, transparency, and manageability of substantive standards," and that "the goal is to minimize . . . the detrimental effects of uncertainty."[145]

The computation of remedies for patent infringement may also introduce uncertainty. The *Evolving IP Marketplace* report notes comments that the oft-employed *Georgia Pacific* evidentiary standard[146] for determining reasonable royalties provides a "lack of guidance and framework."[147] This could lead "the trier of fact to reach virtually any outcome"[148] — a substantial issue given that , when parties have "unrealistic expectations about the likely size of the reasonable royalty award," they may be unable to reach agreement on a license absent litigation.[149]

The observations in the *Evolving IP Marketplace* report are consistent with academic commentary.[150] Commentators have noted that the *Georgia Pacific*

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[142] TO PROMOTE INNOVATION, *supra* note 45, ch. 5 at 3.

[143] *Id*. ch. 5, at 4. *See also id*. ch. 5, at 20 ("[U]ncertainty regarding patent validity . . . harms competition and innovation by . . . interfering with the . . . negotiation of licenses.").

[144] *Id*. ch. 1 at 38.

[145] *Id*.

[146] The *Georgia Pacific* evidentiary standard refers to "[a] comprehensive list of evidentiary facts relevant, in general, to the determination of the amount of a reasonable royalty for a patent license." Georgia-Pac. Corp. v. U.S. Plywood Corp., 318 F. Supp. 1116, 1120 (S.D.N.Y. 1970), *modified and aff'd sub nom*., 446 F.2d 295 (2d Cir. 1971).

[147] THE EVOLVING IP MARKETPLACE, *supra* note 46, at 182.

[148] *Id*. at 183.

[149] *Id*. at 170.

[150] *See, e.g*., Stuart Graham, Peter Menell, Carl Shapiro & Tim Simcoe, *Final Report of the Berkeley Center for Law & Technology Patent Damages Workshop August 15, 2016*, 25 TEX. INTELL. PROP. L.J. 115, 116 (2017) ("Determining a reasonable royalty in these complex circumstances often strains both remedial principles and economic analysis."). *Id*. at 115-16 ("The principal legal framework for determining a reasonable royalty . . . has been widely criticized as ambiguous, unworkable, inherently contradictory, and circular."); David O. Taylor, *Using Reasonable Royalties to Value Patented Technologies*, 49 GA. L. REV. 79, 150 (2014) ("A problem with the *Georgia-Pacific* factors and the hypothetical negotiation construct is that their flexibility leads to great uncertainty."); John M. Golden, *Reasonable Certainty in Contract and Patent Damages*, 30 HARV. J. L. & TECH. 257, 263 (2017) ("The fundamental concern with reasonable royalty calculations is that, even after several years of increased scrutiny and new instruction from the courts, they remain enmeshed in massive methodological and quantitative uncertainty.").

standard is broad enough to allow for the admission of a wide variety of valuable evidence.[151] As a result, applications of the *Georgia Pacific* standard can yield unpredictable outcomes. The magnitude of this uncertainty is significant: as both Professor John Golden and this paper's author have previously noted, the current law can result in the presentation of competing royalty claims to the jury that differ by a factor of over one-hundred.[152] In turn, this uncertainty poses impediments to parties seeking to value or license patent rights.[153]

B. Transaction Costs Related to Finding Trading Partners

Costs related to finding trading partners can also frustrate patent licensing.[154] If trading partners cannot find each other, there can be no trade in technology markets.[155] This can impact both patent holders and prospective licensees.[156] It may be difficult for patent holders to identify all firms that may practice their patents.[157] This might even require reverse engineering or access to nonpublic product information, such as source code.[158] Likewise, it may be difficult for manufacturers to identify the patent holders from which they may require a license.[159] Doing so requires identifying patents relevant to their products, and then identifying the owners of those patents.[160] The *Evolving IP Marketplace* report addresses the latter problem in its advocacy regarding patent notice.[161]

One of the three notice subjects that the *Evolving IP Marketplace* discusses is the "difficult[y] in sifting through a multitude of patents."[162] This refers to the

[151] *Id*. at 263; *see* Graham et al., *supra* note 150, at 126 (noting the *Georgia Pacific* framework "was so broad and open-ended as to permit a wide range of reasonable royalty results").

[152] John E. Dubiansky, *A Competition Perspective on Apportionment of Patent Infringement Remedies*, COMPETITION POL'Y INT'L: N. AM. COLUMN, May 2016, at 1, 4-5 (citing cases); John M. Golden, Commentary, "*Patent Trolls*" *and Patent Remedies*, 85 TEX. L. REV. 2111, 2151 (2007) (citing cases).

[153] Erik Hovenkamp & Jonathan Masur, *How Patent Damages Skew Licensing Markets*, 36 REV. LITIG. 379, 379-80 ("[A]s a policy issue, what matters most is not the number of dollars awarded in a particular case, but rather the legal standard used to choose that amount. Such standards have a substantial impact on the private exchange of patent rights and should therefore be viewed as an important policy lever for encouraging the efficient dissemination and commercialization of patented damages.").

