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FOREWORD

Robert Merges[†]

This is a timely symposium. Renewed attention to the dynamics of patent licensing in the theoretical literature coincides these days with acute interest in doctrines and case outcomes in various licensing-intensive industries. Mobile phone components are the best example, as many of the papers in this volume attest. Of course, one reason people care about patent rights—the main reason, for most business people—is that in some industries large sums of money change hands because of patents. For scholars, though, the flow of money is of interest not just for its own sake, but also for what it tells us about patterns of research, invention, and innovation.

Looking broadly, the question for mobile phone technology is how this industry organizes production, and how that organization affects the “rate and direction” of technical change.¹ Mobile phones are a good case study; they are made up of dozens of sophisticated components, some of which are made in-house by phone makers (or “handset manufacturers”), but many of the components are sourced from independent specialist firms. Each component is covered by numerous patents, as befits sophisticated technologies such as microprocessors, sound and video chips, data compression software, antennas, and even specialized glass that includes sensitive touchscreen capabilities. According to one branch of theory, this is a recipe for disaster: a multitude of independent, autonomous right holders all of whom must cooperate with a central firm if a state-of-the-art product is to hit the market. Too many independent patents, too many independent firms, creates a transaction cost nightmare.²

And yet: as the saying goes, it works in practice, though maybe not so well in theory.³ The question for the patent system, and for patent scholars, is why. Why does it work when it is not supposed to, at least in some accounts?

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1. The reference is to the classic book edited by Professor Richard R. Nelson of Columbia University, *The Rate and Direction of Inventive Activity* (1962).

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

3. See, e.g., Alexander Galetovic, Stephen Haber & Lew Zaretski, *An Estimate of the Average Cumulative Royalty Yield in the World Mobile Phone Industry: Theory, Measurement and Results*,

One part of the answer comes from new developments in patent theory. The economic study of patents has undergone a gradual but thorough change over the past twenty-five years. As late as the 1990s, most economists understood patents as state-backed monopolies. Theoretical studies mostly featured a tradeoff model: losses from monopoly pricing were balanced against the societal benefits of new technologies.⁴ The lure of monopoly power called forth inventive effort, but the benefits of new inventions came at the expense of above marginal-cost pricing.

Call this the Incentive/Tradeoff (I/T) theory.⁵ I/T theory deals in highly aggregated terms: the costs and benefits of patents are modeled and discussed at the society-wide level. The total value of all new inventions called forth by patents is weighed against the total cost of supra-marginal pricing across all markets in an economy.

Roughly twenty-five years ago something new began to take shape in economic writing on patents. The same trends that swept through economics as a whole, where classical microeconomics was being modified by a newfound interest in the various structural elements that together determine aggregate economic activity (firms, transactions, property rights, and other “institutions”), also visited the literature on patent economics. I/T theory was refined by inquiries into two new topics: (1) how patents affect the *locus* of inventive activity and not just its aggregate level, and (2) transactional solutions to problems of dispersed patent ownership. One frequent finding in these newer studies is that patents (and IP rights generally) promote firm specialization, and in this way patents affect not just aggregate incentives but industry structure as well. For this reason, we might call the new approach the Specialization/Industry Structure (S/IS) Theory.

The basic insight from this literature is that IP rights can and do affect the location of firm boundaries.⁶ The key to this new understanding of IP is to see

42 TELECOMM. POL'Y 263, 271–72 (2018); Alexander Galetovic, Stephen Haber & Ross Levine, *An Empirical Examination of Patent Holdup*, 11 J. COMP. L. & ECON. 549, 564–69 (2015).

4. See, e.g., WILLIAM D. NORDHAUS, *INVENTION, GROWTH, AND WELFARE: A THEORETICAL TREATMENT OF TECHNOLOGICAL CHANGE* 76 (1969) (using tradeoff model to assess optimal patent length).

5. See Robert P. Merges, *Economics of Intellectual Property Law*, in 2 THE OXFORD HANDBOOK OF LAW AND ECONOMICS: PRIVATE AND COMMERCIAL LAW 200, 207 (Francesco Parisi ed., 2017) (reviewing the Incentive/Tradeoff Model and its role in patent scholarship).

6. See generally David J. Teece, *Profiting from Technological Innovation: Implications for Integration, Collaboration, Licensing and Public Policy*, 15 RSCH. POL'Y 285 (1986) (an early contribution). See also Robert P. Merges, *A Comparative Look at Intellectual Property Rights and the Software Industry*, in THE INTERNATIONAL COMPUTER SOFTWARE INDUSTRY: A COMPARATIVE STUDY OF INDUSTRY EVOLUTION AND STRUCTURE 272, 282 (David C. Mowery ed., 1996)

it not primarily as something that affects overall incentive levels, but instead as an instrument that affects transactions and, hence, the organization of production. Advocates of this view see IP as a way for small, specialized firms to protect against opportunism when contracting with larger firms. IP makes it easier for specialized firms to sell technology and know-how via arm's-length contracts, which permits specialized producers to exist as independent firms. IP rights can then be said to affect industry structure: without these rights, specialized knowledge subject to opportunistic copying would have to be produced within large, vertically integrated firms. This in turn would mean a loss of the “high powered incentives” (to use Oliver Williamson’s term)⁷ available to independent firms who sell their output via contracts. The upshot is that IP at the margin may enable more small and independent firms to remain viable even in industries where multicomponent products are assembled and sold by large, vertically integrated firms.⁸

And so contemporary theory gives us some insights into why disaggregated production works in the mobile phone industry. Specialist component suppliers are an effective way to encourage technological advances. In some industries, the combination of specialization and eventual integration (in the making of handsets, for example) has proven to be effective.⁹

But of course, as this branch of theory emphasizes, product integration works only if the components can be effectively integrated. In physical products, the solution is modularity: plug-in components, made with standard interfaces, that work in an integrated product regardless of which manufacturers makes and sells the components. For intangible inputs—product designs, blueprints, and manufacturing techniques, etc.—integration

(“The Japanese software industry teaches some valuable lessons about the role of property rights in overcoming transaction costs. Without the security of a property right granted by the government, software suppliers in Japan would be loath to leave the protective contractual sphere they shared with their captive customer/patrons [“keiretsu”]. But with such a right, enforceable outside the context of an individual contract (that is, a right that is “good against the world”), these firms are free to sell to other customers.”); Robert P. Merges, *A Transactional View of Property Rights*, 20 BERKELEY TECH. L.J. 1477, 1485 (2005). See generally JONATHAN M. BARNETT, *INNOVATORS, FIRMS, AND MARKETS: THE ORGANIZATIONAL LOGIC OF INTELLECTUAL PROPERTY* (2021) (discussing an excellent overview of the literature that has developed around these ideas, with many important and original contributions of its own).

7. See OLIVER E. WILLIAMSON, *THE ECONOMIC INSTITUTIONS OF CAPITALISM: FIRMS, MARKETS, RELATIONAL CONTRACTING* 141–44 (2007).

8. See Ashish Arora & Robert P. Merges, *Specialized Supply Firms, Property Rights and Firm Boundaries*, 13 INDUS. & CORP. CHANGE 451, 451 (2004).

9. See, e.g., Keith Mallinson, *Don't Fix What Isn't Broken: The Extraordinary Record of Innovation and Success in the Cellular Industry under Existing Licensing Practices*, 23 GEORGE MASON L. REV. 967, 1000 (2016).

works differently. It involves a market exchange that provides payment for the intangible, and this in turn often involves patent protection. Which means that legal institutions are an important part of the market-making mechanism for components of this type. (I don't mean to suggest that physical products do not involve patent-related issues; they do, just of a slightly different flavor. "Exhaustion" of patent rights, for example, is an issue that often accompanies transactions over physical components.)

The legal system is charged with granting the rights that help to structure this market. And at the enforcement stage, the legal system mediates conflicts between right owners and those who use (or are at least accused of using) technologies covered by those rights. The intangible nature of the assets; the high economic value of many of the technologies involved; and the relevance of legal craft and strategy—these combine to create special conditions for market-making.

At a high level of abstraction, in the mobile phone industry the market for intangible inputs is serviceable if far from perfect. One helpful feature is that, for some patented inputs, mobile phones are designed and sold before the market-making process is complete. In many cases, these steps happen before the market-making process even begins. By necessity and convention, handset makers negotiate licenses for some technologies up front (*ex ante*), but for others they wait to hear from claimants holding patents that were not cleared in advance.¹⁰ Patent courts thus facilitate *ex post* market-making in two ways: first, by sorting out which of the supposed inputs added any value (i.e., are covered by valid patents); and second, by determining whether any accused handset makers reaped any of that value (i.e., infringed a valid patent). Only after these initial determinations do courts get to the important issue of putting a monetary value on the handset maker's use of the patented technology (i.e., damages). These damages set the market price between the parties to the dispute, and also provide indirect guidance for future conflicts and deals between component suppliers and handset makers.

Industry-wide engineering organizations debate and adopt technical standards to insure product modularity. This is an important practice that encourages component interoperability and price-based competition among component makers. To prevent patent-related opportunism in standard-setting, standards groups routinely require participants to make a general promise that patent coverage (and resultant potential profit) will not be used to extort unfair royalties from those who adopt the standard. Unlike a patent

10. Robert P. Merges, *After the Trolls: Patent Litigation as Ex Post Market-Making*, 54 AKRON L. REV. 555, 559–71 (2020).

pool, these binding pledges do not set a precise price on patented technologies that are incorporated into standards.¹¹ Instead, these pledges merely defer negotiations over royalties, with a promise to be “reasonable” should the issue later arise. This general commitment only “kicks the can down the road,” but that is valuable in itself. It takes patents (and in some measure self-interest) off the table, leaving only technical issues to be resolved.

Of course, down at the granular level, participants in this ecosystem take the big picture as a given. They are too busy fighting to maximize their own profit to care much about overall efficiency, or the way their industry is structured. Business and legal strategies are intertwined, and each legal tactic that contributes to their strategy is deployed for maximum leverage. Patent owners seek as much of the surplus from a multi-component product as they can; at the limit, their strategy may approach a true holdup (though empirically the precise conditions for technical holdup are rare). On the other side, handset makers and other technology “implementers” work hard to invalidate patents asserted against them. They fight over patent claim language to escape infringement liability. They drive damages down and resist injunctions. They stretch out their defenses, often in coordinated campaigns in different jurisdictions. At the limit they “hold out”: they enjoy the free, uncompensated use of technological inputs for as long as their legal machinations enable them to.¹²

Because the legal system so thoroughly mediates the market for technologies, it must be sensitive to potential abuses growing out of legal tactics. Judges, regulators, even Congress on occasion must root out and put a stop to clever tactics that tilt the bargaining table too steeply in one direction or another. Whenever and wherever possible, the legal system should work to identify and reward real inventions, valuable innovations. It should seek not to reward novel use of tactics, loophole-seeking strategies, and all the other efforts to turn the legal process to private advantage. The integrity of the market for patented, intangible inputs depends on this. The Articles give a good cross-section of the nature of that market today and some of the challenges faced by those charged with keeping it true to its primary function.

11. Cf. Kristen J. Osenga, *Ignorance over Innovation: Why Misunderstanding Standard Setting Organizations Will Hinder Technological Progress*, 56 U. LOUISVILLE L. REV. 159 (2018) (distinguishing standard development organizations and patent pools given their different legal and market functions).

12. See generally Richard A. Epstein & Kayvan B. Noroozi, *Why Incentives for “Patent Holdout” Threaten to Dismantle FRAND, and Why It Matters*, 32 BERKELEY TECH. L. J. 1381 (2017); Bowman Heiden & Nicolas Petit, *Patent Trespass and the Royalty Gap: Exploring the Nature and Impact of Patent Holdout*, 34 SANTA CLARA HIGH TECH. L.J. 179 (2017).

ANTITRUST MERCANTILISM: THE STRATEGIC DEVALUATION OF INTELLECTUAL PROPERTY RIGHTS IN WIRELESS MARKETS

Jonathan M. Barnett[†]

ABSTRACT

Policy approaches to the enforcement and licensing of standard-essential patents (SEPs) in wireless communications markets reflect the competing interests of entities that specialize in the innovation or implementation segments of the technology supply chain. This same principle can anticipate the policy preferences of national jurisdictions that specialize in the chip-design or device-production segments of the global technology supply chain. Consistent with this principle, the legal treatment of SEP licensing and enforcement by regulators and courts in the People's Republic of China reflects a strategic effort to deploy competition and patent law to reduce input costs for domestic device producers that rely on wireless communications technology held by foreign chip suppliers. This mercantilist use of antitrust law has derived its intellectual foundation from patent holdup and royalty stacking models of market failure developed principally by U.S. scholars and has borrowed excessive pricing, essential facility, and other doctrines from E.U. competition and U.S. antitrust law, which have then been applied expansively by Chinese regulators and courts in service of geopolitical objectives. While this strategy promotes the short-term interests of a national economy that specializes in the implementation segments of the technology supply chain, it is unlikely to promote the global economy's longer-term interest in preserving the funding and transactional structures that have supported innovation and commercialization in the wireless technology ecosystem.

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I. INTRODUCTION

Scholarly analysis of intellectual property (IP) policy generally assumes (whether explicitly or implicitly) a benevolent social planner who seeks to maximize social wealth through an optimally designed portfolio of policy instruments to incentivize innovation. Yet, as the public choice literature would anticipate, any real-world entity’s IP policy views and related advocacy and litigation efforts generally reflect its position in the technology supply chain and, in particular, whether it is a net producer or user of intellectual assets. This simple principle explains why hardware manufacturers and other implementers of wireless technologies have generally pursued legal changes

that weaken the ability to enforce and license patents.¹ For these entities, which are located at midstream and downstream points in the wireless technology supply chain, weakening patents supports a strategy of “use, then litigate”: that is, make use of patented technologies and then negotiate the terms of use in a legal environment in which the patent owner has little credible threat to deny access through an injunction. Conversely, entities that specialize in the design and supply of chip designs and chipsets in wireless technology have generally pursued legal changes that provide a secure infrastructure for licensing and enforcing patents.² For these entities, which are located at upstream points in the wireless technology supply chain, strengthening patents enables the negotiation of licensing terms in a legal environment in which infringers cannot freely make use of technologies developed by others. Net producers of wireless-technology innovations have mostly prevailed over net users concerning patent and antitrust policy, resulting in a quasi-compulsory licensing regime in which injunctions are rarely awarded and royalty rates are regularly determined by courts through litigation, rather than being negotiated by businesses in the marketplace.³

The relationship between an entity’s IP policy preferences and the specialized competencies it contributes to the technology supply chain applies not only to companies that pursue market leadership but to national jurisdictions that pursue geopolitical leadership. In this contribution, I show that this relationship accounts for actions taken by policymakers in the People’s Republic of China (China)⁴ concerning patent licensing and enforcement in wireless-enabled markets, including mobile communications, automotive, and other markets. The highest levels of the Chinese government have prioritized the goal of achieving technological independence and leadership in the global marketplace and especially in the computing and communications sectors.⁵ Consistent with this objective, Chinese courts,

1. See generally Jonathan M. Barnett, *Antitrust Overreach: Undoing Cooperative Standardization in the Digital Economy*, 25 MICH. TECH. L. REV. 163, 226-230 (2019).

2. *Id.*

3. For a detailed history and analysis of these developments, see Barnett, *Antitrust Overreach*, *supra* note 1, at 207-226; Jonathan M. Barnett, *Has the Academy Led Patent Law Astray?*, 32 BERKELEY TECH. L. J. 1313, 1338-56 (2017).

4. All references to “China” or “Chinese” (unless used in a geographic sense) refer to the government of the People’s Republic of China, including the exercise of power by the Chinese Communist Party through governmental, private, or other entities. This usage follows Shaomin Li & Ilan Alon, *China’s Intellectual Property Rights Provocation: A Political Economy View*, 3 J. INT’L BUS. POL’Y 60, 61 (2020).

5. At a “study session” of the Chinese Communist Party Politburo in early 2023, President Xi Jinping emphasized the importance of achieving “S&T [*science and technology*] self-

competition regulators, and other policymakers have taken actions over approximately the past two decades to minimize local device producers' reliance on technology inputs supplied by foreign firms or, when that is not technologically feasible (the typical case in wireless communications), to minimize local producers' royalty obligations to foreign technology suppliers. The economic values at stake in the wireless communications industry are massive. In 2021, 1.43 billion units were shipped in the global smartphone market,⁶ 67% of those units were produced in China,⁷ and global smartphone sales were valued at \$508.1 billion.⁸ Even these values understate substantially the size of the global market for wireless-enabled technologies, which encompasses not only wireless communications but a myriad of other industries within the emergent "Internet of Things."

It is expected that any national government would take steps to promote its economic interests through industrial and trade policies. However, China presents an unusual case in which it has deployed—sometimes explicitly, sometimes implicitly—the instruments of patent and competition law for this purpose.⁹ This strategy relies on the weak rule-of-law constraints that

reliance and self-improvement . . . to create a global S&T power." *Xi Jinping Emphasizes the Effective Strengthening of Basic Research and the Consolidation of the Foundation of Self-Reliance and Self-Improvement in S&T During the Third Collective Study Session of the Politburo of the CCP Central Committee*, INTERPRET: CHINA (Feb. 21, 2023), <https://interpret.csis.org/translations/xi-jinping-emphasizes-effective-strengthening-of-basic-research-and-consolidation-of-the-foundation-of-self-reliance-and-self-improvement-in-st-during-the-third-collective-study-session-of-the-po/> (English translation).

6. STATISTA, NUMBER OF SMARTPHONES SOLD TO END USERS WORLDWIDE FROM 2007 TO 2021 (2022), <https://www.statista.com/statistics/263437/global-smartphone-sales-to-end-users-since-2007/>.

7. Minsoo Kang, *China Accounted for 67% of Global Handset Production in 2021*, COUNTERPOINT (Sept. 13, 2022), <https://www.counterpointresearch.com/insights/global-handset-production-2021/>.

8. *Global Smartphones Market to Generate Revenue of \$789.5 Billion by 2028*, GLOBALNEWswire (Oct. 31, 2022), [https://www.globenewswire.com/news-release/2022/10/31/2544832/0/en/Global-Smartphones-Market-to-Generate-Revenue-of-789-5-Billion-by-2028-Apple-and-Samsung-Tops-the-Chart-with-Over-44-Market-Share.html#:~:text=Global%20smartphones%20market%20was%20valued,period%20\(2022%2D2028\)](https://www.globenewswire.com/news-release/2022/10/31/2544832/0/en/Global-Smartphones-Market-to-Generate-Revenue-of-789-5-Billion-by-2028-Apple-and-Samsung-Tops-the-Chart-with-Over-44-Market-Share.html#:~:text=Global%20smartphones%20market%20was%20valued,period%20(2022%2D2028).).

9. The integration of industrial trade policy is typical of Chinese regulators' approach to competition law generally, see Robert D. Atkinson, Nigel Cory & Stephen J. Ezell, *Stopping China's Mercantilism: A Doctrine of Constructive, Alliance-Backed Confrontation*, INFO. TECH. & INNOVATION FOUND. (2017), <https://www2.itif.org/2017-stopping-china-mercantilism.pdf>; U.S. CHAMBER OF COM., INTERNATIONAL AFFAIRS, *COMPETING INTERESTS IN CHINA'S COMPETITION LAW ENFORCEMENT: CHINA'S ANTI-MONOPOLY LAW APPLICATION AND THE ROLE OF INDUSTRIAL POLICY* (2014), https://www.uschamber.com/assets/archived/images/ami_final_090814_final_locked.pdf.

characterize China's political system. As Shaomin Li and Ilan Alon describe this structure, "[t]he party-state [in China] follows rule *through* law (rule *by* law) as opposed to the rule *of* law, namely, the party uses the law subjectively and selectively for the purpose of maintaining its rule."¹⁰ In a legal framework characterized both by weak rule-of-law constraints and no meaningful division of powers across the branches of government,¹¹ Chinese policymakers have deployed both patent and competition law for mercantilist purposes that advantage the economic interests of domestic device producers over foreign technology suppliers in the mobile communications device market. China's use of competition law for this purpose is consistent with a broader portfolio of policy tools—particularly, preferential credit and procurement policies,¹² compelled technology transfer to domestic joint venture partners,¹³ requirements that foreign licensors provide domestic licensees with indemnification against third-party infringement claims and exclusive rights over improvements,¹⁴ the use of administrative, licensing, and testing requirements to extract technological information,¹⁵ cyber espionage and related forms of IP theft,¹⁶ alleged obstacles to the enforcement by foreign

10. Li & Alon, *supra* note 4, at 64. On the concept of “rule by law” or “party rule by law” in the Chinese legal system, see Jordan Link, Nina Palmer & Laura Edwards, *Beijing's Strategy for Asserting Its "Party Rule by Law" Abroad*, U. S. INST. OF PEACE, SPECIAL REP., No. 512 (2022), at 4, <https://www.usip.org/publications/2022/09/beijings-strategy-asserting-its-party-rule-law-abroad>.

11. Link et al., *supra* note 10, at 4–5 (noting that concept of “rule of law” in the Chinese legal system implies use of the legal apparatus to implement the political objectives of the Chinese Communist Party, as distinguished from internationally recognized understandings of the “rule of law” as an overarching principle to which all persons and institutions are subject); Ji Weidong, *The Judicial Reform in China: The Status Quo and Future Directions*, 20 IND. J. GLO. LEGAL STUD. 185, 186 (2013) (stating that “the principle of judicial independence is not established” in China); Li & Alon, *supra* note 4, at 64 (“To maintain one-party rule, the party cannot allow judiciary independence and various interest groups to be represented, such as the interest for better IPR protection”); Susan Finder, *Using Cases to Explain the Law in the New Era*, SUPREME PEOPLE'S CT. MONITOR (2013), <https://supremepeoplescourtmonitor.com/tag/model-cases/> (noting that, in a document issued by the Chinese Communist Party Congress on the importance of “publicizing knowledge about law,” the Supreme People's Court is “treated as any other state or Party organ”).

12. REPORT TO CONGRESS OF THE U.S.-CHINA ECONOMIC AND SECURITY REVIEW COMMISSION 83–87 (2012) [hereinafter REPORT TO CONGRESS 2012].

13. *Id.* at 8.

14. *Id.* at 48.

15. Li & Alon, *supra* note 4, at 65.

16. *Id.* at 62 (specifically in the aerospace industry); *id.* at 63 (stating that “the [Chinese] party-state not only sponsors IPR theft and forced IPR transfer but also conducts them”); *id.* at 65 (providing data on U.S. federal prosecutions of IP theft by China-based entities, “most

owners of patents covering key technologies in strategically important industries,¹⁷ and efforts to influence international standard-setting bodies¹⁸—that it has deployed to bolster the competitive position of its communications equipment and device manufacturers in the global marketplace.¹⁹ Given the size of the Chinese market, both as the largest single producer and consumer of mobile communications devices, this use of patent and competition law for industrial trade purposes can impact the pricing of wireless technology inputs not only in the Chinese market but throughout the global supply chain.

These policy objectives run counter to the widely agreed-upon purpose of antitrust and competition law,²⁰ which is to enable the market to determine asset prices on a level playing field free of efforts by single firms, groups of firms, or state entities to distort the market pricing mechanism. Yet policy actions by Chinese courts and regulators, implemented through the apparatus of patent and competition law, are designed specifically to deflate the price of technology inputs in wireless markets, whether directly by determining royalty rates or indirectly by impeding patent owners' ability to legally block unauthorized usage. This contradicts the fundamental principles of international trade to which World Trade Organization (WTO) members are committed, as reflected by China's joint statement with the United States in 2014 to use competition law "to promote consumer welfare and economic efficiency, rather than promote particular competitors or industries."²¹ Most

of which were directed or sponsored by, or related to the Chinese government"). For further sources, see *infra* note 70.

17. Stu Woo & Daniel Michaels, *China's Newest Weapon to Nab Western Technology—Its Courts*, WALL ST. J. (Feb. 20, 2023) (reporting European Union survey in which "people expressed concerns about 'a tendency of [Chinese] court rulings to favor Chinese stakeholders when strategic sectors or companies, in particular state-owned enterprises, are concerned'", and providing examples of multiple cases in which protectionism was alleged to have motivated court decisions against foreign patent owners).