[154] *See* Hagiu & Yoffie, *supra* note 110, at 47.

[155] *Id*. at 45-46.

[156] *Id*.

[157] *Id*. at 47.

[158] Sunny Handa, *Reverse Engineering Computer Programs under Canadian Copyright Law*, 40 MCGILL L.J. 621, 629 (1995).

[159] *See* Hagiu & Yoffie, *supra* note 110, at 47.

[160] Id. at 46. *See also* THE EVOLVING IP MARKETPLACE, *supra* note 46, at 92-135.

[161] *See generally* THE EVOLVING IP MARKETPLACE, *supra* note 46, at 92-135.

[162] *Id*. at 90-92, 126-135.

ability of manufacturers to "identify and review the patents and patent applications that might cover its products."[163] The report cites testimony indicating that, in the information and communications technology industries, such review is "almost cost prohibitive" due to the "sheer number[]" of patents.[164] It analyzes several contributions to this problem, such as the patent classification system and challenges with the computerized searching of patent databases.[165] The report recommends improvements to address these issues.[166]

The *Evolving IP Marketplace* report also recommends the enactment of legislation requiring the public recording of patent assignments.[167] The report notes that the current system, in which such recording is voluntary, may fail to provide manufacturers with the identity of those who own relevant patents.[168] This may frustrate manufacturers attempts to engage such patent owners in license negotiations.[169] In 2013, the FTC and the DOJ cited this recommendation in advocacy before the Patent Office in support of a proposal to collect and publish information regarding the ownership of patent applications, including the real party of interest behind applications.[170]

C. Transaction Costs Due to Product Complexity

Competition advocacy can be a tool to address situations where changing technologies or business practices create a tension between laws and the conditions of the markets they govern.[171] The FTC has used advocacy to address areas where modern developments in technology create such tensions.[172] Modern technology is very different than the state of the art at the time that the patent

[163] *Id*. at 90.

[164] *Id*. at 90. However, participants in the biotechnology industry did not express similar problems. *Id*. at 92.

[165] *Id*. at 127-29.

[166] *Id*. at 134.

[167] *Id*.

[168] *Id*. at 129-30.

[169] *Id*. at 130-31.

[170] U.S. Dep't Justice & Fed. Trade Comm'n, Comment Before the United States Department of Commerce Patent and Trademark Office In the Matter of Notice of Roundtable on Proposed Requirements for Recordation of Real-Party-in-Interest Information Throughout Application Pendency and Patent Term, at 1, 4 (Feb. 1, 2013), https://www.ftc.gov/sites/default/files/documents/advocacy_documents/proposed-requirements-recordation-real-party-interest-information-throughout-application-pendency.pto-p-2012-0047-patent-and-trademark-office/130201pto-rpi-comment.pdf.

[171] Andrew J. Gavil, *The FTC's Study and Advocacy Authority in Its Second Century: A Look Ahead*, 83 GEO. WASH. L. REV. 1902, 1914 (2015) ("Disruptive, new business models that emerge in regulated industries can provoke tensions due to regulatory incompatibility. . . . [T]hey can differ enough that there is a mismatch between the particular features of the business model and the regulatory scheme.").

[172] *Id*.

system was created, and the industrial organization of modern research and development is likewise very different than the organization of industry at the time of the Nation's founding.[173] One significant area of difference is product complexity.[174]

Modern technologies, such as computers and smartphones, can be comprised of hundreds of discrete components and thousands of lines of code.[175] These products incorporate and build upon many different prior innovations.[176] This is in contrast to the types of innovations prevalent at the time of creation of the patent system; as Professors Lemley and Shapiro observed, "the patent system is designed with a paradigm invention in mind-a new device or machine covered by a single patent."[177] Likewise, the business conduct involved in licensing patents related to complex technologies may differ from the licensing of the paradigmatic single-patent technology.[178] The *To Promote Innovation* report provides an overview of several ways that difference could impact technology market transactions.[179]

First, the *To Promote Innovation* draws a contrast between standalone innovation and cumulative innovation.[180] The report describes standalone innovation as innovation that "is a 'one-time' event."[181] It contrasts this with cumulative innovation, where "innovation is an ongoing process, with one invention frequently providing a building block for the next."[182] The report argues that "the simplest economic model of the patent system assumes that innovation is [standalone]", whereas cumulative innovation better reflects conditions "in the real world."[183] It also explains that cumulative innovation poses a more nuanced

[173] *See id*. at 1905.

[174] *See id*.

[175] *See* Shapiro, *supra* note 111, at 120.

[176] Extrapolating on Isaac Newton's quote "each scientist 'stands on the shoulders of giants 'to reach new heights," Shapiro offered the analogy of "researchers . . . effectively standing on top of a huge pyramid" of many different prior ideas. *Id*. at 119-20.

[177] Mark Lemley & Carl Shapiro, *Patent Holdup and Royalty Stacking*, 85 TEX. L. REV. 1991, 1992 (2007). This paradigm has also informed the economic analysis of patent law: in 2000, Merges observed that "the economic literature on IPRs . . . customarily views property rights and product markets as coextensive . . . that one, and only one, property right covers the entirety of a marketable product." Robert P. Merges, *Intellectual Property Rights and the New Institutional Economics*, 53 VAND. L. REV. 1857, 1858-59 (2000). Merges further observed that "[c]omplex, multi-component products are the norm in many industries . . . and individual patents often cover only a single component or sub-component." *Id*. at 1859 (parenthetical omitted).

[178] TO PROMOTE INNOVATION, *supra* note 45, ch. 1 at 32-37.

[179] *Id*.

[180] *Id*. at 32

[181] *Id*.

[182] *Id*.

[183] *Id*.

policy question than standalone innovation.[184] Patents in the standalone innovation context cover discrete inventions — in theory, giving their inventor the right to exclude rivals, which increases its ability to appropriate value from its invention.[185] In contrast, promoting cumulative innovation requires balancing the value appropriated by both the initial innovator and the subsequent innovators, who are often the initial innovator's licensees.[186]

This policy balance is further complicated when products contain many components and distinct features. In such a case, a single product may be covered by many different patents, which further may be held by many different firms.[187] This can create what is referred to as a "patent thicket," which is "a dense web of overlapping intellectual property rights."[188]

For instance, *To Promote Innovation*, citing testimony from hearing participants regarding the impact of patent thickets, notes that representatives from the computer hardware industry claimed that there were over "90,000 patents generally related to microprocessors held by more than 10,000 parties," and "approximately 420,000 semiconductor and systems patents held by more than 40,000 parties."[189] One panelist described that, in the semiconductor industry, "a firm cannot make a new product without infringing hundreds if not thousands of patents."[190] Similarly, a panelist noted that, in the computer hardware industry, "the large number of issued patents . . . makes it virtually impossible to search all potentially relevant patents, review the claims, and evaluate the possibility of an infringement claim or the need for a license."[191] Testimony from representatives of the computer software industry painted a similar picture.[192] One panelist described that there could be "potentially dozens or hundreds of patents covering individual components of a product."[193] The *Evolving IP Marketplace* report also notes panelist testimony indicating that "IT [information technology] products typically compose hundreds or thousands of patents, with no one company holding all the rights necessary to manufacture a product."[194]

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[184] *Id*. at 36.

[185] *Id*.

[186] *See id*. at ch.1, 32, 36-37. *See also id*. at ch. 2, 21-25.

[187] Product complexity creates two related problems. On the one hand, a single patent that reads upon a complex product only reads upon a small part of the product; most of the product lies outside of its scope. On the other hand, a single product may be covered by many separate patents.

[188] Shapiro, *supra* note 111, at 120.

[189] *Id*. at ch. 3, 34.

[190] *Id*. at ch. 2, 28 (citation omitted).

[191] *Id*.

[192] *Id*. at ch. 3, 52.

[193] *Id*.

[194] THE EVOLVING IP MARKETPLACE, *supra* note 46, at 221.

The *To Promote Innovation* report explains potential problems associated with patent thickets,[195] including possible excessive transaction costs for follow-on innovators[196] who would have to negotiate multiple patent licenses with different rightsholders.[197] Citing the Supreme Court's decision in *BMI v. Columbia Broadcasting*,[198] the report explains that "high transaction costs can render licensing from multiple intellectual-property holders economically infeasible."[199]

To Promote Innovation considers the issue of patent thickets in its analysis of grants of low-quality patents.[200] An individual low-quality patent can impose costs on downstream innovators, "wast[ing] resources;" however, when many low-quality patents cover a single product, "questionable patents contribute to the patent thicket"[201] — an observation which informed the report's recommendations regarding patentability standards.[202] One example is the standard for patent obviousness, which per the report influences competition in three ways. First, an improper standard may grant patent holders unwarranted market power.[203] Further, as noted above, the doctrine influences the division of returns between initial and follow-on innovators.[204] Last, and most relevant to complex product industries, an overly lax obviousness standard can lead to a proliferation of patents, giving rise to patent thickets and their associated transactional problems.[205]

The report also explains that patent thickets can give rise to the complements problem. This refers to an application of an economic theory first identified in 1838 by Antoine Cournot, which suggests that complimentary patents would be licensed at higher aggregate royalties individually than they would be if licensed together as a package.[206] Cournot developed the theory in the context of the manufacture of brass, which required the inputs of copper and zinc, and contrasted the sale of brass by a single monopolist who controlled the markets for both copper and zinc with the sale of brass from a competitor who purchased the inputs from two separate firms, each of which had a monopoly in one of the

[195] TO PROMOTE INNOVATION, *supra* note 45, at 25-30. In addition, the report discussed the risks of group boycott by patent holders, patent flooding, and the creation of patent fences by competitors. *Id.*

[196] "Follow-on innovation" refers to cumulative innovation, and recognizes that "innovation is an ongoing process, with one invention frequently providing a building block for the next." TO PROMOTE INNOVATION, *supra* note 45, at 32.