18. Alexandra Bruer & Doug Brake, *Mapping the 5G Leadership Landscape: The Impact of Global Telecommunications Standard Setting on U.S. Strategy and Policy*, INFO. TECH. & INNOVATION FOUND. (2021), at 19–20; Mark Leonard, *The New China Shock*, WIRE CHINA (Apr. 11, 2021), <https://www.thewirechina.com/2021/04/11/the-new-china-shock>.

19. Jeanne Suchodolski, Suzanne Harrison & Bowman Heiden, *Innovation Warfare*, 22 N.C. J. L. & TECH. 175, 195–203 (2020).

20. "Antitrust" and "competition law" are used interchangeably in this article.

21. U.S. CHAMBER OF COM., *supra* note 9, at 6–7 (citing U.S. Dept of the Treasury, Updated: U.S.-China Joint Fact Sheet Sixth Meeting of the Strategic and Economic Dialogue, July 11, 2014), <https://home.treasury.gov/news/press-releases/jl2563>. On China's failure in general to meet its WTO commitments, see U.S. TRADE REPRESENTATIVE, 2020 REPORT TO CONGRESS ON CHINA'S WTO COMPLIANCE 2 (2020), <https://ustr.gov/sites/default/files/files/reports/2020/2020USTRReportCongressChinaWTOCompliance.pdf> (stating that "China's record of compliance with the terms of its WTO

recently, efforts by Chinese courts to act as exclusive global rate-setters in litigations involving standard-essential patents (SEPs) relating to wireless technologies—which are enforced by the issuance of anti-suit injunctions to impede judicial proceedings in other countries—are incompatible with China’s treaty obligations under the Trade-Related Aspects of Intellectual Property Rights (TRIPS) Agreement,²² as is currently alleged by the European Union (EU) before the WTO.²³

Setting aside treaty commitments, China’s patent and antitrust policies make perfect sense for a national jurisdiction that is generally located at the midstream and downstream levels of the global technology supply chain. As observed by several Chinese scholars in 2020: “China’s massive industrial system is still at the mid-to-low end of the global value chain, and it has a serious lack of key core technologies”²⁴ IP payment flows are consistent with this assessment. During 2008–2017, China paid out \$185.2 billion to foreign IP owners, while China-based IP owners received only \$12.2 billion from foreign users, representing a net deficit of \$114.4 billion.²⁵ As of 2020, China had an IP payments deficit of \$30.38 billion; by contrast, the United States had an IP payments surplus of \$70.8 billion.²⁶ Moreover, this IP payments deficit understates by a large measure China’s technology deficit due to widespread unlicensed use in China of IP assets held by foreign entities.²⁷ This IP and technology deficit extends to wireless communications, in which

membership has been poor” and noting that “China has continued to embrace a . . . mercantilist approach to the economy and trade.”).

22. Agreement on Trade-Related Aspects of Intellectual Property Rights, Apr. 15, 1994, Marrakesh Agreement Establishing the World Trade Organization, Annex 1C, 1869 U.N.T.S. 299, 33 I.L.M. 1197 (1994). For further discussion, see *infra* notes 214–215 and accompanying discussion.

23. See *infra* notes 215–218 and accompanying text.

24. Cui Leilei, Du Xiangwan, Ge Qin, Li Bin & Liu Xiaolong, *Macro Research on the Development of Chinese Strategic Emerging Industries in the New Era*, INTERPRET: CHINA (Mar. 27, 2020), <https://interpret.csis.org/translations/macro-research-on-the-development-of-chinese-strategic-emerging-industries-in-the-new-era/> (English translation).

25. *Is China Leading in Global Innovation?* CHINA POWER, <https://chinapower.csis.org/china-innovation-global-leader/> (last accessed (updated Sept. 11, 2023) [hereinafter CHINA POWER, *Is China Leading*]).

26. Author’s calculations are based on World Bank, Charges for the use of intellectual property, receipts (BoP, current US\$) and World Bank, Charges for the use of intellectual property, payments (BoP, current US\$), <https://data.worldbank.org/indicator/BX.GSR.ROYL.CD>.

27. STATEMENT OF MARK A. COHEN BEFORE THE U.S.-CHINA ECONOMIC AND SECURITY REVIEW COMMISSION, HEARING ON THE FOREIGN INVESTMENT CLIMATE IN CHINA: PRESENT CHALLENGES AND POTENTIAL FOR REFORM 3–4 (Jan. 28, 2015), https://www.uscc.gov/sites/default/files/Mark%20Cohen_testimony.pdf.

China's device, equipment, and semiconductor producers have been unable to achieve technological parity with the handful of United States- and Europe-based firms that continue to lead innovation in the industry.

To address this technological and economic gap, Chinese policymakers have deployed patent and competition law to promote the interests of domestic device producers in minimizing the costs to secure technology assets that have been developed and are owned by foreign entities. In pursuit of this objective, Chinese regulators and courts have deployed an intellectual "transplant" strategy in which theories of "patent holdup" and "royalty stacking" developed by U.S. academics have been embraced and adapted in the Chinese context for purposes of industrial trade policy. Since approximately the mid-2000s, these conjectural models of market failure have provided the basis for U.S. and E.U. competition regulators' efforts to constrain the licensing and enforcement of SEPs by lead innovators in the wireless industry. Following this precedent, Chinese courts and regulators have implemented IP and IP-related competition policies that impose an across-the-board discount on the price of technology inputs in wireless-enabled markets. At the same time, Chinese courts and regulators have adopted and expanded certain doctrines from U.S. and E.U. competition law that impose a "duty to deal" on holders of "essential facilities" and departed from U.S. and (to a lesser extent) E.U. competition law by converting the "fair, reasonable and nondiscriminatory" (FRAND) licensing principle from a voluntary commitment made through contract to a mandatory requirement under competition law. Once adapted by Chinese regulators and courts, these legal principles have been placed in the service of mercantilist purposes, pursuing outcomes that diverge from the commonly understood objectives of patent and competition law.

Organization of this Article is as follows. In Part II, I review the wireless industry's division of labor among specialized providers of chip design, chip production, and device production capacities and, in light of that division of labor, the Chinese government's use of various policy tools to enhance the competitive position of Chinese firms in the global wireless ecosystem. In Part III, I describe the patent holdup and royalty stacking theories developed by scholars and adopted by regulators in the U.S. and Europe, and the empirical challenges to those theories. In Part IV, I describe how Chinese courts and regulators have deployed and adapted concepts and doctrines developed by U.S. and European scholars, regulators, and courts to impact the "rules of the game" in a manner that favors implementers over innovators in the wireless industry. In Part V, I assess the likely effects of China's mercantilist use of

patent and competition law on the global wireless technology ecosystem. A brief Conclusion then follows.

II. THE GEOPOLITICAL ECONOMY OF THE WIRELESS TECHNOLOGY INDUSTRY

To understand the motivations behind China's strategic use of legal tools to secure national-competitive advantages in the global wireless market, it is necessary to appreciate the position occupied by the Chinese economy and China-based firms in that market. In this Part, I discuss in particular the extent to which China leads in the device production segments of the global wireless technology ecosystem but lags in the chip-design and production segments. I then discuss policy initiatives that the Chinese government has undertaken to address China's IP and technology deficit in wireless communications by achieving technological independence and, primarily, by reducing the costs incurred by domestic device producers to source technology inputs from foreign suppliers.

A. DIVISION OF LABOR IN THE WIRELESS COMMUNICATIONS ECOSYSTEM

The global wireless communications supply chain exhibits a geographically skewed division of labor between China and the rest of the world. Innovation specialists, which focus on the design, production, and supply of the advanced semiconductors that are necessary to support the data-processing and transmission functionalities of mobile communications devices, are principally located in the United States and Europe. Implementation specialists, which focus on the production, distribution, and marketing of those devices, are principally based in China. Additionally, it should be noted that leading chip suppliers are vertically disintegrated entities that rely on stand-alone producers (principally located in Taiwan and Korea) to embody proprietary chip designs in physical chipsets for supply to device producers. Lastly, both innovation and implementation specialists rely on and, to varying extents, contribute to the standards-development services provided by organizations (most notably, ETSI and IEEE) that support the ubiquitous interoperability that characterizes the mobile communications device market.

Table 1. Division of Labor in the Global Mobile Communications Market (simplified, as of 2022)

| Supply-chain function | Leading firms and headquarters locations | Principal headquarters locations | Principal location of physical production |
|-----------------------|--|----------------------------------|---|
| | | | |

| UPSTREAM SEGMENTS | | | |
|---|---|------------|--------|
| Standard-setting | IEEE (US), ETSI (EU) | US, EU | N/a |
| Innovation (chip design) | CN: Huawei EU: ARM, Ericsson, Nokia KO: Samsung, LG US: Qualcomm | US, EU | TW |
| Chip production | TSMC (TW), Samsung (KO) | TW, KO | TW, KO |
| DOWNSTREAM SEGMENTS | | | |
| Implementation (device production and distribution) | CN: Huawei (prior to 2021), ²⁸ Xiaomi, Oppo, Vivo KO: Samsung US: Apple | CN, US, KO | CN, VT |
| Device production (stand-alone ²⁹) | Hon Hai (Foxconn) (TW) | TW | CN |

Legend: CN = China; EU = Europe (incl. U.K.); KO = South Korea; TW = Taiwan; US = United States; VT = Vietnam.

Notes: Leading entities in “Innovation (chip design)” selected based on shares of active and granted 5G self-declared patents as of Feb. 2022. Leading entities in “Implementation (device production and distribution)” selected based on shares of total smartphone shipments as of Q3 2022. ARM is based in the U.K. but owned by SoftBank Group, a Japan-based entity.

Sources: Parv Sharma, *TSMC Captures 70% Share of the Smartphone AP/SoC and Baseband Shipments in Q1 2022*, July 5, 2022 (smartphone chip production); Counterpoint, *Global Smartphone Shipments Market Data* (Q4 2020-Q3 2022) (smartphone handset sales); U.S. Patent &

28. Huawei’s participation in the global handset market has declined substantially since imposition of U.S. sanctions in 2021. *See* Arjun Kharpal, *From No. 1 to No. 6, Huawei Smartphone Shipments Plunge 41% as U.S. Sanctions Bite*, CNBC (Jan. 28, 2021), <https://www.cnbc.com/2021/01/28/huawei-q4-smartphone-shipments-plunge-41percent-as-us-sanctions-bite.html>.

29. “Stand-alone” refers to entities that perform a specialized service on a contractual basis for another entity.

Trademark Office, *Patenting activity by companies developing 5G* (Feb. 2022) (5G SEPs). Other information sourced from companies' annual investor reports.

China leads in the downstream segments of the wireless technology supply chain, both directly in the device production segment and indirectly as the principal location of facilities that produce devices for foreign firms. However, with the exception of Huawei (a qualified exception for reasons discussed below), China lacks any leading firms in the upstream chip-design segments of the supply chain that provide the technological inputs on which device producers rely. This observation may be surprising given widely-covered statistics that China's patent office grants the most applications worldwide, representing 43.4% of all patents granted in 2019 (as compared to only 17% in 2009), and that China-resident inventors lead the world in the total number of patent applications (domestic and international).³⁰ However, these aggregate statistics (typically based on data reported by the World Intellectual Property Organization) obscure the fact that most patents granted by China's patent office (and an even larger portion of the patents granted by that office to China-resident inventors³¹) are "utility model" patents granted for a limited term without substantive examination and are therefore not equivalent to the "utility" patents granted by the U.S. Patent & Trademark Office (USPTO) and other leading patent offices.³²

More generally, there are widely expressed concerns that China excels in patent quantity but lags in patent quality, in which case patenting outputs do not provide a reliable metric of innovation outputs. Several standard proxies for patent quality favor this hypothesis. First, an unusually high percentage of China-resident inventors granted patents at China's patent office do not make a patent filing abroad (as of 2016, only 4%, as compared to 43% of US-resident and Japan-resident patent grantees³³). Second, China-resident inventors lag substantially among filers of triadic patents—that is, patents granted in the patent offices of Japan, the European Union, and the United States. As of

30. WIPO, *WORLD INTELLECTUAL PROPERTY INDICATORS 2019*, at 7–8, https://www.wipo.int/edocs/pubdocs/en/wipo_pub_941_2019.pdf

31. *Are Patents Indicative of Chinese Innovation*, CHINA POWER, <https://chinapower.csis.org/patents/> (last accessed Sept. 11, 2023) [hereinafter CHINA POWER, *Are Patents Indicative of Chinese Innovation*].

32. For extensive analysis, see Jonathan Putnam, Hieu Luu, & Ngoc Ngo, *Innovative Output in China* (Working Paper Jan. 21, 2021), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3760816. As of 2019, the Chinese patent office granted 96.9% of all "utility model" patents granted in the entire world, see WIPO, *supra* note 30, at 7.

33. WIPO, *supra* note 30, at 79–80.

2020, China-resident inventors received 5.9% of all triadic patents, while Japan, U.S., and E.U.-resident inventors received 30.4%, 22.6%, and 11.2%, respectively.³⁴ Third, two other leading measures of patent quality, forward citations and payment of maintenance fees, suggest that patents issued to China-resident inventors do not compare favorably with patents issued to inventors in other high-patenting countries. As of 2017, it was reported that 61% of Chinese “utility model” patents and 37% of Chinese invention patents (equivalent to USPTO utility patents) were not renewed after three years following issuance, as compared to 15% of U.S. utility patents issued during the same period.³⁵

Data on the telecommunications industries identifies a similar mismatch between patent quantity and quality by China-based entities. Concerning only patents relating to telecommunications, a sector targeted heavily by Chinese R&D expenditures³⁶ and government subsidies, grants and other assistance to national champions like Huawei and ZTE,³⁷ the rate at which China-resident inventors make a foreign patent filing in addition to a domestic patent filing is less than half the rate for US-resident inventors in the same sector.³⁸ Huawei, China’s most significant firm in the wireless technology industry and single largest patent filer, excels in patent quantity but lags on quality compared to global competitors. Based on several sources, Huawei leads worldwide in terms of the number of patents self-declared as (potentially) essential to the 5G wireless communications standard.³⁹ However, multiple analyses of the quality of Huawei’s patent portfolio, including a study released in 2022 by the USPTO,

34. Author’s calculations, based on OECD, Triadic patent families, <https://data.oecd.org/rd/triadic-patent-families.htm>.

35. CHINA POWER, *Are Patents Indicative of Chinese Innovation?*, *supra* note 31 (citing Lulu Yilun Chen, *China Claims More Patents Than Any Country—Most Are Worthless*, BLOOMBERG (Sept. 27, 2018), <https://www.bloomberg.com/news/articles/2018-09-26/china-claims-more-patents-than-any-country-most-are-worthless>).

36. *Is China a Global Leader in Research and Development*, CHINA POWER, <https://chinapower.csis.org/china-research-and-development-rnd/> (last accessed Sept. 11, 2023).

37. REPORT TO CONGRESS 2012, *supra* note 12, at 83–87.

38. Putnam et al., *supra* note 32, at 15.

39. U.S. PATENT & TRADEMARK OFFICE, PATENTING ACTIVITY BY COMPANIES DEVELOPING 5G (Feb. 2022), at 5. For additional source showing that Huawei leads in number of declared 5G patents, see *Who Owns Core 5G Patents? Essentiality Check on 5G Declared Patents*, GREYB, <https://www.greyb.com/blog/5g-patents/#The-State-of-Declared-5G-Patents> (last accessed Sept. 11, 2023).

found that it trails the patent portfolios of other market leaders on various parameters (assessed as of 2018, 2019, and 2021).⁴⁰

Given the persistent underperformance of patents issued in China and patents issued by China's patent office to China-resident inventors relative to other major patent offices and inventors resident in other high-patenting countries, it is not surprising that the Center for Strategic and International Studies has concluded that, based on patent filing data, "it is clear that China has not yet matched the innovation level of other leading economies."⁴¹ Given the appearance of similar discrepancies between patent quantity and quality in wireless communications, there seems little doubt that Chinese device makers typically still occupy the position of a net-IP-user when engaging in licensing discussions with foreign owners of patent-protected technology inputs in the wireless technology supply chain.

B. CHINA'S WIRELESS TECHNOLOGY DEFICIT

It is widely observed that the Chinese government has sought to secure parity and leadership as compared to Western countries in critical computing and communications technologies.⁴² Consistent with these objectives (set forth in China's "National, Medium, and Long-Term Plan for Science and Technology Development (2006-2020)" and more recently, the "13th Five Year Plan for Science and Technology"⁴³), China has targeted its extensive R&D expenditures (second in the world in total size) to computers and communications-related technologies.⁴⁴ In the National Integrated Circuit plan, released in 2014 as part of the "Made in China 2035" initiative, the Chinese government stated that it seeks to satisfy 70 percent of the country's semiconductor demand locally and to reach technological parity with international leaders by 2030.⁴⁵ As part of this program, the Chinese

40. U.S. PATENT & TRADEMARK OFFICE, *supra* note 39 (finding that, as of May 2021, Huawei's patents declared essential to 5G wireless standards generally underperform on various quality measures as compared to six other leading patent owners in this field); Takahiro Shibuya & Takashi Kawakami, *Patent King Huawei Lags Intel and Qualcomm in Quality, Study Finds*, NIKKEIASIA (Oct. 27, 2019), <https://www.asia.nikkei.com/Spotlight/Datawatch/Patent-king-Huawei-lags-Intel-and-Qualcomm-in-quality-study-finds> (finding that, as of 2019, the quality of Huawei's patent portfolio falls behind Intel and Qualcomm).

41. CHINA POWER, *Is China Leading*, *supra* note 25.

42. NATIONAL SECURITY COMMISSION ON ARTIFICIAL INTELLIGENCE, DRAFT FINAL REPORT, at 3 (JAN. 2021), <https://www.nscai.gov/wp-content/uploads/2021/03/Full-Report-Digital-1.pdf>.

43. Atkinson, Cory & Ezell, *supra* note 9, at 4.

44. CHINA POWER, *supra* note 36.

45. DAN KIM & JOHN VERWEY, *THE POTENTIAL IMPACTS OF THE MADE IN CHINA 2025 ROADMAP ON THE INTEGRATED CIRCUIT INDUSTRIES IN THE U.S., E.U. AND JAPAN* 5,

government has emphasized the importance of acquiring capacities to innovate new technologies and set industry technology standards.⁴⁶ Concurrently, Chinese government and industry have generally sought to establish a norm of zero or low royalty rates for the use of IP rights embedded in technology standards⁴⁷—an undertaking that this Article will describe in detail in the context of the global wireless communications industry.

To rectify its technology deficit, the Chinese government initially sought to promote the development and adoption of indigenous technology standards for computing and communications markets, including wireless communications,⁴⁸ DVD players, audio/video “codec” standards, local area networking, optical media storage, and cloud computing.⁴⁹ In wireless communications, China sought to replace the globally dominant W-CDMA standard with an indigenous TD-CDMA standard, and to replace the globally dominant WiFi standard with an indigenous WAPI standard. As has generally been the case for China’s indigenous technology efforts,⁵⁰ neither initiative was successful, in part due to a failure to replicate the technical features of the

OFF. OF INDUST. OF THE U.S. INT’L TRADE COMM’N (2019), https://www.usitc.gov/publications/332/working_papers/id_19_061_china_integrated_circuits_technology_roadmap_final_080519_kim_verwey-508_compliant.pdf. For related discussion, see Atkinson et al., *supra* note 9, at 9–11.

46. DAN BREZNITZ & MICHAEL MURPHEE, *THE RISE OF CHINA IN TECHNOLOGY STANDARDS: NEW NORMS IN OLD INSTITUTIONS*, RESEARCH REPORT PREPARED ON BEHALF OF THE U.S.-CHINA ECONOMIC AND SECURITY REVIEW COMMISSION 3-4 (2013), <https://www.uscc.gov/sites/default/files/Research/RiseofChinaInTechnologyStandards.pdf>.

47. *Id.* at 6, 18, 28–33.

48. Tomoo Marukawa, *Diminishing Returns to High-Tech Standards Wars: China’s Strategies in Mobile Communications Technology*, NAT’L BUREAU OF ASIAN RSCH. (Working Paper Aug. 2014), https://www.nbr.org/wp-content/uploads/pdfs/programs/ict_marukawa_paper.pdf.

49. Barnett, *supra* note 1, at 234–35; D. Daniel Sokol & Wenton Zheng, *FRAND in China*, 22 TEX. INTELL. PROP. L. J. 71, 80-81 (2013); Stephen J. Ezell & Robert D. Atkinson, *The Middle Kingdom Galapagos Island Syndrome: The Cul-De-Sac of Chinese Technology Standards*, INFO. TECH. & INNOVATION FOUND. 13–22 (2014), <https://itif.org/publications/2014/12/15/middle-kingdom-galapagos-island-syndrome-cul-de-sac-chinese-technology/>; U.S. INT’L TRADE COMM’N, *CHINA: INTELLECTUAL PROPERTY INFRINGEMENT, INDIGENOUS INNOVATION POLICES, AND FRAMEWORKS FOR MEASURING THE EFFECTS ON THE U.S. ECONOMY* (USITC Publication 4199, Investigation No. 332-514, Nov. 2011), at 2-21 to 2-22.

50. Breznitz & Murphee, *supra* note 46, at 2 (observing that Chinese standards “have also generally been market failures. None have gained significant market support outside of China and most have limited success even within China”).

globally dominant standard, which in turn elicited resistance from local device makers and telecom carriers.⁵¹

Today China still operates under a significant IP and technology deficit in the design and production of the advanced semiconductors used in wireless communications devices. A 2019 U.S. government report observed that “the Chinese semiconductor ecosystem continues to lag several generations behind that of international competitors across nearly all semiconductor sub-markets and industries.”⁵² A 2020 publication by Chinese researchers observed that, in the Chinese economy, “key products such as . . . high-end chips have long been dependent on imports, and China does not yet have independent production capabilities for them.”⁵³ Among several policy instruments, government leadership has sought to address this persistent source of geopolitical and economic disadvantage through the application of IP and competition law to the enforcement and licensing of patents essential to technology standards. Specifically, Chinese courts and regulators have consistently taken actions through patent and competition law that have the effect (either directly or indirectly) of lowering the royalty rates for wireless SEPs that domestic device manufacturers pay to foreign suppliers of these critical technology inputs.

III. WESTERN MODELS OF MARKET FAILURE AND REGULATORY INTERVENTION

The intellectual origins of the interventionist approach taken by Chinese regulators and courts toward SEP licensing can be found in theoretical models of market failure developed by U.S. economists and legal academics, which were adopted by antitrust and competition regulators in the United States, European Union, and other major jurisdictions through policy statements and enforcement actions. In the mid-2000s, a handful of scholarly articles conjectured that, under certain circumstances, a SEP licensing market was prone to failure since SEP owners (each assumed to exercise market power) would “hold up” locked-in users for royalty rates in excess of a patented

51. On the TD-CDMA standard, see U.S. INTERNATIONAL TRADE COMMISSION, CHINA 2011, *supra* note 49, at 5–24. On the WAPI standard, see Ping Gao, *WAPI: A Chinese Attempt to Establish Wireless Standards and the International Coalition that Resisted*, 23 COMM’NS OF THE ASS’N FOR INFO. SYS. 23: 151 (2008). For related discussion, see Ezell & Atkinson, *supra* note 49, 16–17; Peter K. Yu, Jorge L. Contreras & Yu Yang, *Transplanting Anti-Suit Injunctions*, 71 AMER. UNIV. L. REV. 1537, 1572–73 (2022).

52. Kim & VerWey, *supra* note 45, at 2 n.7.

53. Leilei et al., *supra* note 24.

technology's relative contribution to the relevant device or system.⁵⁴ In an alternative scenario, scholars posited that profit-maximizing rate-setting by individual SEP owners would result in a collective royalty burden that would generate prices beyond the reach of most consumers, inhibiting technology adoption and market growth.⁵⁵ In both cases, scholars argued that these models were supported by anecdotal reports of “double-digit” licensing rates⁵⁶ or simple summations of announced royalty rates (without adjustment for negotiation or cross-licensing).⁵⁷

Based on these theoretical assertions, regulators in the United States, European Union, and other jurisdictions have invested considerable efforts in taking actions and advocating policies to “protect” licensees against purported overreaching by SEP licensors. Regulators sought to preclude SEP owners from seeking injunctive relief against infringers, to compel SEP owners to license at the component (rather than device) level, and to establish damages calculation methodologies that would reduce reasonable royalty damages for adjudicated infringers.⁵⁸ In the United States, these objectives were set forth in an influential report released by the Federal Trade Commission (FTC) in 2011⁵⁹ and a joint policy statement issued in 2013 by the U.S. Department of Justice (DOJ), the USPTO, and the National Institute for Standards and Policy.⁶⁰ Regulators' efforts to reengineer the wireless licensing market

54. For the classic sources, see Mark A. Lemley, *Ten Things to Do About Patent Holdup of Standards (and One Not to)*, 48 B.C. L. REV. 149, 150-52 (2007); Mark A. Lemley & Carl Shapiro, *Patent Holdup and Royalty Stacking*, 85 TEX. L. REV. 1991, 1994-2010 (2007); Joseph Farrell, John Hayes, Carl Shapiro & Theresa Sullivan, *Standard Setting, Patents, and Hold-Up*, 74 ANTITRUST L.J. 603, 648 (2007).

55. Lemley & Shapiro, *supra* note 54, at 2010-2017; Lemley, *supra* note 54, at 152-53.

56. Lemley & Shapiro, *supra* note 54, at 2027.

57. Ann Armstrong, Joseph Mueller & Tim Syrett, *The Smartphone Royalty Stack: Surveying Royalty Demands for the Components Within Modern Smartphones*, at 68–69 (May 29, 2014), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2443848. On the unreliability of announced royalty rates as a measure of actual royalty rates in SEP licensing markets, see Barnett, *supra* note 3, at 1338–56.

58. For detailed discussion of these regulatory efforts, see Barnett, *supra* note 1, at 211–12; Barnett, *supra* note 3, at 1338–56.

59. FED. TRADE COMM'N, *THE EVOLVING IP MARKETPLACE: ALIGNING PATENT NOTICE AND REMEDIES WITH COMPETITION* (2011), <https://www.ftc.gov/sites/default/files/documents/reports/evolving-ip-marketplace-aligning-patent-notice-and-remedies-competition-report-federal-trade/110307patentreport.pdf>

60. U.S. DEPT. OF JUSTICE & U.S. PATENT & TRADEMARK OFFICE, *POLICY STATEMENT ON REMEDIES FOR STANDARDS-ESSENTIAL PATENTS SUBJECT TO VOLUNTARY F/RAND COMMITMENTS* (2013), <https://www.justice.gov/atr/page/file/1118381/download>.

culminated in the antitrust suit brought by the FTC in 2017 against Qualcomm, one of the industry's major SEP licensors and the acknowledged innovation leader behind 3G and 4G/LTE wireless communications technologies. While the agency ultimately lost on appeal,⁶¹ it secured a favorable decision and order at the district court,⁶² which had mandated comprehensive changes to the company's licensing practices that would likely have compelled the company to shift toward a vertically integrated business model if the court's order had been implemented.

The view that SEP licensing in wireless devices is inherently prone to market failure was embraced not only by U.S. antitrust agencies but competition regulators in Europe, Korea, Japan, and Taiwan.⁶³ Like the U.S. agencies, E.U. regulators opposed the pursuit of injunctions by SEP owners due to concerns over patent holdup⁶⁴ and advocated imposing an aggregate cap on FRAND royalties to avoid royalty stacking.⁶⁵ With the exception of the DOJ Antitrust Division during 2017-2020 (when the Division expressed the view that patent holdup did not present a significant policy concern in SEP wireless markets⁶⁶), regulators around the world appeared to pay little attention to the seemingly obvious mismatch between the market failure predicted by patent holdup theory and the resounding technological and economic success of the real-world wireless communications market. While regulators consistently advocated action to "protect" producers and consumers from the

61. *FTC v. Qualcomm*, 969 F.3d 974, 1005 (9th Cir. 2020).

62. Findings of Fact and Conclusions of Law at 227–29, *FTC v. Qualcomm, Inc.*, No. 17-CV-00220-LHK (N.D. Cal. May 21, 2019).

63. For discussion, see Douglas H. Ginsburg, Koren W. Wong-Ervin & Joshua D. Wright, *The Troubling Use of Antitrust to Regulate FRAND Licensing*, 10 CPI ANTITRUST CHRON. 2, 2 (2015).

64. See generally EUROPEAN COMM'N, COMMISSION SENDS STATEMENT OF OBJECTIONS TO MOTOROLA MOBILITY ON POTENTIAL MISUSE OF MOBILE PHONE STANDARD-ESSENTIAL PATENTS (2013), https://ec.europa.eu/commission/presscorner/detail/en/IP_13_406.

65. EUROPEAN COMM'N, COMMUNICATION ON SETTING OUT THE EU APPROACH TO STANDARD ESSENTIAL PATENTS 6–7 (2017), <https://ec.europa.eu/docsroom/documents/26583>.

66. See, e.g., U.S. DEPT. OF JUSTICE, ASSISTANT ATTORNEY GENERAL MAKAN DELRAHIM, THE "NEW MADISON" APPROACH TO ANTITRUST AND INTELLECTUAL PROPERTY LAW (Mar. 26, 2018), <https://www.justice.gov/opa/speech/assistant-attorney-general-makan-delrahim-delivers-keynote-address-university> (expressing skepticism concerning significance and prevalence of patent holdup); ASSISTANT ATTORNEY GENERAL MAKAN DELRAHIM DELIVERS REMARKS AT THE USC GOULD SCHOOL OF LAW'S CENTER FOR TRANSNATIONAL LAW AND BUSINESS CONFERENCE (Nov. 10, 2017), <https://www.justice.gov/opa/speech/assistant-attorney-general-makan-delrahim-delivers-remarks-usc-gould-school-laws-center> (same).

allegedly exorbitant rates “imposed” by SEP licensors, consumers consistently enjoyed increasing functionality and, adjusted for those quality improvements, decreasing prices.⁶⁷ Empirical research subsequently confirmed that estimated aggregate royalty rates paid by device manufacturers to SEP owners were in the single digits, representing a relatively modest portion of the immense value generated by wireless communications technologies.⁶⁸ These findings explain why the patent-intensive smartphone market has exhibited broad and rapid rates of adoption across geographic and income segments,⁶⁹ contrary to the market failure scenarios that prevail among the academic and regulatory communities.

If the patent holdup and royalty stacking models misdescribed the actual performance of SEP licensing markets in wireless technologies, then this discrepancy implied that interventions pursued and advocated by competition regulators were unnecessary remedies for a merely hypothetical malady. Even worse, regulatory intervention to impose constraints on SEP enforcement and licensing—by curtailing injunctive relief, disrupting well-settled licensing practices, and adopting methodologies that depress reasonable royalty damages—ran the risk of distorting the pricing of SEPs in a manner that redistributes wealth toward licensee-implementers and away from licensor-innovators that drive technological advancement in wireless communications. This runs counter to the fundamental purpose of antitrust law: rather than preserving the market’s ability to allocate resources efficiently through the pricing mechanism grounded in a secure legal foundation of property rights

67. Alexander Galetovic, Stephen Haber, & Ross Levine, *An Empirical Examination of Patent Holdup*, 11 J. COMPETITION L. & ECON. 549, 572 (2015).

68. Alexander Galetovic, Stephen Haber, & Lew Zaretski, *An Estimate of the Average Cumulative Royalty Yield in the World Mobile Phone Industry: Theory, Measurement and Results*, 42 TELECOMM. POL’Y 263, 266 (2018) (finding average estimated “cumulative royalty yield” for IP licensors of 3.4% of mobile phone sale price); Alexander Galetovic, Stephen Haber, & Lew Zaretski, *Is There an Anticommons Tragedy in the World Smartphone Industry?*, 32 BERKELEY TECH. L. J. 1527, 1532-33 (2017) (finding aggregate royalty rate on a smartphone device equal to approximately 3.4% of average sale price); Keith Mallinson, *Cumulative Mobile-SEP Royalty Payments No More Than Around 5% of Mobile Handset Revenues*, WISEHARBOR (2015) (finding estimated aggregate royalty rate paid to IP licensors by smartphone manufacturers equal to approximately 3.4% of average device sale price), <https://www.wischarbor.com/pdfs/Mallinson%20on%20cumulative%20mobile%20SEP%20royalties%20for%20IP%20Finance%202015Aug19.pdf>; J. Gregory Sidak, *What Aggregate Royalty Do Manufacturers of Mobile Phones Pay to License Standard-Essential Patents?*, 1 CRITERION J. INNOVATION 701, 701-02 (2016) (estimating aggregate royalty rate for IP licensors to smartphone manufacturers and finding upper bound of 4-5%).

69. Jason Dedrick & Kenneth L. Kraemer, *Intangible Assets and Value Capture in Global Value Chains: The Smartphone Industry* 3–4 (World Intellectual Property Organization, Working Paper No. 41, 2017), <https://www.wipo.int/publications/en/details.jsp?id=4230>.

and contract enforcement, regulators took actions that undermined that legal foundation and, as a result, threatened to skew the pricing mechanism in a manner that advantages the users of wireless technologies over the entities that primarily contributed to the development of those technologies. This regulatory misuse of antitrust law has provided the model for Chinese regulators' extensive interventions to impact the pricing of wireless technology assets for mercantilist purposes.

IV. HOW CHINA DEVALUES INTELLECTUAL PROPERTY RIGHTS IN WIRELESS MARKETS

It is widely observed that the Chinese state has adopted multiple strategies to accelerate technology transfer from foreign to domestic entities. These strategies encompass mandatory technology transfer through joint ventures and other relationships with domestic entities, tolerated infringement of patented technologies, and, in the case of certain companies, alleged and adjudicated cases of intellectual property espionage and theft.⁷⁰ In the wireless communications sector, the Chinese government has sought to close its domestic industry's technology shortfall through patent and competition law, having expressed concern internationally and domestically over the potential for patents to impede the adoption of technology standards.⁷¹ Given this background, it is unsurprising that theoretical models of patent holdup and royalty stacking, and regulatory intervention based on those models, have found a receptive audience among Chinese regulators, courts, and device producers. A Chinese scholar has observed that the development of judicial guidelines by Chinese courts concerning the issuance of injunctions in SEP infringement litigations has been influenced by “academic theories that have become the spotlight of legislations, antitrust agencies and courts in various jurisdictions recently—the conjectures of patent holdup and royalty

70. REPORT TO CONGRESS 2022, *supra* note 37, at 180–81; REPORT TO CONGRESS 2012, *supra* note 12, at 18, 91; Suchodolski, *supra* note 19, at 198–203. On allegations of theft of trade secrets by Huawei and ZTE from US-based companies such as Motorola and Cisco, see SEI-JIN CHANG, MULTINATIONAL FIRMS IN CHINA: ENTRY STRATEGIES, COMPETITION, AND FIRM PERFORMANCE 164–65 (2013).

71. Committee on Technical Barriers to Trade, Intellectual Property Rights Issues in Standardization: Background paper for Chinese Submission to WTO, WTO Doc. G/TBT/W/251-Add.1 (Nov. 9, 2006), <https://docs.wto.org/dol2fe/Pages/SS/directdoc.aspx?filename=Q:/G/TBT/W251A1.pdf&Open=True>.

stacking.”⁷² Similarly, a Chinese practitioner has commented that “[o]ne of the biggest concerns among Chinese regulators and judges is royalty stacking.”⁷³ Similar sentiments are expressed by Chinese device producers, as illustrated by a statement attributed to an executive at Xiaomi, who explicitly urged regulators to interpret the FRAND commitment for protectionist purposes: “The heart of FRAND-related issues from the licensees’ perspective is really fair competition (remember ‘cost’ is one part of fair competition). No government will see their domestic companies being unfairly forced into less competitive positions without doing anything about it. That’s why there are regulators.”⁷⁴

Chinese regulators and courts have heeded this call to action. In this Part, I show how patent holdup and royalty stacking theories have translated into regulatory guidelines and enforcement actions by Chinese regulators, and judicial guidelines and decisions by Chinese courts, that have systematically favored the interests of SEP licensees (almost always domestic device producers) over SEP licensors (almost always foreign entities, which usually specialize in chip design). The result: a truncated property-rights regime in which SEP owners have no prospect of denying access through injunctive relief, which in turn distorts the pricing of SEP-protected assets to the detriment of the entities responsible for the innovation efforts that drive forward the wireless technology ecosystem.

A. REGULATORY GUIDELINES

In the IP context (including SEP-related issues), Chinese competition law sometimes borrows doctrines developed in U.S. antitrust and E.U. competition law and broadens the application of those doctrines in a manner that facilitates legal action to constrain the licensing and enforcement capacities of patent owners. Hence, competition law doctrines in the Chinese IP context can play a different function when used as a tool of industrial trade

72. Yuan Hao, *SEP Holder’s Right to Injunction Shall Not Be Lightly Deprived*, 2 CHINA PATENTS & TRADEMARKS 83 (2017), https://www.ssrn.com/sol3/papers.cfm?abstract_id=3010761.

73. CPI ANTITRUST CHRONICLE, THE SCIENCE OF CHINA’S FRAND RATE-SETTING 4 (2020), <https://www.competitionpolicyinternational.com/wp-content/uploads/2020/03/CPI-Jing.pdf>.

74. CTR. FOR INT’L GOVERNANCE INNOVATION, SPECIAL REPORT: CHINA’S STANDARD-ESSENTIAL PATENTS CHALLENGE: FROM LATECOMER TO (ALMOST) EQUAL PLAYER? 30 (2017), <https://www.cigionline.org/static/documents/documents/China's%20Patents%20ChallengeWEB.pdf> (citing statement by Paul Lin in Joff Wild, *The IP Personalities of 2016, Part Two*, IAM, (Jan. 3, 2017)).

policy, as compared to the functions played by those same doctrines in U.S. or E.U. competition law. Using a term from linguistics, Mark Cohen has described a “false friends” phenomenon in which the meaning of a particular legal term borrowed from a foreign legal system (in Cohen’s example, “anti-suit injunctions”) changes when it is applied in the Chinese legal system.⁷⁵ In the SEP context, Chinese regulators have adopted and modified doctrines in U.S. and E.U. competition law to provide regulators with broad discretion to intervene in licensing agreements between technology suppliers and device producers, both directly by limiting the permitted range of licensing terms and indirectly by precluding SEP owners from seeking injunctive relief against infringers.

For purposes of the following discussion, note that Chinese competition regulators were consolidated in 2018 into the State Administration of Market Regulation (SAMR, which also includes the State Intellectual Property Office); however, some of the discussion below will refer separately to the four “predecessor” competition regulators and competition-related entities.⁷⁶ Below is a list of the primary sources of Chinese law (including rules and guidelines) to which reference is made in the following discussion.

Table 2. Selected Sources of Chinese Law Relating to SEP Enforcement and Licensing (2008-2022)

| Year | Source of Law | Issuing Entity | Abbreviation |
|------|-------------------|----------------------------|--------------|
| 2008 | Anti-Monopoly Law | National People’s Congress | AML |

75. Mark Cohen, *China’s Practice of Anti-Suit Injunctions in SEP Litigation: Transplant or False Friend?*, in 5G AND BEYOND: INTELL. PROP. AND COMPETITION POL’Y IN THE INTERNET OF THINGS (eds. Jonathan M. Barnett & Sean M. O’Connor, forthcoming 2023) [hereinafter Cohen, *China’s Practice of Anti-Suit Injunctions*].

76. Until 2018, there were three principal competition regulators in China: the Anti-Monopoly Bureau of the Ministry of Commerce (MOFCOM); the Price Supervision and Anti-Monopoly division of the National Development and Reform Commission (NDRC); and the Anti-Monopoly and Anti-Unfair Competition Enforcement Bureau of the State Administration for Industry and Commerce (SAIC). Additionally, competition guidelines were also issued by the Anti-Monopoly Commission of the State Council, which has also been merged into the SAMR. For full explanation, see Katherine Wang Mimi Yang & David Zhang, *China’s New State Administration for Market Regulation: What to Know and What to Expect*, ROPES & GRAY (Apr. 3, 2018), <https://www.ropesgray.com/en/newsroom/alerts/2018/04/chinas-new-state-market-regulatory-administration-what-to-know-and-what-to-expect>.

| | | | |
|------|--|---|--------------------------|
| 2012 | Provisions of the Supreme People's Court on Several Issues Concerning Application of Law in Trial of Civil Dispute Cases Arising from Monopolistic Conduct | Supreme People's Court | N/a |
| 2015 | Provision on Prohibition of Conducts Abusing Intellectual Property Rights to Exclude and Eliminate Competition | State Administration for Industry and Commerce | 2015 IP Abuse Rules |
| 2017 | Anti-Monopoly Guidelines for Intellectual Property Abuse (draft) | Anti-Monopoly Commission of the State Council | N/a |
| 2018 | Working Guideline on the Trial of Standard Essential Patent Dispute Cases | Guangdong High People's Court | N/a |
| 2020 | Anti-Monopoly Guidelines in the Field of Intellectual Property | State Administration of Market Regulation | 2020 SAMR IP Guidelines |
| 2020 | Provisions on Prohibiting the Abuse of Intellectual Property Rights to Preclude or Restrict Competition | State Administration of Market Regulation | 2020 SAMR IP Abuse Rules |
| 2022 | Anti-Monopoly Law (amended) | National People's Congress | AML |
| 2022 | Provisions on Prohibition for Abuse of Intellectual Property Rights to Exclude or Restrict Competition (draft) | State Administration of Market Regulation | 2022 SAMR IP Abuse Rules |
| 2022 | Guidelines for Standard-Essential Patent Licensing in the Automotive Industry | China Academy of Information and Communications Technology, China Automotive Technology and Research Center | N/a |

1. *Excessive Pricing*

Enacted in 2008 (and amended in 2022), China’s competition statute (the Anti-Monopoly Law or AML) provides a cause of action for “unfairly high” prices against a firm that has a “dominant market position.”⁷⁷ Draft IP abuse guidelines issued by the Anti-Monopoly Commission of the State Council in 2012 and 2017 specifically stated that IP licenses are subject to the AML’s prohibition of “unfairly high” pricing, which can constitute an abuse of a dominant position.⁷⁸ Additionally, draft IP abuse guidelines issued in 2017 indicated that “when assessing whether SEPs are being licensed at ‘unfairly high patent pricing,’ the level of royalty stacking on standardized products . . . may be considered.”⁷⁹ The 2020 SAMR IP Guidelines reiterated this principle concerning IP licensing by a firm with a “dominant market position.”⁸⁰ In the case of SEPs, the 2020 SAMR IP Guidelines reiterate that “royalty stacking considerations” will be taken into account in determinations concerning “excessive” pricing.⁸¹ The draft 2022 SAMR IP Abuse Rules provide that a SEP owner that has a “dominant market position” would be deemed in

77. ANTI-MONOPOLY LAW, Art. 22(1) (amended June 24, 2022) [hereinafter AML 2022]. For unofficial English translation: <https://www.chinalawtranslate.com/en/anti-monopoly-law-2022>. Art. 17(a) is the analogous provision in the Anti-Monopoly Law, as enacted in 2008 [hereinafter AML 2008]. For official English translation of the 2008 law, see www.npc.gov.cn/zgrdw/englishnpc/Law/2009-02/20/content_1471587.htm.

78. On the 2012 draft guidelines, see Chen Wenjing, *The Royalty Rate is FRAND or Excessive? The Practice in the EU, China, and the Applicability of Selected Economic Models*, 19 US-CHINA L. REV. 267, 272–73 (2022). On the 2017 draft guidelines, see Koren W. Wong-Ervin, *An Update on the Most Recent Version of China’s Anti-Monopoly Guidelines on the Abuse of Intellectual Property Rights*, CPI ASIA COLUMN (May 2017), https://gai.gmu.edu/wp-content/uploads/sites/27/2016/07/CPI-Article-on-China-Comments_4-17.pdf.

79. Yuan Hao, *Through the Anti-Monopoly Lens: What Constitutes ‘Unfairly High Patent Pricing’ in China?*, 69 GRUR INT’L 823, 828 (2020) (describing Article 14 of the draft Anti-Monopoly Guidelines for Intellectual Property Abuse, issued in 2017 by the Anti-Monopoly Commission of the State Council).

80. STATE ADMIN. FOR MKT. REGUL., STATE COUNCIL ANTI-MONOPOLY COMMITTEE ANTI-MONOPOLY GUIDELINES IN THE FIELD OF INTELLECTUAL PROPERTY RIGHTS, Art. 15 (published Sept. 18, 2020, promulgated Jan. 4, 2019) [hereinafter 2020 SAMR IP GUIDELINES]. Partial unofficial English translation available at Aaron Winger, *China Releases Antitrust Guidelines for Intellectual Property*, CHINA IP LAW UPDATE (2020), <https://www.chinaiplawupdate.com/2020/09/china-releases-antitrust-guidelines-for-intellectual-property/>.

81. *Id.*

violation of the AML if the owner “licenses it [the SEP] at an unfairly high price.”⁸²

There are few analogs to these concepts in U.S. or E.U. competition law. U.S. antitrust law does not recognize any cause of action for excessive prices and, while E.U. competition law does provide for such a cause of action, it has historically been applied in a limited number of cases and is generally reserved for exceptional situations.⁸³ China’s cause of action for excessive pricing poses a liability risk for any licensor given the lack of any clear definition of “unfairly high” pricing and courts’ and regulators’ broad discretion to make that determination⁸⁴ (precisely the reasons why E.U. courts and regulators have been reluctant to entertain suits against purportedly excessive prices). This liability risk has been realized in various regulatory actions and private lawsuits against SEP owners that have alleged “unfairly high pricing,” including matters involving InterDigital Corporation (IDC), Ericsson, Sisvel, and Qualcomm.⁸⁵ This background legal risk may impact market-negotiated royalties since prospective licensees have a credible threat of contesting (or lobbying competition regulators to contest) royalty rates as “unfairly high” pricing.

2. *Essential Facility Doctrine*

In general, Chinese competition law recognizes that IP rights may sometimes be treated as an “essential facility” that imposes on the IP owner a duty to license to all parties on “reasonable” terms. This approach departs substantially from the essential facility doctrine in U.S. antitrust law, which has been applied narrowly by U.S. courts⁸⁶ and has never been specifically recognized by the U.S. Supreme Court. While the Supreme Court has

82. STATE ADMINISTRATION FOR MARKET REGULATION, REGULATION ON PROHIBITION FOR ABUSE OF INTELLECTUAL PROPERTY RIGHTS TO EXCLUDE OR RESTRICT COMPETITION, at Art. 16 (2) (draft released June 29, 2022) [hereinafter 2022 IP ABUSE RULES]. Partial unofficial English translation available at Aaron Winger, *China’s State Administration for Market Regulation Introducing Compulsory Licensing Regime with Draft Provisions on Prohibiting the Abuse of Intellectual Property Rights to Exclude and Restrict Competition?*, CHINA IP LAW UPDATE (June 28, 2022), <https://www.chinaiplawupdate.com/2022/06/chinas-state-administration-for-market-regulation-introducing>.

83. DAMIEN GERADIN, ANNE LAYNE-FARRAR, & NICOLAS PETIT, *E.U. COMPETITION LAW AND ECONOMICS* §§ 4.408-4.419 (2012).

84. Hao, *supra* note 79, at 824 (observing that the lack of a clear definition of “unfairly high prices” in China’s Anti-Monopoly Law “has left enforcement agencies with exceedingly broad discretion in deciding whether a market price is ‘unfairly high’ or not”).