[197] *Id.* at 27.

[198] Broadcast Music, Inc. v. Columbia Broadcasting Systems, Inc., 441 U.S. 1 (1979).

[199] TO PROMOTE INNOVATION, *supra* note 45, at 28 n.195.

[200] *Id.* at Executive Summary, 5-7.

[201] *Id.* at 7.

[202] *Id.* at ch. 4, 4-6.

[203] *Id.* at 5-6.

[204] *Id.* at 5.

[205] *Id.* at 5.

[206] *Id.* at ch. 2, 32.

metals.[207] In the former case, the single monopolist would charge a monopoly price for brass whereas in the latter case, the two monopolists would each charge a monopoly price for copper and zinc.[208] In the latter case, the aggregate monopoly rents would exceed the single monopoly rent in the former case. The *To Promote Innovation Report* observed that Cournot's theory would also apply to overlapping patent rights, noting that "when acting alone, patent holders . . . will demand higher aggregate royalties than they would if they acted as a group."[209]

Private ordering solutions may mitigate some of the complements problem. The *To Promote Innovation* report cites representatives of computer hardware and software industries who explained that they used approaches such as cross-licenses, patent pools, and standard setting organizations to address some of the problems attendant to patent thickets.[210] In his study of the problem, discussed below, Professor Shapiro similarly argued that these private ordering solutions could address the complements problem.[211] He noted, for example, that patent pools may be "the purest solution to the complements problem" and would benefit licensees, who would enjoy both "the convenience of one-stop shopping," as well as avoiding the risk of licensing patents that "turn out to be useless without other complimentary rights."[212]

A third problem identified in the *To Promote Innovation* report in the context of complex products is patent hold up. The report describes that hold up could occur in two different situations. In the first, "follow-on innovation and production depends on having access to patents that are economically infeasible to license because they are too numerous to license individually or even to learn about."[213] In the second, "secrecy surrounding a patent makes it very difficult for downstream actors to avoid it," particularly when there is uncertainty regarding the scope of pending and unpublished patent applications.[214] In either situation, "downstream actors . . . have to choose between the risk of being sued for infringement after they sink costs into invention or production, or dropping innovative or productive efforts altogether."[215] The report notes that either choice could injure economic welfare.[216]

Hold up can cause harm because a downstream actor that "has committed sunk costs to its innovation and production [is] thus locked in to the effort."[217] If the downstream actor learns of a patent only after being "locked in," it may be

[207] Shapiro, *supra* note 111, at 123.

[208] TO PROMOTE INNOVATION, *supra* note 45, at 32.

[209] *Id*.

[210] *Id*., at 41-43, 55.

[211] Shapiro, *supra* note 111, at 128-31, 134-38.

[212] *Id*. at 134.

[213] TO PROMOTE INNOVATION, *supra* note 45, at 28.

[214] *Id*. at 28-29.

[215] *Id*. at 28.

[216] *Id*.

[217] *Id*. at 29.

in a weaker bargaining position for a license than had it learned of the patent earlier, when it "might have used the opportunity to adopt alternate designs as leverage for seeking a competition royalty rate."[218] In such a case, the patentee "may be in a position to demand supra-competitive royalty rates."[219] The *To Promote Innovation* report cites two ways in which hold up can injure innovation and competition. First, it could compel downstream actors to pay inflated royalty rates which could "be passed on to consumers in the form of higher prices."[220] Second, the threat of hold up may reduce overall levels of innovation because some downstream actors would "refrain from introducing certain products for fear of holdup."[221]

In its discussion of patent hold up, the *To Promote Innovation* report cites Professor Carl Shapiro's 2000 *Navigating the Patent Thicket* paper.[222] Professor Shapiro discussed the tensions that complex technologies imposed on the patent system. In the case of "cumulative innovation and multiple blocking patents," Professor Shapiro reasoned, "strong patent rights can have the perverse effect of stifling, not encouraging innovation."[223] Professor Shapiro noted that the hold up problem is "worst in industries where hundreds if not thousands of patents, some already issued, others pending, can potentially read on a given product."[224] In such cases, he noted "the danger that a manufacturer will step on a land mine is all too real."[225] This was particularly the case, "under a system in which patent applications are secret and patents slow to issue."[226] He further asserted that hold up raised challenges that were irreparable absent patent-system reforms such as increased transparency regarding pending patent applications and improved mechanisms for post-grant review.[227]

In addition to this academic commentary, the *To Promote Innovation* report cites market participant commentary regarding hold up. Representatives of both the semiconductor and computer hardware industries indicated that the number of patents that may read upon their products was so large that it was "virtually impossible" to identify them all, making it likely that a manufacturer could be subject to hold up after introducing their product.[228] Representatives of the computer hardware industry similarly noted that "the presence of the patent thicket

[218] *Id*.