85. *See id.*

86. In U.S. law, the doctrine is generally derived from *United States v. Terminal Railroad Association of St. Louis*, 224 U.S. 118 (1912), although it has been developed more fully in lower-court decisions.

recognized the related “duty to deal” in limited circumstances⁸⁷, it has indicated that this remedy lies at “the outer boundary” of antitrust law and should be applied in only the most exceptional cases.⁸⁸ Moreover, the IP licensing guidelines adopted by U.S. antitrust agencies specifically provide that IP rights should not be treated differently from other assets for purposes of antitrust law.⁸⁹ As applied in E.U. competition law, the essential facility doctrine can apply to dominant firms but only in narrowly defined circumstances.⁹⁰ Similarly, in the IP context, European courts only impose a duty to license (or otherwise make available) IP-protected assets in “exceptional circumstances.”⁹¹

In contrast, Chinese competition law provides a substantially broader scope to the essential facility and duty to deal doctrines. Specifically, the AML provides that a refusal to deal by a company with a “dominant market position” constitutes an abuse of dominance “without justifiable reasons.”⁹² In the IP context, this appears to create a presumption that in the case of a dominant firm, a refusal to license presumptively constitutes an antitrust violation, which places the burden on the defendant to demonstrate “justifiable reasons” for engaging in that practice.⁹³ Moreover, it is not clear

87. *Aspen Skiing Co. v. Aspen Highlands Skiing Corp.*, 472 U.S. 585, 609 (1985).

88. *Verizon Comm’n v. Law Off. of Curtis V. Trinko*, 540 U.S. 398, 398 (2004).

89. U.S. DEPT. OF JUSTICE AND FED. TRADE COMM’N, ANITRUST GUIDELINES FOR THE LICENSING OF INTELLECTUAL PROPERTY 3 (2017), https://www.ftc.gov/system/files/documents/public_statements/1049793/ip_guidelines_2017.pdf (“The Agencies apply the same general antitrust principles to conduct involving intellectual property that they apply to conduct involving any other form of property”).

90. *Case C-7/97, Oscar Bronner GmbH & Co. v. Mediaprint Zeitungs-und Zeitschriftenverlag GmbH & Co. KG*, 1998 E.C.R. I-17794, at 41. For further discussion, see GERADIN ET AL., *supra* note 83, at §§ 4.314-4.319.

91. Communication from the Commission, Guidance on the Commission’s enforcement priorities in applying Article 82 of the EC Treaty to abusive exclusionary conduct by dominant undertakings, OJ C 45, 24 Feb. 2009.

For discussion, see GERADIN ET AL., *supra* note 83, at §§ 4.303, 4.309-4.313, 4.328-4.339, 4.361-4.370.

92. AML 2008, *supra* note 77, at Art. 22(3).

93. Susan Ning & Ding Liang, *Commentary on the Anti-Monopoly Judicial Interpretation*, KING & WOOD MALLESONS (Aug. 29, 2012), <https://www.chinalawinsight.com/2012/08/articles/compliance/commentary-on-the-antimonopoly-judicial-interpretation/> (stating that the Anti-Monopoly Judicial Interpretation provides that “[w]here the alleged monopolistic conduct is an abuse of a dominant market position as described in Article 17.1 of the AML, the defendant shall assume the burden to prove a defense of justifiable cause of its conduct”). For the primary source, see PROVISIONS OF THE SUPREME PEOPLE’S COURT ON SEVERAL ISSUES CONCERNING THE APPLICATION OF LAW IN THE TRIAL OF CIVIL DISPUTE CASES ARISING FROM MONOPOLISTIC CONDUCT (issued May 3, 2012), <https://www.lawofchina.com/display.aspx?lib=law&id=9300&CGid=>

whether the phrase “justifiable reasons” captures the efficiency gains that regulators and courts under U.S. and E.U. law typically consider when evaluating the competitive effects of a business practice under a balancing test (as implemented in U.S. law through the rule of reason⁹⁴ and E.U. law through an “assessment of effects” analysis⁹⁵).

Chinese competition regulators have developed more detailed guidelines concerning refusals to license IP rights. Draft guidelines released in 2010 provided for compulsory licensing if access to IP rights is “essential” for others to compete.⁹⁶ This concept has continued to appear in more attenuated forms in subsequently issued guidelines. In 2012, draft IP guidelines were released providing that a SEP holder’s refusal to license “on reasonable terms within the process of standardization” would constitute an abuse of dominant position under the AML, absent “due justifications.”⁹⁷ The 2015 IP Abuse Rules, issued by SAIC (one of the “predecessor” competition regulators), provided that an entity that has a “dominant market position” and owns IP that “constitutes a facility essential for production and business operations” may not “refuse to license other business operators to use such intellectual property rights under reasonable conditions to eliminate or restrict competition.”⁹⁸ The SAMR 2020 IP Abuse Rules provide that an entity with a “dominant market position” may not decline to allow other entities to use the entity’s “intellectual property rights under reasonable conditions . . . if their [*the entity’s*] intellectual property rights are necessary for production and business activities without proper reasons.”⁹⁹ The 2020 SAMR IP Guidelines take a

94. See, e.g., *California Dental Ass’n v. F.T.C.*, 526 U.S. 756, 779–81 (1999).

95. Lisa Kaltenbrunner, *European Union: Abuse of dominance and article 102 of the TFEU*, GLOBAL COMPETITION REV. (June 24, 2022), <https://globalcompetitionreview.com/review/the-european-middle-east-and-african-antitrust-review/2023/article/european-union-abuse-of-dominance-and-article-102-of-the-tfeu>.

96. *China’s AML and its Impact on U.S. firms: Hearing Before the Subcomm. on Courts and Competition Policy of the H. Comm. on the Judiciary*, 111th Cong. 7 (2010) (statement of the U.S. Chamber of Commerce).

97. Wenjing, *supra* note 78, at 272–74 (describing Guide on Anti-Monopoly Law Enforcement in the Field of Intellectual Property Rights, released in 2012).

98. Stephen Crosswell, Isabella Liu, Grace Wong, Eva Crook-Santner & Donald Pan, *Hong Kong: SAIC Publishes Landmark Antitrust Regulation for Intellectual Property Rights*, GLOBAL COMPLIANCE NEWS (Apr. 27, 2015), <https://www.globalcompliancenes.com/2015/04/27/hong-kong-saic-publishes-landmark-antitrust-regulation-for-intellectual-property-rights/> (describing Article 7 of the State Administration for Market Regulation, Provision of Prohibition of Conducts Abusing Intellectual Property Rights to Exclude and Eliminate Competition (released Apr. 7, 2015)).

99. STATE ADMIN. FOR MKT. REGUL., REGULATIONS ON PROHIBITING ABUSE OF INTELLECTUAL PROPERTY RIGHTS TO EXCLUDE AND RESTRICT COMPETITION (released 2015, amended Oct. 23, 2020, released Nov. 30, 2020) [hereinafter 2020 IP ABUSE RULES].

similar position, stating that a firm with a dominant market position may be held liable for abuse of dominance if it declines to license an IP right “without valid justifications.” The determination concerning “valid justifications” takes into account (among other criteria) whether the IP right is “essential for others to enter the market” and “whether the party being refused is unwilling or unable to pay reasonable royalties.”¹⁰⁰ Similarly, the draft 2022 SAMR IP Abuse Rules construe a refusal to license as an antitrust violation in the case of any IP owner who has a dominant market position and “refuse[s] to license . . . under reasonable conditions, so as to exclude or restrict competition when its intellectual property constitutes necessary facilities for production and business activities.”¹⁰¹

A recent decision issued in 2021 provides the first case in which a Chinese court has deemed a patent to be an essential facility, leading to a compulsory licensing remedy.¹⁰² In *Ketian Magnet et al. v. Hitachi Metals*, an intermediate Chinese court found that Hitachi’s patents, which related to a rare-earth magnet alloy used in parts for automobiles and other products, were an essential facility, which imposed an obligation on Hitachi to license the patents to any party on “reasonable” terms. Given that the Hitachi patents were not even SEPs, the court’s decision heightens the risk that Chinese courts may treat SEPs as essential facilities, which could then challenge SEP owners’ customary practice of only licensing at the device (rather than component) level of the wireless supply chain.

3. FRAND Principle

SEP owners are generally subject to a commitment to license and enforce SEPs in a manner consistent with the FRAND principle. U.S. courts and E.U. competition law confine FRAND obligations to entities that voluntarily adopted a FRAND commitment to the relevant standard-development organization. In contrast, rules and guidelines issued by Chinese competition

Partial unofficial English translation: Aaron Wininger, *China’s State Administration for Market Regulation Releases Updated Regulations on Prohibiting Abuse of Intellectual Property Rights to Exclude and Restrict Competition*, CHINA IP LAW UPDATE (June 29, 2023), <https://www.chinaiplawupdate.com/2023/06/chinas-state-administration-for-market-regulation-releases-provisions-prohibiting-abuse-of-intellectual-property-rights-to-exclude-and-restrict-competition/>.

100. 2020 SAMR IP GUIDELINES, *supra* note 80.

101. 2022 IP ABUSE RULES, *supra* note 82, at Art. 7.

102. This paragraph relies on Wei Huang, Fan Zhu, Bei Yin, & Xiumin Ruan, *A Review of the Development of SEP-Related Disputes in China and Outlook for the Future Trend*, CPI COLUMNS ASIA (Nov. 15, 2022), https://www.pymnts.com/cpi_posts/a-review-of-the-development-of-sep-related-disputes-in-china-and-outlook-for-the-future-trend/.

regulators have treated the FRAND principle as a mandatory obligation in the case of any patent that is “essential” to a standard (whether or not the patent owner voluntarily made a FRAND commitment) and identifies certain practices as being categorically inconsistent with the FRAND standard. Draft IP guidelines released in 2012 held that, in the case of a SEP that is included in a “national or industrial standard,” the royalty rate should be no higher than the rate charged prior to inclusion of the SEP-protected technology in the standard.¹⁰³ The 2020 SAMR IP Abuse Rules adopt a less rigid approach, holding that a SEP owner that has a “dominant market position” must conform to “principles of fairness, reasonableness, and non-discrimination” and refrain from “acts that exclude or restrict competition, such as refusing to license, tying goods or adding other unreasonable conditions in the transaction.”¹⁰⁴ The draft 2022 SAMR IP Abuse Rules provide that the owner of a SEP may not breach “a promise of fair, reasonable and non-discriminatory licensing” and specifically identifies “refusing to license without justification, tying and bundling products, applying differential treatment or imposing other unreasonable restrictions” as violations of the FRAND obligation.¹⁰⁵ Aside from treating the FRAND obligation as a voluntary commitment undertaken by SEP owners, U.S. antitrust law and E.U. competition law also do not treat any specific practices as being *per se* inconsistent with FRAND; rather, any such determination requires a case-specific analysis.

Chinese regulators’ *per se* or “*per se*-like” approach to certain SEP licensing practices creates a mismatch between competition law and long-standing market practice. In the 2020 SAMR IP Abuse Rules, the apparent treatment of “refusing to license” as a *per se* violation is incompatible with standard licensing practice in wireless communications, in which the SEP owner typically licenses at the device level only and declines to license to component suppliers (which are nonetheless generally free from liability as a practical matter since SEP owners would risk patent exhaustion¹⁰⁶ by enforcing SEPs at upstream points on the supply chain). The same is true of the draft 2022 SAMR IP Abuse Rules’ designation of “differential treatment” as a

103. Wenjing, *supra* note 78, at 273–74 (citing AML IP Guidelines (fifth draft), Art. 22, Para. 3).

104. 2020 IP ABUSE RULES, *supra* note 99, at Art. 13(2).

105. 2022 IP ABUSE RULES, *supra* note 82, at Art. 16(2).

106. The doctrine of patent exhaustion provides that, after an “authorized sale” of an “article” embodying a patented technology, the patent owner has no legal right to control or otherwise regulate the subsequent resale or use of that article in the market (but is free to do so through technological or contractual means). For the leading U.S. Supreme Court case, see *Impression Prods., Inc. v. Lexmark Int’l, Inc.*, 581 U.S. (2017).

FRAND violation, which would seem to bar even the slightest differences in licensing terms offered to different licensees by the same patent owner. That position departs both from market practice and the general understanding under U.S. antitrust and E.U. competition law that FRAND does not bar differential licensing terms that legitimately reflect differences among licensees or different packages of licensing terms offered to similarly-situated licensees.¹⁰⁷

Chinese competition-law guidelines relating to SEPs also depart from U.S. antitrust and E.U. competition law in another important respect. Under E.U. (and U.K.) case law, a SEP owner risks antitrust liability if it seeks injunctive relief against an infringer; however, if the infringer is shown to be an “unwilling licensee,” then the SEP owner may seek an injunction without such liability and the court may grant an injunction if it finds that the infringer has engaged in “holdout” tactics.¹⁰⁸ While somewhat less clear, U.S. case law similarly holds that the FRAND commitment precludes injunctive relief for SEP owners unless the infringer is not engaging in good-faith negotiation.¹⁰⁹ In contrast, the 2020 SAMR IP Guidelines provide that a SEP holder with a dominant market position can be subject to antitrust liability for seeking injunctive relief against an infringer if it is found to have done so “to force the licensee to accept . . . unfairly high license fees or other unreasonable licensing conditions.”¹¹⁰ The concept reappears in the 2022 SAMR IP Guidelines, which provide that a SEP holder with a dominant market position would breach its FRAND obligation if it “refuses to license without justifiable reasons.”¹¹¹ Given that “justifiable reasons” is not defined, this provision provides a wide ambit for a court to deny injunctive relief as being inconsistent with a SEP

107. See, e.g., *Unwired Planet Int’l Ltd. v. Huawei Technologies Co. Ltd. et al.*, High Court of Justice, [2017] EWHC 711 (Pat.) (May 4, 2017) at ¶¶ 418–502 (holding that non-discrimination principle in FRAND commitment should be applied based on a case-specific showing of competitive harm). For further discussion, see Jorge L. Contreras & Anne Layne-Farrar, *Non-Discrimination and FRAND Commitments*, in *THE CAMBRIDGE HANDBOOK OF TECHNICAL STANDARDIZATION LAW, VOL. 1: COMPETITION, ANTITRUST AND PATENTS* (ed. Jorge Contreras 2018).

108. *Unwired Planet Int’l Ltd. v. Huawei Techs. Co.*, 2017 EWHC (Pat) 71; Case C-170/13, *Huawei Techs. Co. Ltd. v. ZTE Corp. and ZTE Deutschland GmbH*, ECLI:EU:C:2015:477 (July 16, 2015).

109. *Apple Inc. v. Motorola Inc.*, 757 F.3d 1286, 1331–32 (Fed. Cir. 2014) (ruling that trial court “erred” when it “applied a per se rule that injunctions are unavailable for SEPs” and that “an injunction [for a SEP owner] may be justified where an infringer unilaterally refuses a FRAND royalty or unreasonably delays negotiations to the same effect”).

110. 2020 SAMR IP GUIDELINES, *supra* note 80.

111. 2022 IP ABUSE RULES, *supra* note 82, at Art. 16(2).

owner's FRAND commitment (although, as discussed subsequently,¹¹² it now appears that Chinese courts have adopted to a substantial extent the view that SEP owners may seek injunctive relief against an infringer that is deemed to be an unwilling licensee).

It might be questioned whether a SEP owner would always be deemed to hold a dominant market position, which triggers the effective ban on injunctive relief. While the 2020 SAMR IP Guidelines state that a SEP owner is not always deemed to have a "dominant market position,"¹¹³ there are two reasons to believe that SEP owners will infrequently escape this categorization. First, the AML defines dominant market position broadly based on several factors, including whether the entity is "preventing or exerting an influence on the access of other undertakings to the market" and "the extent to which other business managers depend on it in transactions."¹¹⁴ Second, as a matter of judicial and regulatory practice, some commentators observe that SEP owners have usually been placed in this category,¹¹⁵ noting that judicial and administrative findings "have relieved the burden of proof from the implementer in showing the SEP holder's dominant position."¹¹⁶ This is illustrated by the litigation between IDC and Huawei (discussed in more detail

112. See *infra* notes 145–149 and accompanying text.

113. 2020 SAMR IP GUIDELINES, *supra* note 80.

114. AML 2008, *supra* note 77, at Arts. 17, 18(4). The analogous provision in the 2022 AML statute is Art. 23(1), which refers similarly to "the level of difficulty for other undertakings to enter the relevant market" and "the extent to which other undertakings rely on the [dominant] undertaking for trading," see AML 2022, *supra* note 77. A commentary on these provisions (in the 2008 statute) notes that this "would seem to raise the possibility that a business may be found to have market dominance because it is a major supplier or customer to another," see Yee Wah Chin, *Intellectual Property Rights and Antitrust in China*, in IP PROTECTION IN CHINA 303 (2015). This broad definition of market dominance contrasts sharply with U.S. antitrust law, which cannot support a single-firm monopolization claim (the closest U.S. equivalent to an abuse of dominance claim) without a showing of market power, and departs from E.U. law, which requires that any abuse of dominance claim show that a firm can "prevent effective competition being maintained on the relevant market." See Case 85/76, *Hoffman-La Roche & Co. AG v. Commission of the European Communities*, 1979 E.C.R. 461 (interpreting TFEU Art. 82).

115. Huang et al., *supra* note 102.

116. *Id.* The authors refer to the decision in the *Huawei v. IDC* case by the Guangdong Higher Court and the administrative decision by the NDRC against Qualcomm. However, the authors point out that the draft 2022 SAMR IP Abuse Rules suggest that it is possible that SEP owners may still be able to challenge a finding of dominance if they can show sufficiently countervailing bargaining power on the part of SEP implementers. Moreover, certain Chinese judges have rejected a categorical approach on this point, holding that whether or not a SEP owner has a dominant market position must be determined on a case-specific basis. I thank Prof. Yuan Hao for this last observation.

subsequently¹¹⁷), where the court treated each of IDC’s SEPs as a separate product market,¹¹⁸ which in turn ensured that IDC would be deemed to hold a “dominant” position in each SEP-specific licensing market. This departs from market definitions used in at least two SEP litigations in the United States and Germany, in which the relevant market was defined more broadly as the product market for which the relevant SEPs were licensed¹¹⁹—a crucial difference since a product-level market definition does not predetermine that the SEPs being litigated are an essential technology input that confers market power on the SEP owner.¹²⁰ While the point is not settled, it appears that a SEP owner must assume as a matter of prudence that it will be deemed to hold a dominant market position and therefore cannot seek injunctive relief against an infringer without a significant risk of liability under Chinese competition law for doing so.

B. REGULATORY INVESTIGATION AND ENFORCEMENT

Chinese regulators have used the tools supplied by competition law to undertake investigations or enforcement actions concerning the SEP licensing practices of multiple foreign licensors, including IDC, Qualcomm, Dolby, HDMI, Technicolor,¹²¹ and in recently launched investigations concerning 5G wireless technologies, Nokia and Ericsson.¹²² Most notably, in 2013, the NRDC (one of the “predecessor” competition regulators) brought an abuse of dominance action against Qualcomm on the ground that it had charged “excessive” royalty fees and engaged in anticompetitive grant-backs and tying practices in licensing CDMA, WCDMA, and LTE wireless communications technologies. This followed the filing of a complaint by Chinese telecom firms with the regulator, alleging that Qualcomm was “overcharging Chinese mobile makers on patent fees and boosting sales by tying products.”¹²³ Both claims relied on the ability under Chinese competition law to bring suit for “unfairly

117. See *infra* notes 160–166 and accompanying text.

118. Chin, *supra* note 77, at 314.

119. *FTC v. Qualcomm*, 411 F. Supp. 3d 658, 683 (N.D. Cal. 2019) (defining relevant market as the market for CDMA modem chip and premium LTE modem chips); *IP Bridge v. Huawei*, Dusseldorf Regional Court (Dec. 12, 2018), at 52–53 (defining relevant market as the market for smartphones that implement the H.264 standard).

120. On this point, see Huang et al., *supra* note 102.

121. U.S. CHAMBER OF COM., *supra* note 9, at 62.

122. Scott Yu & Jiang Huikuang (Zhong Lun Law Firm), *China Antitrust/Competition Update (2022 Q2)*, LEXOLOGY (Nov. 2, 2022), <https://s3.amazonaws.com/documents.lexology.com/de587a36-a4b2-4af1-9617-f8d95602267b.pdf?AWSAccessKeyId=AKIAVYILUYJ754JTDY6T&Expires=1694501110&Signature=4V7tU7hR0Z9dpVsYbF%2FkLb9eLP0%3D>.

123. U.S. CHAMBER OF COM., *supra* note 9, at 66.

high” prices and, in the case of a firm with a “dominant market position,” to bring suit for tying with the burden placed on the defendant to demonstrate “valid justifications” for that practice. In 2015, Qualcomm resolved the enforcement action by agreeing to pay a fine of approximately \$975 million. Of greater importance, Qualcomm was required to lower substantially the royalties paid by domestic 3G and 4G handset device makers for licensing Qualcomm’s patent portfolio, principally by redefining the “royalty base” as only 65% of the device sale price.¹²⁴ It is notable that suits brought by competition regulators in Europe, Japan, and the United States against Qualcomm for engaging in allegedly anticompetitive tying practices all ultimately failed to establish liability when subjected to scrutiny by appellate courts (and none brought claims for excessive pricing).¹²⁵ In the Chinese system, regulators’ actions are largely immune from such scrutiny due to defendant firms’ reluctance to appeal, which is attributed to the perceived futility of doing so¹²⁶ (in part due to the lack of judicial independence¹²⁷) and fear of retribution or public “shaming” by authorities.¹²⁸ Defendants’ litigation posture may also be impacted by an effort to avoid triggering the maximum penalties under Chinese competition law, which can result not only in disgorgement of gains derived from the offending practice but also a fine of up to 10% of the defendant’s annual revenue.¹²⁹

This strategic use of competition law as a device for collectively negotiating IP royalty rates advances China’s interest in lowering the input costs incurred by its domestic device producers that continue to rely on technology inputs sourced from foreign owners. Given the size of the Chinese market for mobile communications devices, the rates secured by Chinese regulators on behalf of domestic device producers can impact the global market rate for purposes of future licensing and settlement negotiations and “reasonable royalty” damages

124. Noel Randewich & Matthew Miller, *Qualcomm to Pay \$975 Million to Resolve China Antitrust Dispute*, REUTERS (Feb. 9, 2019), <https://www.reuters.com/article/us-china-qualcomm/qualcomm-to-pay-975-million-to-resolve-china-antitrust-dispute-idUSKBN0LD2EL20150210>.

125. *FTC v. Qualcomm Inc.*, 969 F.3d 974 (9th Cir. 2020) (rejecting all antitrust claims and rescinding the district court’s order); *Case T-235/18, Qualcomm, Inc. v. European Commission*, ECLI:EU:T:2022:358, (June 15, 2022) (annulling fine of 997 million euros imposed by regulator and finding no violations of competition law); Shara Tibken, *Qualcomm’s Not a Monopoly, Japan Decides after Monthlong Investigation*, CNET (Mar. 15, 2019) (competition regulator finds that Qualcomm is not a monopoly and cancels 2009 cease-and-desist order).

126. Atkinson, Cory & Ezell, *supra* note 9, at 44.

127. U.S. INT’L TRADE COMM’N, *supra* note 49, at 1-11 to 1-12.

128. ANGELA HUYUE ZHANG, CHINESE ANTITRUST EXCEPTIONALISM 72–73, 89, 95, 115 (2021).

129. Huang et al., *supra* note 102.

in patent infringement actions in other jurisdictions. Illustrating this possibility, Chinese competition authorities' actions against Qualcomm in 2015 were followed by large fines being assessed against Qualcomm in 2016 and 2017 by competition authorities in Korea and Taiwan, respectively (although the fines in both jurisdictions were reduced substantially on appeal).¹³⁰ More importantly, regulators' interventions may have encouraged SEP licensors to offer lower royalty rates to minimize exposure to the costs, delays, and penalties involved if regulators were to intervene again. Through these direct and indirect mechanisms, the strategic deployment of competition law on behalf of net-IP users in a major jurisdiction can impact royalty rates across multiple jurisdictions, resulting in wealth transfers on a global scale from IP licensor-innovators to IP licensee-producers.

Most recently, the Chinese government has (somewhat indirectly) issued guidelines that signal an intent to intervene concerning SEP licensing practices in the automotive industry, in which wireless-enabled functionalities are now an integral part of the industry. In September 2022, two institutes that are reportedly supported by the Ministry of Industry and Technology published draft guidelines concerning SEP licensing in the automotive industry.¹³¹ The guidelines adopt several features that would favor the interests of implementers (in this case, China-based automotive producers) over the interests of innovators that enable connectivity functionalities in motor vehicles. Given the size of the Chinese market (which accounted for more than 32% of worldwide vehicle production as of 2022¹³²), these interventions have the potential to impact SEP licensing practices and rates worldwide.