[219] *Id*.

[220] *Id*.

[221] *Id*.

[222] *See, e.g*., TO PROMOTE INNOVATION, *supra* note 45, at ch. 2, 28 n.197 (citing Shapiro, *supra* note 111, at 125).

[223] Shapiro, *supra* note 111, at 216. Professor Shapiro identified both the compliments problem and the holdup problem as challenges created by patent thickets. *Id*.

[224] *Id*.

[225] *Id*.

[226] *Id*.

[227] *Id*.

[228] TO PROMOTE INNOVATION, *supra* note 45, at ch. 2, 28; ch. 3, 39, 52.

makes patent infringement very difficult to avoid," and explained that patent holders could employ patent hold up as a strategic technique in licensing negotiations.[229]

The *To Promote Innovation* report relies upon this analysis of hold up in complex technologies to motivate the adoption of proposed reforms. The report explains that one cause of patent hold up was the problem of "submarine patents," patent applications that were intentionally kept secret during their pendency so that potential infringers would be unaware of the patents until after they implemented their technology.[230] Prior to the passage of the American Inventors' Protection Act of 1999 (AIPA), which requires the publishing of many patent applications eighteen months after filing, a patent application could remain nonpublic until the patent issued.[231] The report cites complaints that "over the years" a patent applicant would keep an application pending "while watching another company make substantial investments in technology," and then, "once the other company's sunk costs are large . . . obtain[] the patent, assert[] infringement, and 'hold[] up' the other company."[232] The report notes that the AIPA amendment, which lead to application publication in the majority of cases, "can assist inventors and businesses to some extent in avoiding hold up."[233]

The *To Promote Innovation* report also explains that continuation practice — including the use of claim amendments to obtain claims broader than those made public pursuant to AIPA patent application publication — may present related hold up problems.[234] To prevent this sort of opportunism, the report recommends a prior use defense to patent infringement for third parties who developed products prior to the publication of the patent claims asserted against them.[235]

The *Evolving IP Marketplace* report reiterates this recommendation in its discussion of patent notice.[236] In addition, the report introduces a new mechanism to address patent hold up — remedies for patent infringement. In 2007, after the *To Promote Innovation* report's publication, the Supreme Court decided *eBay v. MercExchange*.[237] *eBay* rejected the Federal Circuit's "general rule that courts

[229] *Id*. at ch. 3, 37, 39.

[230] *Id*. at ch. 3, 26.

[231] *Id*. at ch. 3, 26; *see also* Shapiro, *supra* note 111, at 1038-39.

[232] TO PROMOTE INNOVATION, *supra* note 45; *see also* Shapiro, *supra* note 111, at 126.

[233] TO PROMOTE INNOVATION, *supra* note 45, at ch. 1, 26; *see also* Shapiro, *supra* note 12, at 1038-39.

[234] TO PROMOTE INNOVATION, *supra* note 45, at ch. 4, 26-28.

[235] *Id*. at ch. 4, 31.

[236] THE EVOLVING IP MARKETPLACE, *supra* note 46, at 125.

[237] *eBay Inc. v. MercExchange, L.L.C.*, 547 U.S. 388, 391 (2006). The concurring opinion cites the *To Promote Innovation* report, which the Department of Justice also cited to the court in its *amicus curiae* brief supporting the application of the four-factor inquiry. *Id*. The brief argues that a "careful application" of the inquiry "would ameliorate . . . the so-called 'holdup' and 'patent thicket' scenarios." *See* Brief for the United States as Amicus Curiae Supporting Respondent at 21, *eBay Inc. v. MercExchange, L.L.C.*, 547 U.S. 388 (2006) (No. 05-130).

will issue permanent injunctions against patent infringers absent exceptional circumstances," and instead held that the equitable four-factor test for injunctive relief also applies to patent infringement.[238] In so doing, *eBay* created another policy lever for the patent system: the conditions under which courts could exercise their discretion to grant injunctive relief.

In 2007, Professors Lemley and Shapiro published an article, *Patent Holdup and Royalty Stacking*, which addressed how the grant of injunctive relief influenced the bargaining process for patent licenses.[239] The authors argued that the threat of injunctions could lead to hold up in complex products.[240] They offered a model of license negotiations in the shadow of injunctions to show that hold up could lead to inflated royalty rates.[241] The model illustrated that — as a result of the costs of switching to a noninfringing product design and the lost product sales prior to such a redesign[242] — the negotiated royalty rate in cases where the value of the patented feature is small relative to the total value of the licensed product could significantly exceed the level suggested by economic theory.[243] As a result, the authors concluded, because the prospective licensee would be willing to pay to avoid these costs, the threat of injunctive relief could lead to inflated royalty rates in complex products.[244] The authors described this as a form of hold up.[245]

Citing Professors Lemley and Shapiro, the *Evolving IP Marketplace* report argues that "the threat of an injunction allows a patentee to demand and obtain a higher royalty payment."[246] The report also cites testimony from industry participants explaining that they experienced the problem.[247] Representatives of IT manufacturers explained that the complex patent landscape and shortcomings of

[238] *eBay*, 547 U.S at 391 (the plaintiff must establish that: (1) that it has suffered an irreparable injury; (2) that remedies available at law are inadequate to compensate for that injury; (3) that a remedy is warranted considering the balance of the hardships between the parties; and (4) that the public interest would not be disserved by an injunction).