First, and most notably, the guidelines adopt the “license to all” principle, which interprets the FRAND commitment to mean that SEP licensors are required to grant licenses at all points of the supply chain. If implemented, this

130. Barnett, *supra* note 1, at 231–34.

131. Ye Zhao, *China's Auto Guidelines Endorse “License-to-All” and SSPPU*, MONDAQ (Nov. 30, 2022), <https://www.mondaq.com/china/patent/1255512/china39s-auto-guidelines-endorse-licensetoall-and-ssppu>. For the guidelines, see CHINA AUTOMOTIVE TECHNOLOGY AND RESEARCH CENTER AND CHINA ACADEMY OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, GUIDELINES OF STANDARD-ESSENTIAL PATENT LICENSE FOR AUTOMOTIVE INDUSTRY (2022). The report was issued by these two institutes, “with support from IP Committee of China-SAE, the IMT-2020 (5G) Promotion Group and the Working Group on Automotive Standard Essential Patents,” see Johnson Wang, *China: SEPs and FRAND—litigation, policy and latest developments*, GLOBAL COMP. REV. (Dec. 2, 2022), <https://globalcompetitionreview.com/hub/sepfrand-hub/2022/article/china-seps-and-frand-litigation-policy-and-latest-developments>.

132. STATISTA, *Automotive Manufacturing in China—Statistics & Facts*, (source?) (June 21, 2022).

interpretation would deviate from industry practice in the wireless industry, which has historically licensed at the device level, and would expose licensors to the risk of patent exhaustion as a result of licensing at a component level.¹³³ This would also deviate from emergent SEP licensing trends in the automotive industry in the United States and Europe, where many auto manufacturers have recently joined patent pools that operate under the device-level licensing model.¹³⁴ Relatedly, the guidelines suggest that SEP licensing practices should conform to industry custom, which appears to refer to the customary practice in the automotive industry of licensing at the component, rather than the device, level.¹³⁵

Second, the guidelines effectively adopt the principle that reasonable royalty damages for SEP owners must be calculated using a royalty base that is confined to the specific component covered by the relevant patent (the “smallest saleable practicing patent unit” or “SSPPU”), rather than the vehicle as a whole.¹³⁶ In a 2021 patent infringement case, the SPC applied the SSPPU principle in defining the royalty base for purposes of determining a reasonable royalty.¹³⁷ This departs from U.S. patent law, which adheres to the principle of apportionment but has specifically rejected the view that the SSPPU must be used as the royalty base in calculating reasonable royalty damages.¹³⁸

Third, the guidelines take a strict understanding of the non-discriminatory (“ND”) element of the FRAND obligation by adopting the view that a SEP owner must “license to implementers by using substantially identical or similar terms under substantially identical or similar conditions.”¹³⁹ This view appears to depart from the more flexible understanding of non-discrimination in other

133. On the doctrine of patent exhaustion, *see text in supra* note 106. For the leading U.S. Supreme Court case, see *Impression Prods., Inc. v. Lexmark Int’l, Inc.*, 581 U.S. (2017).

134. Jonathan M. Barnett, *The Economic Case Against Licensee Negotiation Groups in the Internet of Things*, 10 J. ANTITRUST ENFT 518, 534-36 (2022).

135. Wang, *supra* note 131.

136. *Id.*

137. Yan Wang, Da Shi, Yue Li, & Shasha Zhou, *FRAND Royalty Base: Will Chinese Courts More Likely Accept the Component Approach? On Huawei’s Granting of a Cellular IoT SEP License at the Component Level*, CPI COLUMNS INTELL. PROP. (Nov. 13, 2022), [https://www.pymnts.com/cpi_posts/frand-royalty-base-will-chinese-courts-more-likely-accept-the-component-approach-on-huaweis-granting-of-a-cellular-iot-sep-license-at-the-component-level/\(citing decision by SPC in infringement litigation between Double Medical Technology Inc. and Synthes GmbH\)](https://www.pymnts.com/cpi_posts/frand-royalty-base-will-chinese-courts-more-likely-accept-the-component-approach-on-huaweis-granting-of-a-cellular-iot-sep-license-at-the-component-level/(citing%20decision%20by%20SPC%20in%20infringement%20litigation%20between%20Double%20Medical%20Technology%20Inc.%20and%20Synthes%20GmbH)).

138. *Commonwealth Sci. & Indus. Rsch. Org. v. Cisco Sys., Inc.*, 809 F.3d 1295, 1303 (Fed. Cir. 2015) (rejecting the view that “all damages models” in patent infringement litigation must “begin with the smallest saleable patent-practicing unit”).

139. Wang, *supra* note 131.

major jurisdictions¹⁴⁰—for example, the U.K. High Court in *Unwired Planet v. Huawei* rejected a formalist understanding of the non-discrimination principle and instead held that the principle should be applied based on a showing of competitive harm in particular circumstances.¹⁴¹

C. JUDICIAL ACTIONS

In cases involving SEPs, Chinese courts have largely followed the implementer-friendly trajectory followed by competition regulators. During 2011-2020, 46 litigations involving SEPs were filed in Chinese courts, of which eight yielded a decision and four reached a FRAND rate determination.¹⁴² Published decisions¹⁴³ have principally addressed four elements of SEP licensing and enforcement and, concerning each element, have generally advanced positions that favor the interests of SEP licensees over licensors.

1. *Injunctive Relief*

Various statements by Chinese courts identify circumstances in which SEP owners may seek injunctive relief against alleged infringers without triggering liability under competition law. However, these standards are sufficiently vague that a SEP owner (and especially, a foreign SEP owner) would likely be reluctant to pursue this remedy.

In 2015, draft guidelines released by Chinese competition regulators provided that a SEP holder that requests injunctive relief against an alleged infringer may be deemed to violate competition law if the request is deemed to have been made for the purpose of compelling a licensee to accept “unfairly

140. On this point, see Contreras and Layne-Farrar, *supra* note 107.

141. *Unwired Planet Int’l Ltd. v. Huawei Technologies Co. Ltd. et al.*, High Court of Justice, 2017 EWHC 711 (Pat.) (May 4, 2017), at ¶¶ 418–502.

142. Fei Deng, Shan Jiao, & Guanbin Xie, *The Current State of SEP Litigation in China*, AM. BAR. ASS’N. (Oct. 21, 2021), https://www.americanbar.org/groups/antitrust_law/resources/magazine/2021-spring/current-state-sep-litigation-china/. This figure reflects consolidation (where applicable) of multiple cases filed by the same plaintiff that target the same party or parties under different causes of action.

143. Note that not all Chinese court decisions are published (and some are withdrawn after having been published) and hence it is not always possible to deliver comprehensive descriptions of actual judicial outcomes in any particular area of law. See Mark A. Cohen, *US Responses to China’s Changing IP Regime, Testimony Before the US-China Economic and Security Commission*, U.S.-CHINA ECON. AND SEC. REVIEW COMM’N (Apr. 14, 2022) https://www.uscc.gov/sites/default/files/2022-04/Mark_Cohen_Testimony.pdf (noting that Chinese courts “do not publish all cases or important interim decisions” and that “there appears to be some backsliding in the transparency of China’s legal system generally in the past several years, with courts being told to withdraw cases from publication”).

high” royalties or other “unreasonable” terms.¹⁴⁴ In 2016, the Supreme People’s Court (SPC) took a more attenuated position, which entitles SEP owners to injunctive relief in cases where the alleged infringer is deemed to be an unwilling licensee based on bad-faith negotiating tactics. Specifically, the SPC released a “Judicial Interpretation” providing that a SEP owner shall be entitled to an injunction upon a finding of infringement, unless the SEP owner breached its FRAND commitment and the infringer had “apparent fault.”¹⁴⁵ In 2017 and 2018, the Beijing and Guangdong High Courts issued similar guidelines that established a presumption against injunctive relief for SEP owners, which is subject to reversal if an alleged infringer declines to commit to pay a “reasonable” royalty or negotiates in bad faith.¹⁴⁶

Chinese courts’ approach resembles to a certain extent influential court decisions in the European Union and the United Kingdom in 2015 and 2017, respectively, which condition the presumption against injunctive relief for SEP owners on good-faith negotiation by the prospective licensee (the “willing licensee” standard).¹⁴⁷ However, the European courts (especially, decisions by German courts that have applied the “willing licensee” standard) have specified a reasonably well-defined sequence of steps that must be followed to qualify as a willing licensee,¹⁴⁸ providing SEP owners with more certainty that, in certain circumstances, seeking an injunction will not trigger liability under competition law. By contrast, the Chinese courts’ vague reference to “good-faith” negotiation or a “reasonable” royalty offer may discourage SEP owners from seeking injunctive relief since a SEP owner who does so against an alleged infringer who is later deemed to have been a willing licensee would then be exposed to liability under competition law. This is precisely what

144. ANTI-MONOPOLY GUIDELINES ON ABUSE OF INTELLECTUAL PROPERTY RIGHTS (EXPOSURE DRAFT) § 3 (promulgated by the Anti-Monopoly Commission of the State Council, Dec. 31, 2015), <https://web.archive.org/web/20160914225143/http://uschinatradewar.com/files/2016/01/IPR-Guideline-draft-20151231-EN.pdf> (unofficial English translation). For commentary, see Jie Gao, *Development of the FRAND Jurisprudence in China*, 21 COLUM. SCI. & TECH. L. REV. 446, 467 (2020).

145. Hao, *supra* note 72, at 1 (quoting Interpretation (II) of the Supreme People’s Court on Several Issues concerning the Application of Law in the Trial of Patent Infringement Dispute Cases, art. 24 (effective Apr. 1, 2016)).

146. Gao, *supra* note 144, at 473–75.

147. For the E.U. decision, see Case C-170/13, Huawei Technologies Co. Ltd. v. ZTE Corp., ZTE Deutschland GmbH, 2014 E.C.R. 477 ¶¶ 61–67; for the U.K. decision, see Unwired Planet Int’l Ltd. v. Huawei Techs. Co., 2017 EWHC (Pat.) 711.

148. Nadine Hermann, *Injunctions in Patent Litigation Following the CJEU Huawei v ZTE Ruling (Germany)*, 9 J. EUR. COMP. L. & PRACTICE 582 (2018).

occurred to IDC, a SEP owner, when a Chinese court ordered it to pay damages to Huawei, the *infringer* in the litigation.¹⁴⁹

In 2017 and 2018, Chinese courts did grant injunctive relief to SEP owners in two litigations.¹⁵⁰ However, the SEP-owner plaintiffs in both cases were domestic firms in strategically important markets. In *Inwcomm v. Sony*, the SEPs related to an indigenous Chinese standard (a substitute for the international WLAN standard), and in *Huawei v. Samsung*, the SEP owner was China's largest telecommunications manufacturer. Hence the geopolitical considerations that typically favor weak enforcement of SEPs were reversed in those cases. As a matter of practice, there seems to be a low likelihood that foreign SEP owners can secure an injunction in Chinese SEP infringement litigation and a high likelihood that even attempting to do so can result in the SEP owner being held liable under competition law.

2. Reasonable Royalty and FRAND Rate Determinations

The use of competition law for mercantilist purposes is evidenced by a sequence of statements and actions by Chinese courts and regulators that either directly set—or indirectly have the effect of reducing—royalty rates between SEP owners and local device manufacturers.

In 2008, the SPC issued an advisory opinion that any patent included in a mandatory Chinese national standard requires its owner to offer licenses to all implementers and, in the case of infringement, entitles the owner to a royalty rate that is “significantly lower than the normal amount.”¹⁵¹ Similarly, draft guidelines released by a Chinese competition regulator in 2009 provided that a patent owner whose patents are included in a mandatory Chinese national standard must offer its patents at a zero royalty or a royalty “significantly lower than a normal rate.”¹⁵² Revised draft versions of those guidelines, issued in

149. Gao, *supra* note 144, at 467. For further discussion, see *infra* notes 160–165 and accompanying text.

150. Gao, *supra* note 144, at 467–69, 471. On the litigation involving Huawei and Samsung, see Christine Yiu & Richard Vary, *Shenzhen Court Issues Written Judgment in Huawei v. Samsung Case*, BIRD & BIRD (Mar. 25, 2018), <https://www.twobirds.com/en/insights/2018/global/shenzhen-court-issues-written-judgment-in-huawei-v-samsung-case>.

151. Gao, *supra* note 144, at 466–67; Sokol & Zheng, *supra* note 49, at 86.

152. Gao, *supra* note 144, at 479. See generally CHINA: EFFECTS OF INTELLECTUAL PROPERTY INFRINGEMENT AND INDIGENOUS INNOVATION POLICIES ON THE U.S. ECONOMY, INV. NO. 332-519, USITC PUB. 4226 (May 2011), <https://www.usitc.gov/publications/332/pub4226.pdf> (citing Proposed Regulations for the Administration of the Formulation and Revision of the Patent-Involving National Standards (2009)).

2014, dropped the zero-royalty option and the “significantly lower than” language and instead provided that a SEP patent should be licensed at a FRAND rate.¹⁵³ In 2018, the High People’s Court of Guangdong issued guidelines that provided that FRAND rate determinations in SEP infringement litigation should use the comparable licenses and “top-down” approaches.¹⁵⁴ In 2019, a Chinese court applied the top-down approach in setting a global FRAND rate in a declaratory judgment action brought by Huawei, in response to an infringement suit filed against it in a U.K. court by Conversant, a SEP owner.¹⁵⁵ The top-down approach (which has been applied by two U.S. courts in SEP infringement litigation¹⁵⁶ but rejected by most U.S. and European courts in favor of the comparable licenses approach¹⁵⁷) purports to address concerns over royalty stacking but tends to reduce royalty rates since it places a cap on the total aggregate royalty and then allocates a portion of that amount to the SEP owner based on its relative technological contribution to the relevant device.¹⁵⁸ The top-down approach also often relies on the number of patents held by each entity to determine the SEP owner’s technological contribution and therefore the portion of the industry “stack” to which it is entitled, an approach that ignores differences in patent quality and can

153. Gao, *supra* note 144, at 479 (citing Administration Regulations for the National Standards Relating to Patents, Bulletin of the National Standards Administration Committee and State Intellectual Property Office of China, Art. 9 (2013)).

154. King & Wood Mallesons, *Guangdong High People’s Court Issued a Guideline for Trial of SEP Disputes*, CHINA LAW INSIGHT (May 23, 2018), <https://www.chinalawinsight.com/2018/05/articles/intellectual-property/guangdon-high-peoples-court-issued-a-guideline-for-trial-of-sep-disputes/> (describing Working Guideline on the Trial of Standard Essential Patent Dispute Cases, as promulgated by Guangdong High People’s Court, on Apr. 26, 2018).

155. Yu et al., *supra* note 51, at 1576–77.

156. TCL Comm’n Tech. Holdings, Ltd. v. Telefonaktiebolaget LM Ericsson, 943 F.3d 1360, 1369 (C.D. Cal. 2018); *In re Innovatio IP Ventures Patent Litigation*, No. 11 C 9308, 2013 WL 5593609, at *43 (N.D. Ill. Oct. 3, 2013).

157. For cases using the comparable license approach, either exclusively or primarily and subject to certain qualifications, see *Ericsson, Inc. v. D-Link Systems, Inc.*, 773 F.3d 1201, 1227–28 (Fed. Cir. 2014); *Microsoft Corp. v. Motorola, Inc.*, No. C10-1823JLR, at 129–206 (W.D. Wash. 2013); *HTC Corp. v. Telefonaktiebolaget Ericsson*, No. 6:18-CV-00243-JRG, at 10 (E.D. Tex. 2019); *Unwired Planet v. Huawei*, 2017 EWHC (Pat.) 711, *affirmed* *Unwired Planet v. Huawei*, 2018 EWCA (Civ) 2344, at para. 179 *et seq.*

158. Haris Tsilikas, *Comparable Agreements and the “Top-Down” Approach to FRAND Royalties Determination*, COMPETITION POL’Y INT’L (July 21, 2020), https://www.pymnts.com/cpi_posts/comparable-agreements-and-the-top-down-approach-to-frand-royalties-determination/

therefore yield royalty rates that undercompensate SEP owners with the highest-value patents.¹⁵⁹

The earliest and still the most influential FRAND rate determination decision by a Chinese court involved a litigation between IDC, a wireless research and patent licensing entity that brought a patent infringement suit against Huawei, China's flagship wireless device and equipment producer.¹⁶⁰ In 2011, IDC filed a patent infringement suit against Huawei in U.S. district court and sought an exclusion order against Huawei in the International Trade Commission (ITC), a U.S. administrative agency.¹⁶¹ Huawei responded by filing suit in a Chinese court alleging violations of Chinese competition law (specifically, an alleged refusal by Huawei to license on FRAND terms) and seeking a FRAND rate determination.¹⁶² Concurrently, a Chinese competition regulator initiated an investigation into IDC.¹⁶³ In 2013, the Chinese court ordered IDC to pay Huawei approximately \$3 million in damages under the counterclaim for violations of competition law.¹⁶⁴ The court found that IDC, as a SEP owner, had violated competition law by abusing its "dominant position" through excessive pricing, illegal tying of SEPs and non-SEPs, and by seeking an injunction for patent infringement in U.S. district court and an exclusion order at the ITC while negotiations between the parties were

159. On the deficiencies of using patent counts to derive reasonable royalty rates, see J. Gregory Sidak, *Judge Sedna's Errors in TCL v. Ericsson Concerning Apportionment, Nondiscrimination, and Royalties Under the FRAND Contract*, 4 CRITERION J. INNOVATION 101, 158–161 (2019).

160. The decisions in the litigation include: Huawei Jishu Youxian Gongsi Su Jiaohu Shuzi Tongxin Youxian Gongsi [Huawei Tech. Co. v. InterDigital Communications, Inc.], 2011 Shen Zhong Fa Zhi Min Zi No. 858 (Shenzhen Inter. People's Ct. 2011); Huawei Jishu Youxian Gongsi Su Jiaohu Suzi Tongxin Youxian Gongsi [Huawei Tech. Co. v. InterDigital Communications, Inc.]; and 2013 Yue Gao Fa Min San Zhong Zi No. 305 & 306 (Guangdong High People's Ct. 2013).

161. U.S. INTERNATIONAL TRADE COMMISSION, IN THE MATTER OF CERTAIN WIRELESS DEVICES WITH 3G CAPABILITIES AND COMPONENTS THEREOF: NOTICE OF INSTITUTION OF INVESTIGATION, 76 Fed. Reg. 54252, 54253 (Aug. 31, 2011); Complaint, InterDigital Communications, Inc. et al. v. Huawei Technologies Co. Ltd. et al., 2013 WL 30637 No. 1:13CV00008 (D. Del. Jan. 2, 2013).

162. Gao, *supra* note 144, at 455–57; Wenjing, *supra* note 78, at 274–75; Mark Cohen, *Huawei/InterDigital Appeal Affirms Shenzhen Lower Court on Standards Essential Patent*, CHINA IPR (Oct. 29, 2013), <https://chinaipr.com/2013/10/29/huaweinterdigital-appeal-affirms-shenzhen-lower-court-on-standards-essential-patent/>.

163. InterDigital, Quarterly Report (Form 10-Q) (Oct. 31, 2013).

164. *Chinese Court Publishes Decisions Finding That InterDigital Violated AML Through Discriminatory Pricing, Sets FRAND Rate for Licensing InterDigital's SEPs Under Chinese Standards*, ORRICK (June 6, 2014), <https://blogs.orrick.com/antitrust/2014/06/06/chinese-court-publishes-decisions-finding-that-interdigital-violated-aml-through-discriminatory-pricing-sets-frand-rate-for-licensing-interdigitals-seps-under-chinese-standards/>.

reportedly still pending.¹⁶⁵ Hence, IDC's effort to enforce its SEP rights resulted in payment of a monetary penalty by IDC simply for attempting enforcement.

The most important effect of the IDC/Huawei litigation was likely the court's determination of the FRAND royalty rate—which the infringer had affirmatively sought by initiating litigation in China. The appellate court determined the FRAND royalty rate for IDC's 2G, 3G, and 4G/LTE essential patents as 0.019% of the device sale price, although it failed to publish the reasoning behind this determination.¹⁶⁶ These values fell well below contemporaneously published rates for LTE-related SEPs, which ranged from 0.8% to 3.25% of a device's sale price¹⁶⁷ as well as reported royalty rates of 1.5% and 1% set by Huawei and ZTE when licensing out wireless SEPs.¹⁶⁸ Moreover, the appellate court's reasoning in affirming the lower court's rate determination seems to rely explicitly on an interest in promoting Huawei's competitive interests (rather than preserving the interest in preserving market pricing): "IDC's act of charging unfairly high licensing fee to Huawei, will force Huawei to either quit the competition in the relevant end product market, or accept the unfair pricing conditions, which will render Huawei to increased costs and decreased profits in relevant end product market, directly restricting its capability to compete."¹⁶⁹ The apparently low royalty rates determined in the IDC/Huawei litigation seem to be a typical occurrence in Chinese SEP infringement litigations. As observed by one researcher, the determination of a reasonable royalty by Chinese courts in SEP infringement litigations translates into judicially determined "royalty rates [that are] lower than other countries, especially the United States and Europe."¹⁷⁰ This form of judicial rate-setting effectively reduces the value of SEPs, both for purposes of

165. Gao, *supra* note 144, at 467.

166. *Id.* at 457; Wenjing, *supra* note 78, at 275–76.

167. Eric Stasik, *Royalty Rates and Licensing Strategies for Essential Patents on LTE (4G) Telecommunications Standards*, LES NOUVELLES 114, 116 (Sept. 2010), <https://www.scribd.com/document/455123937/Royalty-Rates-And-Licensing-Strategies-For-Essential-Patents-On-LTE-4G-Telecommunication-Standards>.

168. U.S. CHAMBER OF COM., *supra* note 9, at 75. *See also* Chin, *supra* note 77, at 314 (noting that court's royalty rate determination in the IDC/Huawei litigation fell below the rate charged by Huawei on its own SEPs).

169. The quoted language is sourced from Hao, *supra* note 79.

170. Gao, *supra* note 144, at 477. For similar views, see Richard A. H. Vary, *Arbitration of FRAND Disputes in SEP Licensing*, WORLD TRADEMARK REV. (Mar. 11, 2021) ("There is a perception that some U.S. courts . . . and the Chinese courts will award lower royalty rates and be sympathetic to implementers").

determining damages in infringement litigation and in the broader context of licensing negotiations that take place “in the shadow” of potential litigation.

Following the court’s determination of the IDC/Huawei litigation, the Guangdong High Court published an opinion piece that appears to endorse the use of SEP litigation as a vehicle for promoting geopolitical purposes (which, as noted above, had already been suggested in the court’s opinion). In the article, entitled “A Battle Across the Pacific Ocean,” the author asserts that Chinese firms are compelled to pay “excessive” royalties to foreigners and that this royalty burden impedes growth by Chinese firms.¹⁷¹ The author concludes that for “Chinese companies to make a revival, there is only one road to take: strengthen our capacity for innovation, and only by gaining control over SEPs can Chinese companies avoid being ‘led by the nose[.]’”¹⁷² In pursuit of this objective, the author suggested that Chinese competition law could provide an effective tool and attributes this view to the chief judge of the court that had adjudicated the case: “Qui Yongqing, the Chief Judge [of the Guangdong Higher People’s Court] believes that Huawei’s strategy of using anti-monopoly laws as a countermeasure is worth learning by other Chinese enterprises. Qui suggests that Chinese should bravely employ anti-monopoly lawsuits to break down technology fortresses and win space for development.”¹⁷³ It is hard to imagine a more candid statement of the extent to which geopolitical considerations motivate at least some Chinese courts’ determination of SEP litigations.