[239] Lemley & Shapiro, *supra* note 177, at 1994-2010, 2035-39.

[240] *Id*. at 1999-2002. They first propounded a "benchmark royalty level" that reflected the value of the patented technology and the likelihood that the patent was valid and infringed. *Id*. The patent holder and licensee would engage in Nash bargaining to distribute this value amongst themselves; the resulting royalty would therefore reflect patent value, strength, and the parties' relative bargaining acumen. *Id*. The authors then modelled license negotiation, and concluded that the negotiated royalty rate for a licensee that chose not to redesign its product to avoid infringement would exceed this benchmark and reflect both the cost that the licensee would incur to redesign, as well as the value of the non-patented features of its product that would be impacted by an injunction. *Id*.

[241] *Id*.

[242] *Id*.

[243] *Id*.

[244] *Id*.

[245] *Id*.

[246] THE EVOLVING IP MARKETPLACE, *supra* note 46, at 222.

[247] *Id*.

notice could lead to patent hold up.[248] Problems such as "the large number of patents, the uncertainty of patent scope and late issuing patents," made identifying all patents that might be asserted against an IT product "prohibitively expensive and sometimes impossible"[249] Thus, it was possible for such manufacturers to face allegations of patent infringement after sinking costs to produce and distribute infringing products.[250]

The *Evolving IP Marketplace* report argues that hold up "gives patent holders excessive bargaining power in component-based industries."[251] This is "because the infringer cannot separate the infringing component from the non-infringing ones," as a result an injunction would prevent the sale of both infringing and non-infringing components.[252] In the case of "a minor invention having several alternatives," the cost of adopting an alternative at the time of product design would be significantly less than the switching costs at the time of license negotiation and as a result, an infringer could "pay higher royalties than a competitive market" for the patented technology.[253] This would overcompensate patent holders, letting them "capture value that has nothing to do with [their] invention."[254] In that event, "the patentee's compensation is no longer aligned with the value of its technology."[255] In light of this observation, the report recommends that considerations of hold up inform the analysis that courts undertake when determining whether to grant injunctive relief upon a finding of infringement.[256]

VI. OPPORTUNITIES FOR COMPETITION ADVOCACY

The patent system will present continued opportunities for reform. One avenue for providing competition-based guidance to policymakers is through examining current technology markets to identify areas where those markets operate inefficiently. So examining and identifying will permit further analysis of individual laws and regulations contribution to these inefficiencies.

Product complexity will likely contribute to many of the challenges facing the contemporary patent system. While recent advocacy regarding patent hold up has addressed one such challenge, there will likely be more. Because this recent

[248] *Id*. at 221-22. In contrast, workshop participants representing the life sciences industry noted the "importance of exclusivity supported by patents" and raised concerns about decreased predictability in injunction law. *Id*. at 219.

[249] *Id*. at 222.

[250] *Id*.

[251] *Id*. at 225-26 (quoting Lemley & Shapiro, *supra* note 177, at 2010).

[252] *Id*.

[253] *Id*. at 144.

[254] *Id*. at 225-26.

[255] *Id*. at 144.

[256] *Id*.

advocacy has promoted reforms that would alter the remedies available for patent infringement, such advocacy implicates issues of patent strength.[257] However, advocacy focused on other issues raised by the underlying challenge of product complexity may focus on market inefficiencies that impede private transactions for patent rights without necessarily influencing patent strength.

Licensing in complex technologies underlies two business practices that the FTC has recently focused on: PAE behavior and SEP licensing. Following its publication of the *Evolving IP Marketplace* report, the FTC studied both practices. In 2011, it conducted a workshop on SEP licensing.[258] In 2012, it conducted a joint workshop with the Department of Justice on PAE licensing practices.[259] It followed this workshop with a market study of PAE activity, culminating in a report issued in 2016.[260]

The FTC's recent report on its *Patent Assertion Entity* study provides empirical insight into patent licensing in complex technology industries. The *Patent Assertion Entity* report summarizes a three-year market study that the FTC conducted into PAEs, which it defined as "businesses that acquire patents from third parties and seek to generate revenue by asserting them against alleged infringers."[261] The FTC found that the PAEs it studied most frequently licensed patents relating to computers and electronics.[262] These are the same industries that participants in the *To Promote Innovation* and *Evolving IP Marketplace* hearings identified as being prone to patent thickets.[263]