3. *Extra-Territorial Jurisdiction and Anti-Suit Injunctions*

In the most recent development in SEP infringement litigation, Chinese courts have taken actions to establish themselves as the exclusive global jurisdiction to adjudicate disputes between SEP owners and implementers. Chinese courts have pursued this objective through three tools: (1) anti-suit injunctions (ASIs) that prevent parties from seeking recourse (or seeking certain types of recourse) in foreign courts, (2) reasonable royalty orders that purport to apply globally, and (3) choice of law rulings that subject FRAND disputes to Chinese law. Given the Chinese market’s large share of the global wireless device market, this multi-pronged strategy enables Chinese courts to

171. David L. Cohen & Douglas Clark, *China’s Anti-Monopoly Law as a Weapon Against Foreigners*, IAM (Nov/Dec 2018), at 51–57. See also U.S. CHAMBER OF COM., *supra* note 9, at 63 n.257 (citing Lin Jinbiao, *A Battle Across the Pacific Ocean: Conclusion of Trial by the Higher People’s Court of Guangdong Province of the Case of Anti-Monopoly Dispute between Huawei and IDC Regarding Abuse of Market Dominance*, PEOPLE’S COURT NEWS (Oct. 29, 2013)).

172. Cohen & Clark, *supra* note 171, at 51–57.

173. *Id.*

exert influence over the worldwide price of technology inputs for the benefit of local manufacturers. Some Chinese policymakers explicitly acknowledge the use of ASIs for mercantilist purposes, as illustrated by the reported statement of a Chinese judge (who had adjudicated several SEP decisions) characterizing ASIs as a tool to assist China “to build the main battlefield for foreign-related dispute resolution.”¹⁷⁴ These views align in turn with statements attributed to President Xi Jinping, in which he has called on several occasions for the extraterritorial application of Chinese law (and IP law in particular) for geopolitical purposes.¹⁷⁵

In 2014, as described previously, a Chinese court held that IDC, a SEP owner, had violated competition law by pursuing an exclusion order at the ITC and filing an infringement suit against Huawei in U.S. federal district court.¹⁷⁶ In connection with this ruling, the court also held that IDC’s FRAND commitment to the SDO would be interpreted under Chinese law,¹⁷⁷ an approach that stands in contrast to courts in other jurisdictions, which have typically interpreted a FRAND commitment under the law that governs the relevant SDO. (In this case, ETSI, the relevant SDO, was established under French law and courts in the United States, United Kingdom, Japan, and Korea have applied French law when adjudicating disputes involving FRAND commitments made to ETSI.¹⁷⁸) The Chinese court’s unilateral choice of local law effectively converted the parties’ litigation into a dispute to be resolved exclusively in Chinese courts and subject to Chinese law.

174. Mark Cohen, *Unwired Planet and the Role of Chinese Courts: A Perspective from Shenzhen*, CHINA IPR (Jan. 18, 2021), <https://www.chinaipr.com/2021/01/18/unwired-planet-and-the-role-of-chinese-courts-a-perspective-from-shenzhen/>.

175. See Link et al., *supra* note 10, at 4–5 (referencing statement by President Xi Jinping in 2018 stating that “[i]n foreign struggles, we must take up legal weapons, occupy the commanding heights of the rule of law, and dare to say no to spoilers and disrupters globally”), and at 8 (noting that official Chinese state media reports that President Xi Jinping has called for promoting “the construction of a legal system applicable outside the jurisdiction of China”). For a statement by President Xi Jinping promoting the extraterritorial application of Chinese IP laws, see REPORT TO CONGRESS OF THE U.S.-CHINA ECONOMIC AND SECURITY REVIEW COMMISSION 197 (Nov. 2022), https://www.uscc.gov/sites/default/files/2022-11/2022_Annual_Report_to_Congress.pdf [hereinafter REPORT TO CONGRESS 2022] (citing Xi Jinping, *Comprehensively Strengthen Intellectual Property Protection Work to Stimulate Innovation Vitality and Promote the Construction of a New Development Pattern*, Qiushi (Jan. 31, 2021). Translation).

176. See *supra* note 165 and accompanying text.

177. Gao, *supra* note 144, at 462.

178. King Fung Tsang & Jyh-An Lee, *Unfriendly Choice of Law in FRAND*, 2019 VA. J. INT’L L. 221, 223–24 (2019).

The Chinese court's decision in the Huawei/IDC litigation constituted an implicit ASI insofar as it signaled that parties may be subject to competition-law liability by initiating outside China a concurrent infringement action against China-based entities. This was a precursor to the use of explicit ASIs by Chinese courts in SEP-related litigation (known formally as an “act preservation” or “behavior preservation” order under Chinese law¹⁷⁹).¹⁸⁰ As shown in the Table below, during 2020 and early 2021, Chinese courts considered six petitions for ASIs to bar certain SEP owners from seeking relief against the alleged infringer in courts outside China.¹⁸¹ In all but one case the petitioner for the ASI order was a China-based device producer, and in all cases the counterparty was a SEP owner that had brought an infringement suit against the petitioner outside China.¹⁸² In all but one case (involving an ASI petition by Lenovo, a China-based device producer) the petition was granted.

179. Zhonghua Renmin Gongheguo Minshi Susong Fa [Civil Procedure Law of the People's Republic of China] (promulgated by the Standing Comm. Nat'l People's Cong., Apr. 9, 1991, amended June 27, 2017, effective July 1, 2017), art. 100.

180. The next three paragraphs are informed by Cohen, *supra* note 75; Adam Houldsworth, Jacob Schindler, Joff Wild & Bing Zhao, *The EU WTO Patent Attack on China Explored from Every Angle*, IAM (Mar. 2, 2022), [https://www.iam-media.com/frand/the-eu-wto-patent-attack-on-china-explored-from-every-angle?utm_source=IAM%2BWeekly%";](https://www.iam-media.com/frand/the-eu-wto-patent-attack-on-china-explored-from-every-angle?utm_source=IAM%2BWeekly%) Yu et al., *supra* note 51; Yang Yu & Jorge L. Contreras. *Will China's New Anti-Suit Injunctions Shift the Balance of Global FRAND Litigation?*, PATENTLY-O (Oct. 22, 2020), <https://patentlyo.com/patent/2020/10/contreras-injunctions-litigation.html>.

181. The cases are: Xiaomi Tongxin Keji Youxian Gongsi YuJiaohu Shuzi Gongsi Biaozhun Biyao Zhuanli Xuke Feilu Jiufen An [Xiaomi Commc'n Tech. Co. v. Interdigital Tech. Corp.], 2020 E 01 Zhi Min Chu No. 169-1 (Wuhan Interm. People's Ct. Sept. 23, 2020); Xiapu Zhushi Huishe Yu OPPO Guangdong Yidong Tongxin Youxian Gongsi Biaozhun Biyao Zhuanli Xuke Jiufen An [Sharp Corp. v. OPPO Guangdong Mobile Telecomms. Co.], 2020 Yue 03 Min Chu No. 689-1 (Shenzhen Interm. People's Ct. Dec. 3, 2020); Sanxing Dianzi Zhushihuishe Yu Ailixin Gongsi Biaozhun Biyao Zhuanli Xukefei Jiufen An [Samsung Elecs. Co. v. Telefonaktienbolaget LM Ericsson], 2020 E 01 Zhi Min Chu No. 743 (Wuhan Interm. People's Ct. Dec. 25, 2020); Huawei Jishu Youxian Gongsi Yu Kangwensen Wuxian Xuke Youxian Gongsi Queren Bu Qin Hai Zhuanliquan Jiufen An [Huawei Techs. Co. v. Conversant Wireless Licensing S.A.R.L.], 2019 Zuigao Fa Zhi Min Zhong 732, 733, 734-1 (Sup. People's Ct. Aug. 28, 2020).

181. Yu et al., *supra* note 51, at 1578–80.

182. For discussion, see Cohen, *supra* note 75; EUR. COMM'N, EU CHALLENGES CHINA AT THE WTO TO DEFEND ITS HIGH-TECH SECTOR (2022), https://ec.europa.eu/commission/presscorner/detail/en/ip_22_1103.

Table 3. Reported Anti-Suit Injunctions Sought in SEP Litigations in Chinese Courts (2020-Present)

| Month/Year | SEP Owner | Alleged Infringer (HQ location) | ASI granted by Chinese court? | Location of foreign litigations |
|------------|------------------------------|---------------------------------|-------------------------------|--|
| Aug. 2020 | Conversant (United States) | Huawei (China) | Y | Germany |
| Sept. 2020 | InterDigital (United States) | Xiaomi (China) | Y | Germany, India |
| Sept. 2020 | Conversant (United States) | ZTE (China) | Y | Germany |
| Oct. 2020 | Sharp (Japan) | Oppo (China) | Y | Germany, India, Japan |
| Dec. 2020 | Ericsson (Sweden) | Samsung (Korea) | Y | Belgium, Germany, Netherlands, United States |
| Jan. 2021 | Nokia (Finland) | Lenovo (China) | N | Germany |

Sources: Cohen, *China's Practice of Anti-Suit Injunctions*, *supra* note 75; European Union, *supra* note 182; Igor Nikolic, *Global Standard Essential Patent Litigation: Anti-Suit and Anti-Anti-Suit Injunctions*, Working Paper (Robert Schuman Centre for Advanced Studies RSC 2022/10, Florence School of Regulation); Yu et al., *supra* note 51, at 1588; Colangelo and Torti, *see infra* note 193.

In one proceeding involving Conversant, a SEP owner, Huawei sought an ASI in the SPC on the same day that Conversant had been granted an injunction in its patent infringement litigation against Huawei and ZTE in a German court. The ASI petition, which targeted specifically the German litigation, was granted within 24 hours, enforced by a penalty of RMB one

million per day (approximately \$140,000).¹⁸³ ZTE also petitioned successfully for an ASI against Conversant in a lower Chinese court.¹⁸⁴ It is worth noting that the German court had determined a FRAND licensing rate in the Conversant litigation that was 18.3 times the rate determined by a lower Chinese court,¹⁸⁵ so this appears to be a case in which Chinese courts intervened with the effect of reducing substantially the royalty obligation borne by a local device manufacturer. In an ASI petition brought by Xiaomi, a China-based device producer, Xiaomi sought an injunction barring IDC from enforcing an injunction in connection with an infringement suit that IDC had filed against it in India. The Chinese court granted the petition, issuing an order barring IDC from seeking injunctive relief or a FRAND rate determination from any other court in the world while the Chinese proceeding (initiated by Xiaomi to secure a FRAND rate determination) was ongoing, enforced by a penalty of one million RMB per day.¹⁸⁶ By operating on a worldwide basis, the ASI petition departed both from the ASI that had been issued in the *Conversant v. Huawei* decision and the ASIs that had been issued by U.S. courts in prior SEP litigations.¹⁸⁷ A statement from the court described explicitly the mercantilist objectives behind this decision, explaining that the decision to issue an ASI against IDC “effectively safeguard[ed] my country’s high-tech enterprises’ participation in intellectual property rights in transnational competition”¹⁸⁸ This is by admission a case in which the judicial system has been deployed for purposes of global trade strategy.

Consistent with this geopolitical approach, the SPC has issued statements endorsing lower courts’ issuance of ASIs for the purpose of setting a global royalty rate, as determined under Chinese law. In 2021, the Intellectual Property Tribunal of the SPC affirmed the right of Chinese courts in SEP licensing disputes to set FRAND royalty rates on a global basis. The ruling was made in the context of a dispute in which Sisvel, a patent licensing intermediary, had sued Oppo, a China-based handset producer, in the U.K. for

183. Yu et al., *supra* note 51, at 1578–80. Dollar amount calculated using current exchange rate (as of March 7, 2023).

184. *Id.* at 1580.

185. Mark Cohen, *Three SPC Reports Document China’s Drive to Increase its Global Role on IP Adjudication*, CHINA IPR (May 5, 2021), <https://chinaipr.com/2021/05/05/three-spc-reports-document-chinas-drive-to-increase-its-global-role-on-ip-adjudication/>.

186. Yu et al., *supra* note 51, at 1581–82.

187. *See id.*, at 1599 n.345.

188. Cohen, *supra* note 75 (citing Ke Xuwen & Lu Ming, *By the establishment of Intellectual Property Courts and Quick Trial of Technical Cases involving ‘Bottlenecks’, the Hubei Courts have Organized an Intellectual Property Network*, HUBEI DAILY (Oct. 27, 2021), <https://hubeigy.chinacourt.gov.cn/article/detail/2021/10/id/6333102.shtml>).

patent infringement, which led Oppo to bring an action for a FRAND rate-setting determination in a Chinese court.¹⁸⁹ In 2022, the SPC recognized the decisions in *Huawei v. Conversant* and *Oppo v. Sharp* to issue ASIs as two of the 10 “big, typical IP cases” of the year, an action that signals to other courts that these cases should be viewed as a form of guidance or quasi-precedent.¹⁹⁰ As described by Mark Cohen, the language used by the SPC in endorsing these cases conveys an intent to make use of the judicial apparatus as a mechanism for engineering royalty rates in the global market for SEP royalty rates. Cohen writes: “The SPC . . . describes this case [*Oppo v. Sharp*] as ‘providing strong judicial guarantees for enterprises to fairly participate in international market competition’ and considers these cases [*Oppo v. Sharp* and *Huawei v. Conversant*] to be indications of the transformation of the court from a ‘follower of property rights rules’ into a ‘guide of international intellectual property rules’ and that it is of ‘great significance.’”¹⁹¹

To be sure, courts in the United States, United Kingdom, and France have also issued ASIs in connection with SEP infringement litigations¹⁹² and, in the U.S. and U.K. litigations, did so prior to the use of ASIs by Chinese courts.¹⁹³

189. Luke Maunder, *Sisvel Anti-Trust Complaint Can Proceed, Rules Supreme People’s Court of the PRC*, BRISTOWS, (Apr. 8, 2021), <https://inquisitiveminds.bristows.com/post/102gv73/sisvel-anti-trust-complaint-can-proceed-rules-supreme-peoples-court-of-the-prc>. In September 2022, the Supreme People’s Court reaffirmed this principle in the Nokia/Oppo litigation, see Aaron R. Winger, *China’s Supreme People’s Court Again Affirms Right to Set Global FRAND Rates in Standard Essential Patents in Nokia/OPPO Case*, SCHWEGMAN, LUNDBERG WOESSNER (Sept. 18, 2022), <https://www.slwip.com/resources/chinas-supreme-peoples-court-again-affirms-right-to-set-global-frand-rates-in-standard-essential-patents-in-nokia-oppo-case/>.

190. EUR. COMM’N, *supra* note 182, at 4.

191. *Id.*

192. The U.S. cases are: *Microsoft Corp. v. Motorola, Inc.*, 871 F. Supp. 2d 1089 (W.D. Wash. 2012) (issuing an ASI precluding enforcement of an injunction secured by Motorola in a German court); *TCL Commc’ns Tech Holdings. v. Ericsson Incorporation*, No. SACV14-00341 JVS (DFMx) (C.D. Cal. June 29, 2015) (granting injunction, in part, of TCL’s Motion for Anti-Suit Injunction, in which the court granted an ASI barring the patent holder from pursuing infringement claims against the defendant in courts in six foreign jurisdictions, on the ground that both parties sought a global resolution of the dispute in the U.S. federal court); and *Huawei Huawei Techs., Co, Ltd v. Samsung Elecs. Co, Ltd.*, 340 F. Supp. 3d 934 (N.D. Cal. 2018) (issuing an injunction barring Huawei from enforcing an injunction it had secured from a Chinese court against Samsung). For a litigation that took place in the U.K. and France, in which ASIs were issued to preclude further judicial action in the United States, see *IPCom v. Lenovo* [2019] EWHC 3030 (Pat.); Cour d’appel [CA] [regional court of appeal] Paris, Mar. 3, 2020, 19/21426 (France).

193. For a detailed history, see *generally* Guiseppe Colangelo & Valerio Torti, *Anti-Suit Injunctions and Geopolitics in Transnational SEP Litigation*, EURO. J. LEGAL. STUD. (forthcoming 2023)

However, in contrast to Chinese practice to date, courts outside China often reject ASI petitions in SEP infringement litigation: at least four U.S. courts¹⁹⁴ and two U.K. courts have done so.¹⁹⁵ The determinations by courts in the United States and United Kingdom have generally been based on long-established legal principles that instruct courts to make a tradeoff between comity principles, designed to reduce frictions with litigation in other domestic or foreign courts involving the same or similar issues, and litigation efficiency, which may recommend consolidating determination of a legal issue in a single venue.¹⁹⁶ An illustrative example of this common-law reasoning is provided by a 2021 decision by the U.S. Court of Appeals for the Second Circuit in dismissing antitrust claims of collusion among China-based Vitamin C producers on grounds of deference to Chinese law (which had purportedly compelled the producers to collude for export purposes).¹⁹⁷

By contrast, Chinese Civil Procedure Law does not require deference to a foreign court's determination in a parallel proceeding nor does it require consideration of international comity principles in determining whether to issue an ASI.¹⁹⁸ Moreover, there are indications that Chinese courts' sudden and frequent use of ASIs during 2020 and early 2021 may have reflected a policy decision by Chinese government leadership. In a 2020 speech to Chinese Community Party leaders, President Xi Jinping stated: "Intellectual property is a core factor for competitiveness on the international stage, as well as a focal point of international dispute. We need to have the courage and the capacity to stand up for ourselves."¹⁹⁹ Consistent with this view, the SPC has

194. *Vringo Inc. v. ZTE Corp.*, No. 14-cv-4988, 2015 WL 3498634 (S.D.N.Y. June 3, 2015); *Apple Inc. v. Qualcomm Inc.*, No. 3:17-cv-00108, 2017 WL 3966944 (S.D. Cal. Sept. 7, 2017); *Optis Wireless Tech., LLC v. Huawei Techs. Co.*, No. 2:17-cv-00123, 2018 WL 3375192 (E.D. Tex. July 11, 2018).

195. *Conversant Wireless Licensing S.A.R.L. v. Huawei Techs. Co.* [2018] EWHC (Ch) 2549 [10], [12] (Eng.); *Nokia Techs. OY v. OPPO Mobile UK Ltd and Others* [2021] EWHC 2952 (Pat.).

196. On the standard used in addressing ASI petitions in U.S. civil litigation, see *E & J Gallo Winery v. Andina Licores S.A.*, 446 F.3d 984, 989–91 (9th Cir. 2006); *In re Unterweser Reederei GMBH*, 428 F.2d 888, 890 (5th Cir. 1970), *aff'd per curiam*, 446 F.2d 907 (5th Cir. 1971) (en banc), *vacated*, 407 U.S. 1 (1972).

197. *In Re Vitamin C Antitrust Litig.*, 8 F.4th 136 (2d Cir. 2021).

198. Mark A. Cohen, *Draft Policy Statement on Licensing Negotiations and Remedies for Standards-Essential Patents Subject to Voluntary F/RAND Commitments* 13, REGULATIONS.GOV (Feb. 3, 2022), <https://www.regulations.gov/comment/ATR-2021-0001-0118>. However, other commentators have expressed the view that Chinese courts determine whether to issue an ASI based on factors that are similar to the factors used by U.S. courts, see Yu et al., *supra* note 51, at 1579–80.

199. Woo & Michaels, *supra* note 17.

specifically advocated that Chinese courts adopt ASIs for the purpose of defending national sovereignty and promoting national competitiveness in the global marketplace²⁰⁰—geopolitical factors that would not typically be viewed as pertinent considerations in a judicial regime characterized by robust rule-of-law and division-of-powers principles. For these reasons, Mark Cohen has argued that Chinese ASIs should be distinguished from ASIs issued by Western courts since Chinese courts use them as a “tool by a non-independent . . . judiciary at the urging of China’s political leadership.”²⁰¹

More recently, there are indications that Chinese policymakers are effectively shifting the use of ASIs or equivalents from the judiciary, operating largely under patent law, to regulators, operating through competition law. In January 2021, a Chinese court declined to grant an ASI sought by Lenovo, a China-based device producer that had been sued for SEP infringement by Nokia in Germany and the US²⁰² (litigations which the parties resolved through a global settlement in April 2021, following issuance of an injunction by a German court in September 2021²⁰³). Yet the denial of the ASI does not appear to signal any change in Chinese policymakers’ resistance to robust SEP enforcement. Subsequent to the Chinese court’s denial of an ASI to Lenovo, SAMR issued proposed IPR Abuse Rules that prohibit a firm with a dominant market position from violating the FRAND commitment in connection with licensing SEPs. Following these rules, such behavior could include “unfairly request[ing] the court or relevant department to make or issue a judgment . . . prohibiting the use of relevant intellectual property rights, forcing the licensee to accept unfairly high prices or other unreasonable restrictions”²⁰⁴ Additionally, the rules contemplate that the regulator may seek the equivalent of an ASI through administrative action.²⁰⁵

200. Yu et al., *supra* note 51, at 1599–1600 (citing statement by Supreme People’s Court that “[t]he internationalization trend surrounding ASIs profoundly reflects the competition among major powers for jurisdiction over international disputes and for dominance in rulemaking. The use of ASIs is an important tool for preventing and reducing the abuse of parallel litigation and safeguarding national judicial sovereignty. Without ASIs, Chinese courts will be put in a passive position in the international judicial competition”).

201. Mark Cohen, *The Pushmi-Pullyu of Chinese Anti-Suit Injunctions and Antitrust in SEP Licensing*, CHINA IPR (Oct. 19, 2022), <https://www.chinaipr.com/2022/07/31/the-pushmi-pullyu-of-chinese-anti-suit-injunctions-and-antitrust-in-sep-licensing/>.

202. *Id.* (referring to *Lenovo v. Nokia* decision by Chinese Supreme People’s Court).

203. *Nokia Settles Patent Fight with Lenovo*, REUTERS (Apr. 6, 2021), <https://www.reuters.com/article/us-nokia-patent-lenovo/nokia-settles-patent-fight-with-lenovo-idUSKBN2BU0F7>.

204. Cohen, *supra* note 201 (citing draft 2022 SAMR IP Abuse Rules, Art. 16).

205. *Id.* (citing draft 2022 SAMR IP Abuse Rules, Arts. 21–22).

By admission, Chinese competition regulators seek to apply competition law extraterritorially to advance China's geopolitical interests. In a public statement made in 2012, the head of a Chinese competition regulatory agency (MOFCOM) said so explicitly:

To protect China's public interest MOFCOM should leverage the extra-territorial effect of the Anti-Monopoly Law After four years of antitrust enforcement, we found that extraterritorial jurisdiction plays an important and irreplaceable role in maintaining effective competition in the Chinese market and safeguarding China's national economic benefit[s].²⁰⁶

In a vivid example,²⁰⁷ in 2013 Chinese competition authorities delayed approval of a merger of Glencore and Xstrata, leading Swiss mining and commodity trading companies, which each represented less than two percent of the relevant global market (copper concentrate), and 9% and 3.1%, respectively, of the Chinese market in the same product. While this falls well below the threshold at which competition regulators typically investigate a merger, the Chinese authorities conditioned approval on the sale of a copper mine owned by Glencore in Peru, including approval of the specific buyer. The merger received clearance from the Chinese authorities once an agreement had been signed to sell the mine to a consortium comprised primarily of Chinese state-owned enterprises and other entities controlled by those enterprises. Just as China has deployed competition law extraterritorially to advance its interests in securing control of vital natural resources, so too it appears willing to do the same to advance its interest in securing favorable terms of access to technologically vital resources.

V. MERCANTILIST ANTITRUST AND THE GLOBAL INNOVATION ECOSYSTEM

The approach of Chinese regulators and courts to the legal treatment of IP rights in wireless markets illustrates how the potent remedies of competition and antitrust law can be used for industrial-trade purposes that lie outside, and even run counter to, the generally understood objectives of this body of law. Chinese regulators and courts have used patent and competition law as a mechanism for weakening property rights in wireless technology markets and harnessing the judicial and regulatory apparatus to influence

206. U.S. CHAMBER OF COM., *supra* note 9, at 26 (citing Lu Yanchun & Liu Jan, *A Preliminary Discussion of Rules Regarding IPR Enforcement*, LEGAL DAILY (Mar. 19, 2014)).

207. The remainder of this paragraph relies on information in U.S. CHAMBER OF COM., *supra* note 9, at 33–35.

royalty rates to the advantage of implementers over innovators. These actions have significant effects on licensing and other transactions involving wireless SEPs, potentially encompassing every industry in which wireless technologies are deployed, ranging from mobile communications to automobiles and a myriad of other markets.