The Commission performed the study to provide a description "of the nonpublic aspects of PAE business models" in order to "enhance the quality of the policy dialogue" regarding patent reform.[264] To this end, the FTC used its compulsory process authority under FTC Act Section 6(b) to collect confidential business information from a variety of firms involved in patent assertion.[265] The FTC compelled information from twenty-two PAEs regarding all of their patent acquisition, litigation, and licensing behavior for an almost six-year period from

[257] *See id.*

[258] *See Tools to Prevent Patent "Hold-up:" IP Rights in Standard Setting,* FED TRADE COMM'N (June 21, 2011), https://www.ftc.gov/news-events/events-calendar/2011/06/tools-prevent-patent-hold-ip-rights-standard-setting [https://perma.cc/S2GB-896Q].

[259] *See Patent Assertion Entity Activities Workshop,* FED TRADE COMM'N (Dec. 10, 2012), https://www.ftc.gov/news-events/events-calendar/2012/12/patent-assertion-entity-activities-workshop [https://perma.cc/FEA5-ZGNY].

[260] *See generally* PATENT ASSERTION ENTITY ACTIVITY, *supra* note 52.

[261] *Id.* at 1.

[262] Seventy-five percent of all patents litigated by PAEs in the study related to computers or communications and many of the remaining patents related to other electronics. FED. TRADE COMM'N, *supra* note 45, at 74-76. In addition, seventy-five percent of Portfolio PAE licensees operated in the computer and electronic product manufacturing industries. *Id.* at 98-99.

[263] *See supra*, text accompanying notes 185-189.

[264] PATENT ASSERTION ENTITY ACTIVITY, *supra* note 52, at 2.

[265] *Id.* at 2.

2009 until 2014.[266] In addition, the FTC compelled information from an additional thirteen non-PAE firms that held and licensed patents in the wireless chipset sector, to provide a basis for comparison to PAE activity.[267]

The FTC reviewed data on 2,715 PAE patent license agreements executed by the twenty-two PAEs it studied.[268] These 2,715 agreements contracted with 1,400 separate licensees.[269] Collectively, these licenses represented royalty payments of over $4 billion.[270] The FTC compelled the production of not only each license agreement, but also answers to a number of questions regarding each agreement.[271] It further collected information regarding patent litigation and pre-suit correspondence related to these licenses.[272] Therefore, while this data is limited to the group of PAEs that the FTC studied, it nevertheless presents a very detailed view of the practice of licensing patents in complex technologies.

The study found, *inter alia*, that the PAEs at issue fell into two distinct groups: Portfolio PAEs and Litigation PAEs.[273] The report describes and contrasts the business practices of the two groups in detail.[274]As described in the report, Litigation PAEs generally did not enter into bilaterally negotiated licenses to their patents. Rather, they received revenues through "behavior . . . consistent with nuisance litigation."[275] Several observations in the report support this conclusion. First, the report observes that ninety-three percent of the Litigation PAE's license agreements followed the PAE's having filed a lawsuit against the licensee.[276] Second, many of those license agreements explicitly referenced the pending litigation and included dismissal of the lawsuit as part of the agreement.[277] Third, seventy-seven percent of those agreements were for royalty payments lower than a benchmark cost of defending a lawsuit through discovery.[278]

In contrast to the experience of Litigation PAEs, Portfolio PAEs frequently consummated licenses through bilateral negotiation.[279] The report indicates that

[266] PATENT ASSERTION ENTITY ACTIVITY, *supra* note 52, at 3.

[267] *Id*. at 103 n.265.

[268] *Id*. at 82 n.232.

[269] *Id*. at 97.

[270] *Id*. at 89.

[271] *Id*. at 82 n.230.

[272] *See id*. at 58-81.

[273] *Id*. at 3-4.

[274] *Id*. at 42-53.

[275] *Id*. at 43; *id*. at 4 n.8 (citing references indicating a nuisance suit is one which the cost of litigation will motivate defendants to settle despite the expectation that the defendant would likely prevail at trial).

[276] *Id*. at 83.

[277] *Id*. at 90.

[278] *Id*. at 91-92.

[279] *Id*. at 83.

seventy-one percent of Portfolio PAE licenses were negotiated without any corresponding litigation between the parties.[280] In addition, the Portfolio PAEs obtained significant revenues from their agreements: Portfolio PAEs accounted for nine percent of the license agreements reported in the study, but those agreements bore eighty percent of the reported revenue.[281]

Notably, the licenses offered by Litigation PAEs differed from those offered by Portfolio PAEs in one key dimension: the number of licensed patents. Litigation PAEs licensed small patent portfolios — seventy-five percent of their licenses were for between one and five patents and over ninety percent were for less than ten patents.[282] In contrast, Portfolio PAEs typically licensed hundreds or thousands of patents at a time — seventy-five percent of their agreements contained more than one thousand patents.[283]

The *Patent Assertion Entity Activity* report does not analyze the technology market conditions that motivated the behavior that it describes.[284] Nevertheless, one avenue to identify areas for future competition advocacy is to examine the empirical findings of the study for evidence of underlying market inefficiencies. Along these lines, one possible explanation for the distinction between Litigation PAE and Portfolio PAE behavior is that there is a market failure frustrating bilateral negotiation of the type of license that Litigation PAEs offer, causing those PAEs to turn to nuisance litigation in order to obtain revenues. The report is one of several pieces of evidence that suggest that the patent system may fail to support the bilateral negotiation of licenses for small portfolios in complex technologies with the same frequency as the licensing of large portfolios.[285]

Testimony provided at the FTC's 2011 workshop on SEP licensing also indicated that bilateral negotiation of small patent portfolios of SEPs was rare. Participants indicated that transaction costs related to valuing individual patents lead to most SEP transactions involving large portfolios of patents.[286] As one participant noted, "the little licenses are so trivial that the cost to actually sit down and do a negotiation for every possible license would just be too expensive."[287] Another participant explained that "one of the reasons why we've gotten

[280] *Id*. Similarly, only one percent of license agreements from manufacturing firms were included in the wireless chipset case study followed litigation. *Id*. at 119.

[281] *Id*. at 3.

[282] *Id*. at 83-84.

[283] *Id*. at 82-83.

[284] *See generally id*.

[285] *Id*. at 82-83.

[286] Anne S. Layne-Farrar, Remarks at the Fed. Commc'n Comm'n Workshop "Tools to Prevent Patent 'Hold-up': IP Rights in Standard Setting" 204 (June 21, 2011), https://www.ftc.gov/sites/default/files/documents/public_events/tools-prevent-patent-hold-ip-rights-standard-setting/transcript.pdf [https://perma.cc/GW3C-2WAV] ("It's precisely because these things are difficult to do, and taking a portfolio as a whole makes it a bit easier, because you have some comfort that, okay, I'm taking everything that's on this general technology.").

[287] *Id*. at 153.

to the place where lots of portfolios are licensed on a package is precisely because it can be so difficult to value these things."[288] As a result of these challenges, commentators noted that licensing on an individual patent basis was almost unheard of.[289]

These comments are consistent with several commentators' observations regarding the technology market more generally. Hagiu and Yoffie observe that "the patent market consists mainly of bilateral transactions . . . between large companies . . . [that] are privately negotiated and might involve hundreds or thousands of patents."[290] Sidak observes that "negotiation generally occurs over a bundle of patents rather than a single patent or a select few patents."[291] Akemann et al., observe that "it is generally not practical to try to negotiate licenses on [an individual] basis, as the transaction costs would be prohibitive," and that, therefore, "licensees often want the so-called 'design freedom' that comes with a broad portfolio-wide license."[292] Hagiu and Yoffie further observe that "market failures are most problematic for individual investors or small companies, who represent the majority of patent owners."[293]

It is possible that market inefficiencies may frustrate attempts to license individual patents that read on complex products. This would be significant for several reasons. First, this suggests that lone inventors and small enterprises with small patent holdings may be foreclosed from trade in technology markets. Second, private ordering solutions frequently cited to address the patent thicket problem, such as patent pools, rely upon the licensing of large patent portfolios, and may therefore not help to overcome this market failure for such small firms. Such small enterprises or lone inventors may lack the experience with the patent system or the resources to serve as their own advocates for reform. Therefore, if competition advocates can identify the underlying causes, this may be a fruitful area for competition advocacy.

VII. CONCLUSION

Competition advocacy can be a powerful tool to promote competition and consumer welfare. In the context of the patent system, it can offer a viewpoint on proposed reforms that market participants may not articulate. It will continue

[288] *Id*. at 203.

[289] *Id*. at 170 ("I've done more than 200 licenses for standards-related technologies in patents and products, I can think of one occurrence in 200 where somebody came to me and said 'I just want a patent to these essential claims for this kind of product.'"); *id*. at 195 (noting that "the reality of it is" that negotiations for "one patent claim and a product coming out of a standards organization" is "very rare").

[290] Hagiu & Yoffie, *supra* note 110, at 45.

[291] J. Gregory Sidak, *The Meaning of FRAND, Part I: Royalties*, 9 J. COMP. L. & ECON. 931, 945 (2013) (further noting that "the parties have no desire to negotiate a license for an individual patent, and therefore they have no need to value a single patent.").

[292] Akemann et al., *supra* note 111, at 6.

[293] Hagiu & Yoffie, *supra* note 110, at 48.

to offer a unique perspective, focused on how laws and regulations shape private transactions for patent rights. One avenue for such advocacy is promoting technology market efficiency. Advocacy directed towards improving technology market health should benefit all stakeholders in the patent systems. By focusing on impediments to private bargaining, advocacy can promote technology market competition, leading to greater predictability in the value of patent rights and greater confidence in investing in innovation and commercialization.