In a legal system in which rule-of-law constraints are weak, the division-of-powers principle is not recognized, and competition law appears to be widely viewed as an extension of industrial policy,²⁰⁸ it is unsurprising that Chinese regulators and courts would be willing to deploy patent and competition law to promote the state's mercantilist interest in mitigating the Chinese economy's IP and technology deficit in wireless communications. From a political economic perspective, however, it remains somewhat surprising that regulators in the United States and European Union have generally maintained the rigid view that wireless SEP markets operate under a perpetually high risk of market failure when more than two decades of market performance and a substantial body of empirical evidence indicate that precisely the opposite is the case.²⁰⁹ This mismatch between regulators' theories of market failure and the *actual* success of wireless markets may explain why regulators and device producers have a poor track record when compelled to defend those theories in court that apply appropriately demanding rules of evidence.

In two SEP infringement litigations before U.S. courts, judges declined to instruct juries to take into account patent holdup or royalty stacking effects when determining damages, on grounds of insufficient factual evidence.²¹⁰ This follows instruction on this specific point from the Court of Appeals for the Federal Circuit, which has stated that "abstract recitations of royalty stacking theory . . . are insufficiently reliable."²¹¹ In both the United States and the European Union, regulators suffered resounding defeats in court when bringing monopolization and abuse of dominance claims, respectively, against

208. See U.S. CHAMBER OF COM., *supra* note 9.

209. On this evidence, see *supra* notes 67–69 and accompanying text.

210. See, e.g., *Ericsson Inc. v. D-Link Sys., Inc.*, 773 F.3d 1201, 1209, 1233–34 (Fed. Cir. 2014) (declining to instruct jury to take into account holdup and stacking effects when calculating damages, without actual evidence of such effects in a particular case); *Ericsson Inc. v. TCL Commc'n Tech. Holdings, Ltd.*, No. 2:15-cv-00, 2018 WL 2149736 (E.D. Tex., May 10, 2018) (declining to instruct jury to take into account stacking effects when calculating damages, due to lack of specific evidence of such effects).

211. *Commonwealth Sci. & Indus. Rsch. Org. v. Cisco Sys., Inc.*, 809 F.3d 1295, 1302 (Fed. Cir. 2015).

Qualcomm, one of three lead innovators in the global wireless market.²¹² In the European Union and the United Kingdom, courts have also recognized that a quasi-prohibition on injunctive relief for SEP owners induces opportunistic stalling tactics by infringers who face little risk of being denied access to the SEP owner's technology and have the resources to fund costly and protracted litigations. Those courts have held that an injunction for a SEP owner may be appropriate when there is sufficient evidence that the infringing party is engaging in "patent holdout",²¹³ illustrating the important role that courts can play in constraining regulatory fiat in jurisdictions with a robust division of powers between the executive and judicial branches.

The Chinese legal system does not operate under these constraints and hence has been able to deploy a comprehensive approach, across regulatory agencies and courts, to minimize input costs for local device producers by constraining SEP owners' enforcement and licensing capacities. Yet the Chinese government does have at least formal commitments under the international "TRIPS" agreement to supply a certain level of patent protection and to refrain from favoring domestic entities in enforcing IP rights.²¹⁴ Chinese regulators' and courts' treatment of SEPs almost certainly depart from these principles by consistently weakening patent protection for the benefit of domestic producers over foreign IP owners. That is precisely the view expressed in a complaint filed in February 2022 by the European Union against China at the World Trade Organization (WTO), in which the European Union asserted that China had violated its commitments under WTO rules (specifically, the obligations set forth in Articles 63.1 and 63.3 of the "TRIPS" agreement) by issuing ASIs against foreign SEP owners who had brought

212. See generally *FTC v. Qualcomm Inc.*, 969 F.3d 974 (9th Cir. 2020) (rejecting all antitrust claims and rescinding the district court's order); see also *Case T-235/18, Qualcomm, Inc. v. European Commission*, ECLI:EU:T:2022:358 (June 15, 2022) (annulling fine of 997 million euros imposed by regulator and finding no violations of competition law).

213. *Unwired Planet v. Huawei* [2020] UKSC 37, [61] ("The possibility of the grant of an injunction . . . is a necessary component of the balance which the [standard-development organization's] IPR Policy seeks to strike, in that it is this which ensures that an implementer has a strong incentive to negotiate and accept FRAND terms for use of the owner's SEP portfolio"); *Case C-170/13, Huawei Technologies Co. Ltd. v. ZTE Corp. and ZTE Deutschland GmbH*, ECLI:EU:C:2015:477 (July 16, 2015) ("[O]n the grounds of equality of treatment between the beneficiaries of licenses for, and the infringers in relation to, a given product, the proprietor of the SEP ought to be able to bring an action for a prohibitory injunction").

214. AGREEMENT ON TRADE-RELATED ASPECTS OF INTELLECTUAL PROPERTY RIGHTS, *supra* note 22, at Art. 3 ("Each Member shall accord to the nationals of other Members treatment no less favorable than that it accords to its own nationals with regard to that protection of intellectual property . . .").

patent infringement suits against Chinese device producers in foreign courts.²¹⁵ Thereafter the United States, Canada, and Japan requested to join the European action.²¹⁶ (Additionally, in March 2022, five U.S. Senators introduced a bill that would assess penalties against entities that seek to enforce in U.S. courts ASIs issued by a foreign court.²¹⁷) In December 2022, the European Union submitted a request to convene a WTO panel to resolve the matter, which the European Union had been able to achieve in consultations with the Chinese government.²¹⁸

As a matter of global innovation policy, it may be objected that the SEP policy preferences expressed by device producers, Chinese governmental entities, and U.S. and E.U. regulators on the one hand, and the SEP policy preferences expressed by chip-design innovators and certain courts and other governmental entities in the European Union and United States on the other hand, are a matter of indifference. If these are simply disputes about “slicing the pie,” then SEP policy debates, and the regulatory and judicial venues in which those debates are held, reduce to distributive gamesmanship without any efficiency implications. That could only be true, however, at any particular “snapshot” in time when a particular technology has already been developed. Over any longer time frame, these disputes are not only about slicing the economic pie but rather, about determining the institutional rules of the game that impact the total size of the pie over time. A truncated property-rights regime in which regulators and courts regularly intervene to adjust royalty rates in favor of licensees impedes the ability of market forces to determine the prices of technology assets—one of the principal (although sometimes overlooked functions) of the patent system. Given the absence of evidence showing that patent holdup occurs systematically²¹⁹ and the growing evidence of patent holdout in the absence of injunctive relief,²²⁰ these regulatory

215. EUR. COMM’N, *supra* note 182, at 7–8.

216. *China – Enforcement of Intellectual Property Rights*, WTO (Mar. 28, 2023), https://www.wto.org/english/tratop_e/dispu_e/cases_e/ds611_e.htm.

217. S. 3772 Defending American Courts Act, 117th Cong. § 2 (2022).

218. Request for the Establishment of a Panel by the European Union, *China – Enforcement of Intellectual Property Rights*, WTO Doc. WT/DS611/5 (Dec. 9, 2022).

219. *See supra* notes 67–69 and accompanying text.

220. For circumstantial evidence, see Jonathan M. Barnett & David Kappos, *Restoring Deterrence: The Case for Enhanced Damages in a No-Injunction Patent System*, in 5G AND BEYOND: INTELLECTUAL PROPERTY AND COMPETITION POLICY IN THE INTERNET OF THINGS (Jonathan M. Barnett & Sean M. O’Connor eds, 2023 forthcoming); Bowman Heiden & Nicolas Petit, *Patent “Trespass” and the Royalty Gap: Exploring the Nature and Impact of Patent Holdout*, 34 SANTA CLARA HIGH TECH. L. J. 179, 221–24 (2018); Richard A. Epstein & Kayvan Noroozi, *Why Incentives for “Patent Holdout” Threaten to Dismantle FRAND, and Why It Matters*, 32 BERKELEY TECH. L. J. 1381, 1419–1420 (2017).

interventions are difficult to reconcile with the widely recognized objectives of competition law in preserving the integrity of the pricing mechanism that underlies a market-based economy. The deployment by Chinese, E.U., and U.S. regulators of patent and competition law to address the purported risk of holdup and stacking—motivated in China’s case by mercantilist objectives—may depress the input costs of device producers, potentially resulting in a short-term gain for some consumers. However, this dilution of IP protections risks far larger longer-term losses by placing at risk the incentive and funding structures that sustain the billions of dollars of investment in research and development activities without which the global wireless technology ecosystem cannot move forward.

VI. CONCLUSION

The legal treatment of SEPs in China reflects a strategic effort to use the powerful apparatus of competition and patent law to reset the terms of trade in the global market for wireless technology inputs. This strategy has relied for its intellectual foundation on patent holdup and royalty stacking models of market failure developed by U.S. academics and has borrowed legal doctrines from E.U. competition and U.S. antitrust law, which have then been applied expansively by Chinese courts and regulators. Part of a larger goal of achieving technological self-sufficiency and leadership, this mercantilist strategy seeks to reengineer market pricing—both domestically and globally—in wireless technology for purposes of favoring domestic device producers over foreign technology suppliers. This objective is incompatible with the general understanding of competition law as a mechanism for removing distortions from the playing field so that competitive forces can determine winners and losers on their merits. While this strategy promotes the narrow and short-term economic interests of net-IP-user entities and jurisdictions, it is unlikely to promote the broader and longer-term interest in preserving the incentive, funding, and transactional structures behind the R&D and commercialization activities that drive technological advances in the global wireless ecosystem.

PROTECTING INNOVATION IN THE MOBILE WIRELESS ECOSYSTEM: UNDERSTANDING AND ADDRESSING “HOLD-OUT”

Kalyan Dasgupta[†] & David J. Teece^{††}

ABSTRACT

Mobile device manufacturers can often utilize technology embodied in standard essential patents (SEPs) for many years before they are asked to take a license to use such SEPs. The non-excludable nature of SEPs and the ability to use before negotiating a license means that implementers or manufacturers can wield delay or the threat of delay as a weapon to extract inappropriately low “sub-FRAND” royalties. Such “hold-out” threatens the robustness of the licensing marketplace and with it the robustness of the innovation ecosystem built around cellular standards. Our article shows that the attraction of hold-out strategies will exist so long as the worst-case scenario for implementers is a FRAND royalty unadjusted for the economic costs of delay to the licensor. We discuss ways in which this situation can be addressed while not undermining the broader purposes of the FRAND commitment made by SEP holders. Solutions range from the minimal solution of ensuring that FRAND rates awarded by courts at least prevent hold-out implementers from receiving rates comparable to those received by more cooperative licensees, adjusting court-awarded rates to account for the economic cost of delay, and strengthening injunctive relief regimes for SEPs.

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I. INTRODUCTION AND SUMMARY¹: STANDARDS-RELATED HOLD-OUT

The European Telecommunications Standards Institute (ETSI) conducts stewardship—of cooperative research and standard setting in cellular mobile telephone technology—that constitutes one of the most significant endeavors in cooperative research and development at a global level. Ensuring the continued robustness and integrity of this global enterprise depends in significant measure on the “FRAND” (Fair, Reasonable and Non-Discriminatory) licensing regime for technologies developed in relation to ETSI standards. Individual implementers are third-party beneficiaries of the commitment entered into by holders of standards-essential patents (SEPs) to

1. This Article draws on our consulting and academic work dealing with standard essential patents (SEPs) and innovation, over a number of decades. A number of individuals have provided helpful insights and comments along the way, including Mike Akemann, Peter Grindley, Bowman Heiden, John Blair, Bertram Huber, Ed Sherry, Greg Sidak, Stuart Chemtob and numerous others. The views expressed here are our own, as is sole responsibility for errors and omissions.

make licenses to standards-essential patents available on FRAND terms.² But the integrity of this system also requires that technology adopters or implementers pay FRAND royalties for their use of the standards-essential technologies.³

The interpretation of the FRAND commitment contained in ETSI's Intellectual Property Rights (IPR) policy is now at the heart of litigation between holders of standards-essential patents ("SEP holders" or "upstream innovators" or "licensors" in this Article) and firms that sell products that implement cellular mobile technology ("implementers" or "licensees").⁴ The FRAND commitment (on the face of it) requires nothing more of the SEP holder than to be prepared to make licenses available to all willing licensees on FRAND terms. Further, this commitment sits within an overarching policy objective of ETSI's IPR policy to secure a "balance" between the interests of implementers and the interests of SEP holders. As we explain in this Article, an interpretation of FRAND as requiring the SEP holder to always license on FRAND terms with all implementers⁵ arguably goes beyond the letter of ETSI's IPR policy as well as the spirit of "balance" that ETSI's broader IPR policy seeks. The practical effect of such an interpretation is that FRAND royalty rates, paid with considerable delay, will actually form an upper bound to what an implementer might pay for the use of SEPs. This appreciably increases the likelihood that SEP holders end up accepting licenses on what

2. SEPs are patents that relate to technologies that are essential or potentially essential to implementing technology standards. For example, there are thousands of patents that are declared essential to implementing third or fourth generation mobile cellular standards. These standards specify how precisely devices might interact with each other and with network infrastructure such as cell towers, or how devices might be identified. Not all patents declared essential to standards are actually essential or are actually infringed by devices that implementer the standard.

3. See David Teece, *Technological Leadership and 5G Patent Portfolios: Guiding Strategic Policy and Licensing Decisions*, 63 CAL. MGMT. REV. 5 (2021) (discussing SEP in the context of 5G licensing now underway).

4. The historic focus of licensing has been on handset and smartphone manufacturers, but there is an increasing range of products, from Internet of Things (IoT) modules to wearables and laptops, that are also now cellular-enabled. Our discussion applies to the licensing of all such cellular-enabled products. However, as much of the available evidence and theoretical discussion around the licensing of cellular SEPs pertains to smartphones, we use that term in the rest of the Article, for ease of expression.

5. For example, a news report describing the change in stance towards SEPs of the Biden Administration relative to the Trump Administration stated that: "Companies that are part of developing industry standards commit to license patents that are essential for those standards on terms that are 'fair, reasonable and non-discriminatory.'" See Matthew Bultman, *Biden Signals Shift Toward Tech on Standard Essential Patents*, BLOOMBERG L. (July 26, 2021), <https://news.bloomberglaw.com/ip-law/biden-signals-shift-toward-tech-on-standard-essential-patents>.

are effectively sub-FRAND terms, thus depressing their incentives to participate in developing technologies for standards and resulting in an imbalance between the interests of implementers and SEP holders.

These issues around the meaning and intent of the FRAND commitment are of great practical interest given the increasing attention to the problem of “hold-out” behavior by implementers. When SEP-related disputes in cellular telephony first burst into prominence in the mid-2000s, the prevalent focus among academics and among antitrust agencies was on the theoretical problem of “hold-up”—i.e., the SEP holder’s potential ability to extract supra-FRAND rates arising by virtue of the threat of excluding the implementer from practicing not just the SEP holders’ particular portfolio but from practicing any part of the standard itself. This theory of hold-up⁶ always overlooked the non-self-enforcing nature of patents, and this oversight is particularly important given that injunctive relief is harder to obtain in today’s policy and legal environment (perhaps particularly in the United States). In this context, hold-out—the ability of implementers to resist taking a license for a prolonged period of time, or only take a license on terms that might well constitute sub-FRAND terms—may be a significantly more likely problem than hold-up.

The problem is perhaps particularly acute when licensing “new” geographies (e.g., China) and new market segments (e.g., Internet of Things implementers).⁷ Many SEP holders must spend years and devote extensive resources to negotiation before they are able to achieve a license with implementers, or else resort to litigation before they are able to obtain any value from the implementer for its use of the SEP holder’s patents. In the meantime, implementers can make full use of the SEPs, given the open nature of the standards.

The situation of real-world SEP licensing negotiations contrasts markedly with the standard economic paradigm of bargaining over how to split a pie. The typical assumption is that the parties must come to an agreement over how to split the pie before splitting the pie, i.e., splitting the “gains from trade.” In this case, both parties have incentives to agree because both are eager to enjoy their slice of the pie and the split of the pie is determined by the relative

6. As we explain, the term “hold-up” has been misapplied in the context of SEP licensing.

7. China’s role in future standardization is now a subject of significant policy debate in Europe and the United States. *See, e.g.*, SORINA TELEANU, THE GEOPOLITICS OF DIGITAL STANDARDS: CHINA’S ROLE IN STANDARD SETTING ORGANIZATIONS (2021) (recommending greater national and international attention to maintaining the overall integrity of the standardization framework).

impatience (captured in “discount rates”) of the two parties.⁸ In real-world SEP licensing, things are quite different—here, the implementer has already started eating the pie and the SEP holder must negotiate to get its “fair” slice of the pie. The implementer has no obvious incentive to agree and the threat of potentially infinite delay may result in the SEP holder ending up with nothing.⁹ Even if the SEP holder could turn to courts or arbitrators to award a FRAND license, unless the FRAND license terms are adjusted for the economic cost of delay (such delay can involve a decade or more), the logic of discounting future payoffs means that the SEP holder may be better off accepting a sub-FRAND license today rather than accept a FRAND license awarded after many years of delay.

Delay in taking a license can also improve the implementer’s bargaining position in other ways. Implementers may be able to extract significantly lower rates for past use, benefit from statutes of limitations on past damages, and benefit from potential expiry of patents that they have infringed for many years. Most SEP licensors operate licensing programs aimed at licensing multiple implementers; delays in obtaining licenses (especially if the licensing program is relatively young) can damage the credibility of the entire licensing effort.¹⁰ Thus, the worst outcome for a licensor might be that it pays, after considerable delay, FRAND royalties on only a portion of infringing sales. This has the potential to further depress negotiated royalties.

Even if one can imagine other factors (discussed later) that may mitigate against license negotiations being invariably decided in the implementer’s favor, the “after the bird has flown” nature of the negotiations, the credible threat of many implementers to be able to delay agreement, and the much-less-than-instantaneous nature of remedies available to the SEP holder all suggest

8. For example, Rubinstein’s bargaining game involves two parties—the proposer and the counter-proposer—making alternating offers and counteroffers to each other about how to split a dollar between them. The eventual split depends on the parties’ relative (real or perceived) discount rates. A party that is infinitely patient will be able to keep the entire dollar for itself.

9. The implementer maximises the present value of its profits by paying as little as late as possible. While the implementer in a hypothetical negotiation that occurs on the eve of infringement—a situation to which the Rubinstein analysis applies—would also like to pay as little as possible, she knows that an agreement is necessary in order for her to use the technology in the first place.

10. The English Court in *Interdigital v. Lenovo* correctly recognized that FRAND principles mean that all past use should be paid for, without limitation. *Interdigital Technology Corporation & Ors v. Lenovo Group Ltd.* [2023] EWHC 1578 (Pat), ¶ 529. The Court, however, assumed (or imposed the assumption) that parties negotiating licenses with Interdigital in the past understood this principle. This assumption seems too strong, not least because in many cases one of the main options for redress for the licensor would have been to pursue damages in U.S. courts, which are usually subject to limitations periods.

that hold-out leading to potentially sub-FRAND compensation for the SEP holder is a strong possibility.

Maintaining the robustness of the global “open innovation” licensing model for SEPs requires urgently addressing the problem of “balance” in the context of real-world industry realities. One potential step involves making injunctive relief more easily available, perhaps accompanied by limitations on the FRAND commitment’s scope. For at least the limiting case of a licensee that has expressly indicated a disinclination to accept FRAND terms—as was the case in the proceedings between Apple and Optis in the United Kingdom—immediate injunctive relief may be warranted.¹¹ There may also be a case that a manifestly “unwilling”¹² licensee should not have an unlimited entitlement to a FRAND license. These steps can—by removing the “FRAND cap” on the licensee’s worst-case scenario—alter the licensee’s calculus and reduce the profitability of hold-out.

If these steps seem too radical a departure from today’s received wisdom,¹³ there might be other mechanisms by which the profitability of hold-out can be reduced, especially the manner in which courts use the licensor’s “comparable licenses” in making damages and FRAND license awards.

First, many licenses are relatively complex and multi-dimensional, and may feature significant absolute lump sum amounts. In such cases, Courts should pay careful attention to the commercial context of these licenses and recognize that royalty rates may not fully embody the value of such licenses. Second, Courts should recognise the existence of a “FRAND range.” In any given licensing situation between a given licensor and a given licensee, a range of rates¹⁴ may be consistent with meeting the “balance” envisioned in FRAND.

11. We understand that this is effectively the case in jurisdictions such as Germany or the Netherlands, where once it is established by the Court and to the Court’s satisfaction that a licensee has not demonstrated a willingness to engage on FRAND terms, injunctive relief is granted. The *Optis v. Apple* case brings the U.K. practice into line with the German and Dutch practices. See *Optis Cellular Tech. v. Apple Retail UK Ltd.* [2021] EWHC 2564 (Pat).

12. As discussed, the “after the bird has flown” nature of SEP licensing negotiations itself weakens the incentives for licensees to negotiate licenses on FRAND terms and limits their “willingness” to agree. In this context, the term “unwilling licensee” refers to one that has expressly indicated its unwillingness.

13. The English Court has not been willing to go as far as to circumscribe the availability of FRAND terms, even in the case of a manifestly unwilling licensee. This is consistent with the interpretation that the SEP holder must make FRAND licenses available without limitation or qualification.

14. The idea of the FRAND range is related to the idea of a bargaining range, which is widely used in determining reasonable royalties in patent litigation. In a typical license negotiation, the bargaining range is between the implementer’s maximum willingness-to-pay and the SEP holder’s minimum willingness-to-accept. The maximum willingness to pay is typically the value contribution (typically expressed in terms of incremental profit gain relative

The theoretical upper bound for this FRAND range is, as we explain later, based on the value contribution¹⁵ that the technology makes to the product, which we refer to as a “FRAND benchmark rate.” In practice, many implementers will obtain rates that are well below the top end of this FRAND range (or even below it), often because the SEP holder will be prepared to accept rates well within the FRAND range to avoid delay and litigation. In fact, as discussed later, the SEP holder could even accept rates outside the FRAND range, if the alternative is severe delay in receiving a FRAND payment.¹⁶

We argue that court-awarded rates (whether applied to licenses or past use damages) should at a minimum be based on the FRAND benchmark rate.

to making an otherwise identical product that does not use the technology) that the licensed technology makes to the product. The minimal willingness to accept would normally be the (very low) short-run incremental costs associated with making the license available (although SEP holders would typically also factor in the impact on their broader licensing program and might therefore resist accepting very low royalty rates). This bargaining range indicates the gains from trade or the “size of the pie” that is available to be split between SEP holder and implementer. In the case of ETSI SEPs with an attendant FRAND commitment, however, there is also the issue of “balance.” There may be some divisions of the pie that—while they might be acceptable in the short-run—might be inconsistent with providing long-run “balanced” incentives to both sides.

15. As discussed later in this Article, this value contribution should be allowed to reflect the value that the technology offers as part of a standard. Thus, our view of the value contribution should be distinguished from the concept of ex ante incremental value, as offered in, for example, Daniel G. Swanson & William J. Baumol, *Reasonable and Nondiscriminatory (Rand) Royalties, Standards Selection, and Control of Market Power*, 73 ANTITRUST L.J. 1 (2005). This ex-ante approach risks transferring all the value created relative to older generation or public domain technologies to implementers. For a discussion, see Luke Froeb & Mikhael Shor, *Innovators, Implementers and Two-Sided Hold Up*, ANTITRUST SOURCE (2015), <https://www.mikeshor.com/research/antitrustsource.pdf>, among others. The ex-ante proposition is closely related to critiques of the “winner take all” approach in the patent system at large, i.e., that such an approach over-rewards patent holders and generates wasteful patent races. Stephen Maurer and Suzanne Scotchmer suggest, however, that proposals to rein in the winner-take-all nature of the patent system could inefficiently retard innovation rather than simply eliminating wasteful duplication. See generally Stephen Maurer & Suzanne Scotchmer, *The Independent Invention Defence in Intellectual Property*, 69 ECONOMICA 535 (2002).

16. It is possible too that license agreements can be concluded at rates above the FRAND range. For example, a small-scale implementer may lack the resources and sophistication to challenge an opportunistic licensing demand. The unsophisticated implementer may perceive a credible threat that a court will buy the SEP holder’s case (especially if the SEP holder has superior resources with which to influence the court’s reasoning) and go as far as to grant an injunction or award a license on supra-FRAND terms. However, there are limits on how likely such a scenario is. An SEP holder can ultimately only extract a supra-FRAND rate if a court can be persuaded of it. Given this and also (i) the small potential payoff and (ii) the fact that litigation costs will not at all scale down in line with the payoff, litigation may produce a lower expected value for the SEP holder than it can get from negotiating a FRAND royalty.

However, one will in practice have to proxy this FRAND benchmark rate from licenses negotiated in the marketplace. In practical terms, then, this will mean a rate that is based on the top end of the range of rates that a SEP holder has negotiated with other implementers (provided these are FRAND). This is, of course, a minimalist corrective action for the problem of hold-out, particularly given the increased likelihood these days that negotiated licenses themselves reflect pervasive hold-out.

Further, we stress that the non-discrimination (“ND”) prong of FRAND should not be invoked as a reason to base awards either on “best prices” or even averages across licensees—the ND prong cannot be interpreted in such a way that non-discrimination trumps the fundamental idea of balance. The comparison of royalty rates achieved by different licensees is relevant for an ND analysis to the extent that differences in royalty rates results in a “distortion of competition.”¹⁷ Royalty rates paid to individual SEP holders are a small sliver of the implementer’s overall cost stack, and so differences in these rates paid are unlikely to distort competition. The fact that licenses are so often agreed in the form of lump sums that do not impact marginal pricing and output decisions provides even more reason not to give weight to arguments about levelling the playing field.

Other remedies such as the application of interest factors or delay corrections in the determination of FRAND awards by courts may also be

17. We view the “ND” prong of FRAND through the lens of ETSI’s IPR policy, and its underlying economic goals, rather than through the lens of antitrust law. However, we think that the “distortion of competition” concept referenced by the U.K. Court in *Unwired Planet*, which draws from (European) competition law, is broadly consistent with our thinking. See *Unwired Planet Int’l Ltd. v. Huawei Techs. (UK) Co.* [2017] EWHC 711 (Pat). The Court in *Unwired Planet* referred to an effects-based framework and stated at ¶ 501: “In my judgment, the ETSI FRAND undertaking should not be interpreted so as to introduce the kind of hard-edged non-discrimination obligation . . . without also including consideration of the distortion of competition.” See also ¶¶ 502–10. The first step in this framework requires establishing that differences in royalty rates across different implementers actually have an impact on competition between these implementers, and that this impact translates into an adverse impact on competition in the downstream market, i.e., it reduces output in the downstream market. What we would add, however, is that the relevant analysis needs to focus on long-run output and welfare, consistent with what we see as ETSI’s focus on the health of the ecosystem built around its standards. By contrast, hard-edged interpretations of non-discrimination preclude examination of economic effects. In the effects-based paradigm, differences in royalty rates (that are within the FRAND range) across different implementers or groups of implementers would only matter if these differences harmed competition and the competitive process (which, at least taking a long-run perspective, is synonymous with harm to the ecosystem built around the standard). In the context of the “ND” prong of FRAND (but less so the “FR” prong), an analysis of which implementers are the closest competitors to the implementer in question may be germane to evaluating the effect on competition.

warranted (and appear to be under consideration by the High Court in England).

The remainder of this Article elaborates on the discussion above. In particular, we note three things: (1) the concept of “balance” (which inherently takes an ecosystemic perspective) that is an over-arching goal of ETSI’s IPR policy; (2) how this concept should inform the understanding of the scope of the FRAND commitment; and (3) the problem of hold-out, which is driven by a combination of weakened injunctive relief and the inherently non-self-enforcing nature of patent rights. We find that the historical policy focus on “hold-up” of implementers by SEP holders rather than “hold-out” against SEP holders has been significantly misplaced. Whereas the actual royalties paid by implementers are a small share of their total revenues, they are the principal way in which vertically unintegrated upstream innovators can monetize their innovation. Providing adequate incentives for such upstream innovation is a problem that has been recognized by some scholars of innovation for decades, but it has been underappreciated in the practice of economic policy towards SEPs.¹⁸

II. SCOPE OF THE FRAND COMMITMENT

In this Section, we discuss: (1) the wording of the FRAND commitment and its implication; and (2) the economic and policy context that must inform the interpretation of the wording. In particular, we focus on the issue of whether the FRAND commitment is intended to serve only as protection for implementers and whether this protection for implementers is circumscribed in any way. Exactly such issues were aired in the *Optis v. Apple* proceedings in the United Kingdom, where Mr. Justice Meade had to consider the issue of whether the FRAND obligation confers a benefit without a corresponding burden, which he identified as the burden of taking a license.¹⁹ Our goal here is to provide economic context that illuminates this issue.

The ETSI IPR policy at 6.1 states:

18. We note that under U.S. patent law, enhanced damages may be available as a remedy for willful infringement, and that the SEP status of infringed patents does not rule out enhanced damages. However, our Article addresses a much broader and more (globally) policy-relevant issue that is distinct from whether or not the licensee willfully infringed patents in a SEP holder’s portfolio. The issue we address deals not with a willful infringer of patents as such, but with a putative licensee that is not willing to accept FRAND terms for a license. A licensee may accept the need to take a license but still seek to redefine FRAND royalties in de minimis terms as many do.

19. See ¶ 279 of the judgment of Meade, J. in *Optis Cellar Tech. LLC v Apple Retail UK Ltd.* [2021] EWCJ 2564 (Pat) [hereinafter *Apple v. Optis*].

When an ESSENTIAL IPR . . . is brought to the attention of ETSI, the Director-General of ETSI shall immediately request the owner to give . . . an irrevocable undertaking . . . that it is prepared to grant irrevocable licenses on . . . (“FRAND”) terms and conditions[.]

The ETSI IPR policy further states:

The above undertaking may be made subject to the condition that those who seek licenses agree to reciprocate.

The SEP holder who makes this commitment must be prepared to grant licenses on FRAND terms—no more than this. There is certainly no express requirement to conclude licenses on FRAND terms with all comers. Further, this preparedness to grant licenses on FRAND terms can be made conditional on reciprocity by those who seek licenses, although the reference to reciprocity may primarily refer to situations of cross-licensing—in the early days of cellular standards, such cross-licensing between vertically integrated firms would have been the standard mode of licensing.

A more important issue (which can also be seen as a type of reciprocity) concerns the obligation or “burden” (in the word used by the English court in *Optis v. Apple*) on any license seeker—regardless of whether cross-licenses are involved—to accept a license on FRAND terms. In our view, regardless of the wording of Section 6.1, for the FRAND requirement to sensibly co-exist with ETSI’s broader goals, there clearly is some reciprocity or burden on the licensee too. This is supported by ETSI’s statements in relation to what a potential licensee should do prior to licensing or implementing SEPs.²⁰

That the licensee also bears a burden ought not to be a controversial or unexpected proposition. After all, the European Union’s framework for assessing injunctive relief in SEP cases, the so-called *Huawei v. ZTE* framework,²¹ places the licensee’s willingness to accept FRAND terms at the

20. In fact, one could argue that ETSI not only envisages reciprocity as outlined above, but a pro-active duty on implementers to seek licenses before they implement SEPs. For example, ETSI says that “[p]rior to making a patent licensing decision and implementing any SEP contained in the ETSI IPR Database, potential implementers shall always contact the declarant.” See *Intellectual Property Rights (IPRs)*, ETSI, <https://www.etsi.org/intellectual-property-rights> [hereinafter *IPRs*, ETSI].

21. The *Huawei v. ZTE* judgment of 2015 was a judgment of the Court of Justice of the European Union (CJEU), based on a referral of a dispute between Huawei and ZTE that had arisen in the German court. In this judgment, the CJEU clarified that an SEP holder, which was deemed to be dominant in the relevant market defined around the technology described in the SEP, could obtain an injunction based on the SEP against an unwilling licensee, i.e., a licensee that had demonstrated an unwillingness to accept a license on FRAND terms. The decision also described the steps (such as making detailed written offers and counteroffers) that a licensee or licensor must take to demonstrate their willingness to deal on FRAND terms.

heart of the framework—it would be considered an abuse of dominant position under European Union competition law for the SEP holder to seek an injunction against a willing licensee, but if the licensee was unwilling, then injunctive relief can be an appropriate remedy against an infringer.²²

What has been much less discussed is whether the unwilling licensee should be able to obtain a license on FRAND terms at all. In *Optis v. Apple*, the Court declined to go so far as to say that Apple—whose unwillingness had been established because it had declined to commit to accepting court-determined FRAND terms—had forfeited its right to a subsequent FRAND license. As we show, as long as the option to avail of FRAND terms (uncorrected for delay) continues to be on the table, bargaining power will still be tilted towards implementers—especially those implementers who can credibly threaten to delay the agreement of a license—and the “balance” envisaged by ETSI is less likely to be struck.

In the next Section, we discuss this very idea of “balance” and explain that it is not merely an institutional goal of ETSI’s IPR policy but has a sound economic basis too. Once we have established the salience of “balance,” we explain why hold-out rather than hold-up is the much likelier threat to achieving this balance. This enables us to explain why strong measures are required to address hold-up and restore balance—and thus why strengthening the cudgel of injunctive relief and/or addressing the basis on which courts make license and damage awards is crucial.

III. “BALANCE,” OPEN STANDARDS, AND THE PROBLEM OF INCENTIVES FOR UPSTREAM INNOVATION

The economics of the FRAND commitment—what constitutes “reasonable” and “non-discriminatory” terms and conditions—are necessarily understood with reference to the objectives of ETSI’s IPR policy and the objectives of standardization.

A foremost consideration reflected in ETSI’s IPR policy is the need for FRAND royalty rates to foster and sustain the development of a robust “innovation ecosystem” for development and implementation of improved

See Huawei Technologies Co. v ZTE Corp. & ZTE Deutschland GmbH, Case C-170/13 (2015).

22. The English Court’s ruling in *Optis v. Apple* actually brings it into line with E.U. practice, as seen in countries such as Germany and the Netherlands. Under this ruling, an injunction can take effect before the Court determines FRAND terms, as long as the implementer’s unwillingness to accept a FRAND license is apparent. Under the Unwired Planet framework, an injunction was only available as an alternative to a FRAND license.

mobile communications. A robust innovation ecosystem requires that all categories of participants are incentivized to work together to create robust and durable commercial outcomes. In particular, we note that if royalty rates are too low or patent enforcement is weakened significantly, the “open innovation” model will suffer. Instead, innovation will be done “in house” by vertically integrated firms such as Huawei, Apple, or Samsung. This could potentially take the market back to the days of GSM technology when vertically integrated firms could use SEPs to impede entry.²³ Another consequence might be that vertically integrated firms are likely to focus on innovations which are of the greatest private benefit to their downstream arms, and thus the focus of their innovation activities will be on tailored proprietary technologies and not on open standards. The successful standardization seen to date might well suffer as a result because a great deal of valuable innovation in ETSI standards is provided by vertically unintegrated firms.²⁴

ETSI standards provide the benefits of compatibility and interoperability that are associated with standardization. These conventional standardization-related benefits are, of course, substantial: interoperability between handsets and IoT devices and cellular networks enables mobile network operators, manufacturers of mobile devices and developers of applications and software on those devices to benefit from global economies of scale. Further, it is well recognized in economics that standardization facilitates network effects—the phenomenon by which the value of a technology increases as the installed base of users of that technology increases. This enables diffusion of technology at a faster rate than would be achieved in a world without standards.

However, ETSI standards also greatly facilitate the improvement of mobile and IoT devices and networks in critical dimensions such as upload and download speeds, power management, network capacity, and latency. Most

23. GSM refers to Global System for Mobile Communications, which was a standard for so-called 2nd generation or 2G mobile technology, developed in Europe, which quickly became the largest global 2G standard in the 1990s and early 2000s. During the 2G era, vertically integrated firms that held the majority of IPRs, could cross-licence each other and thus pay very little net royalty, while others who lacked their own IPRs, suffered from a substantial cost asymmetry. See Rudi Bekkers, Bart Verspagen & Jan Smits, *Intellectual Property Rights and Standardization: the case of GSM*, 26 TELECOMMS. POL’Y 171, 182 (2002).

24. For a discussion of the open innovation model in SEPs, see David J. Teece, *Enabling Technology, Social Returns to Innovation, and Antitrust: The Tragedy of Depressed Royalties*, CPI ANTITRUST CHRONICLE 40 (2018) [hereinafter Teece, *Enabling Technology*]; David J. Teece, *Profiting from Innovation in the Digital Economy: Enabling Technologies, Standards and Licensing Models in the Wireless World*, 47 RSCH. POL’Y 1367 (2018) [hereinafter Teece, *Profiting from Innovation*]; see also David J. Teece, *Technological Leadership and 5G Patent Portfolios: Guiding Strategic Policy and Licensing Decisions*, 63 CAL. MGMT. REV. 5 (2021) (discussing “open innovation” in the context of the emerging 5G ecosystem).

significantly, standardization provides the focal point for coordinating the development and introduction of new communications technologies, as it defines and selects the technological solutions that need to be included in a robust standard. In turn, ever-improving devices and networks fueled by underlying standardized technologies create new opportunities for applications and uses. The growing use of cellular connectivity to support new IoT use cases provides a particularly good example of this. For instance, the high-speed data capabilities of LTE have progressively facilitated use cases ranging from advanced telematics, to video billboards, to connected cameras, with augmented reality and virtual reality applications on the anvil. But cellular connectivity also supports efficient low-speed data communications, giving rise to a range of applications from telematics, remote maintenance and control, with additional use cases such as logistics, wearables, smart infrastructure and emergency assistance applications emerging over time. All these use cases are set to grow substantially in importance with the advent of 5G.

In short, ETSI standards provide a platform for complementary innovations to occur. ETSI is not merely ratifying interoperability standards. It is selecting and combining the best new technologies advanced by a myriad of parties into an agreed upon constellation of technologies (“the standard”) which will enable the enhanced performance of mobile devices and services.

For the system to generate rapid innovation and maximum value for consumers, it must provide technology developers, standards implementers, and vertically integrated firms engaged in developing and implementing standards with appropriate incentives to invest in fundamental technology, while enabling implementers to succeed too. The focus must be on both the generation and adoption of technology; the one without the other will cause the ecosystem to diminish and ultimately fail.²⁵ ETSI has expressly recognized as much in describing its IP policy objectives:

It is ETSI’s objective to create STANDARDS and TECHNICAL SPECIFICATIONS that are based on solutions which best meet the technical objectives of the European telecommunications sector. ... In achieving this objective, the ETSI IPR POLICY seeks a balance between the needs of standardization for public use in the field of telecommunications and the rights of the owners of IPRs.²⁶

25. David J. Teece, *Next-Generation Competition: New Concepts for Understanding How Innovation Shapes Competition and Policy in the Digital Economy*, 9 J. L., ECON. & POL’Y 116, 116–18 (2012).

26. IPRs, ETSI, *supra* note 20.

In summary, “balance” is a key idea at the core of ETSI’s IPR policy. It is an operationalization of a systemic perspective on innovation. The FRAND commitment does provide protection to the licensee, but it cannot be interpreted or implemented in such a way that the incentives of the upstream technology developers—i.e., SEP holders—to participate in future standardization efforts are ignored. Moreover, economic theory provides good reason to think that providing incentives for the upstream technology developers is quite challenging, which means that it might be relatively easy to overturn the required balance.

The Nobel Laureate Kenneth Arrow was puzzled back in 1962 by the impression he had gained that “the firm that has developed the knowledge cannot demand a greater share of the resulting profits.”²⁷ ²⁸ A recent study by Jorge Padilla, Bowman Heiden, and Ruud Peters puts this into context. The authors showed that SEP licensing revenue amounted to 0.17% of the estimated value of the mobile economy.²⁹ These observations suggest that the impact of changes in royalty rates is likely to be of second-order importance for downstream implementers, as they are but a small share of revenues and costs. Thus, even a 20% or 30% reduction or increase in royalty costs will have a relatively small effect on final prices, revenues and profits for downstream implementers (e.g., if royalty revenues as a share of the overall value of the mobile economy were 20% higher than it actually is, royalty revenues would still only constitute just 0.20% of the value of the mobile economy). But this same 20% differential in aggregate royalty earnings would be very substantial and impactful from the perspective of SEP holders.

The economic literature on sequential innovation is also consistent with this observation that upstream firms might extract too little of the ultimate

27. Kenneth Arrow, *Comment on Willard F. Mueller “The Origins of the Basic Inventions Underlying Du Pont’s Major Product and Process Innovations, 1920 to 1950”*, in *THE RATE AND THE DIRECTION OF INVENTIVE ACTIVITY: ECONOMIC AND SOCIAL FACTORS* 355 (1962). Arrow revisited the subject of licensing 50 years later, and noted again in 2012: “I have the impression that licensing is a minor source of revenues.” Kenneth Arrow, *The Economics of Inventive Activity Over Fifty Years*, in *THE RATE AND THE DIRECTION OF INVENTIVE ACTIVITY REVISITED* 47 (Josh Lerner & Scott Stern eds., 2012). See Teece, *Enabling Technology*, *supra* note 24.

28. The social value includes the benefits to consumers as a result of being provided value that exceeds the prices that they pay (“consumer surplus”), as well as profits earned by other economic actors in the ecosystem. In the longer-term or “dynamic” context, the social value includes the benefits of new products and follow-on innovations that mobile standards enable.

29. These calculations are based on adding estimated consumer surplus from mobile to an estimate of the value of the mobile economy. Bowman Heiden, Jorge Padilla & Ruud Peters, *The Value of Standard Essential Patents and the Level of Licensing*, 49 *AM. INTELL. PROP. L. ASS’N Q.J.* 1, 4 (2020).

economic value that their product generates relative to what is required to align social and private incentives to invest. The sequential innovation literature recognizes that, if anything, it is especially difficult to provide appropriate incentives for the “first-stage” innovator: the pioneer who develops the fundamental (enabling) technology. The fundamental technology may in itself have few direct economic applications, but it may be the building block for a follow-on innovation that has tremendous economic benefit. If the developer of the fundamental pioneering technology faced the choice of making sunk investments in fundamental technology knowing that it would be prevented from sharing in the value generated by the follow-on innovation, it may choose to simply forego the development of the fundamental technology in the first place. The literature suggests that in situations of sequential innovation, such as in the mobile telecommunications sector, there may be a need for particularly strong mechanisms to aid the first-stage innovator’s ability to capture a share of the total value.³⁰

Evidence from the experience of the IEEE (Institute of Electrical and Electronics Engineers), which develops standards for Wi-Fi and which had instituted a much more prescriptive version of FRAND than ETSI has chosen to do, aimed at addressing the “hold-up” problem, demonstrates that participation in standards is sensitive to changes in the rule of the game that would impede SEP holders’ ability to monetize the contributions they make to the standard. IEEE revised its IPR policy in 2015, in order to give a more specific meaning to FRAND (under that particular IPR policy). In particular, it revised the meaning of “reasonable rate” to (i) exclude the possibility of patent holders receiving any compensation linked to the inclusion of their technology in the standard (an issue discussed below in Section IV), (ii) exclude the possibility that reasonable rates could be derived from existing licenses if those licenses were obtained under the implicit or explicit threat of an injunction, and (iii) stipulate that the reasonable rate should reflect the value contributed by the SEPs to the smallest saleable patent practicing unit (SSPPU), e.g., potentially a baseband chipset rather than an entire handset.

30. See Jerry R. Green & Suzanne Scotchmer, *On the Division of Profit in Sequential Innovation*, 26 RAND J. ECON. 20 (1995). In their paper, Scotchmer and Green suggest stronger patent protection (e.g., increased patent term length) as one means by which to provide greater incentives for first-stage innovation, but the general point they are making is that the “appropriability” problem—the innovator’s inability to capture a substantial share of value—is particularly pronounced where innovation is of a multi-stage nature. Scotchmer and Green conclude that “in order to give sufficient incentive for basic research, patents must last longer when cumulative research is undertaken by different firms than when both generations of research are concentrated in the same firm.” See *id.* at 31.

At the time that this policy was put into place, Teece and Sherry (2016) authored an article questioned whether the IEEE had perhaps “shot itself in the foot.”³¹ Kirti Gupta and Georgios Effraimidis, in an empirical analysis conducted shortly after the new policy was put into place, answered Teece and Sherry’s question. They found a significant and swift impact on the incentives of firms to participate in IEEE standards under the new FRAND rules.³² In September 2022, IEEE rescinded important parts of its 2015 patent policy, especially those relating to the role of injunctive relief, which suggests that Gupta and Effraimidis’ initial findings and predictions of diminished participation in the standard were on the mark.³³ IEEE’s experience certainly suggests to us that the “balance” between innovator interests and implementer interests can be relatively swiftly perturbed.

In summary, then, the FRAND commitment cannot be divorced from the larger objective of balance that is sought in the ETSI IPR policy. Economic literature also highlights the problem of incentivizing upstream technology innovation. Available evidence from standards setting also suggests that the incentives to develop the fundamental upstream technology for standards are likely to be much more sensitive to changes in royalty rates paid to SEP holders than are the incentives of downstream implementers to add their own innovations. These innate characteristics of sequential innovation are compounded by the ease with which hold-out can occur in the real world. We discuss this next.

31. David J. Teece & Edward F. Sherry, *The IEEE’s New IPR Policy: Did the IEEE Shoot Itself in the Foot and Harm Innovation?* (Fusher Ctr., Working Paper No. 13, 2014), http://businessinnovation.berkeley.edu/wp-content/uploads/2014/07/14-The-IEEEs-New-Policy_Teece_Sherry_8-3-16_2_Clean.pdf.

32. Gupta and Effraimidis conclude in regard to positive and negative Letters of Assurance (“LoAs”) for the 802.11 standards—wherein a technology developer either agrees to license its SEPs under reasonable terms as defined by the SDO (positive), or explicitly declines to provide such an assurance (negative): “We find that the number of *new* positive LoA submissions has (significantly dropped) by 90%. Interestingly, we also find that (1) the number of submitted negative LoAs reached an all-time high in 2016; and (2) during 2015-18, the number of submitted negative LoAs is larger than the number of submitted *new* positive LoAs. The results suggest that many SEP owners are reluctant to license their patent portfolio on the new FRAND terms.” Kirti Gupta & Georgios Effraimidis, *An Empirical Examination of Impact*, 64 ANTITRUST BULL. 151, 156 (2019). They add that this has increased uncertainty for implementers too as new standards are being developed against the backdrop of a number of technology owners declining to provide assurances regarding their portfolios, i.e., a “mixed bag” of positive and negative LoAs. *Id.*

33. *IEEE ANNOUNCES DECISION ON ITS STANDARDS-RELATED PATENT POLICY*, IEEE STANDARDS ASS’N, <https://standards.ieee.org/news/ieee-announces-decision-on-its-standards-related-patent-policy/> (last visited Sept. 25, 2023).

IV. HOLD-UP, REVERSE HOLD-UP, AND HOLD-OUT

A. THE FRAND BALANCE

Given the emphasis on “balance” in the previous Section, we think it useful to consider the issues of FRAND royalties, hold-up, and hold-out in terms of their consistency with the objective of “balance” between the interests of SEP holders and implementers, which maximizes the health of the ecosystem built around ETSI standards.

A useful way to think about FRAND royalty rates is to consider the “surplus” or value-add from the technology as a starting point for a FRAND rate. This surplus reflects the value that the technology adds to the product, e.g., in terms of increased sales, profits, cost savings, and the like. In our view, it is entirely appropriate for this surplus to reflect the value that the technology adds as part of a constellation of complementary technologies, i.e., as a standard. We note that in *Unwired Planet*, the idea that some portion of this excess value of standardization should go to the SEP holder was not contested by either side’s economist or by the court.³⁴ The court in *In re Innovatio* also accepted that “[p]art of the intrinsic value of a technology may precisely be the ease with which it can be adopted into a standard.”³⁵

Thus, the value added by the technology (possibly including some component of value related to the fact that the technology is part of a standard) is the surplus to be split between the SEP holder and the implementer. A range of ways of splitting the surplus may be acceptably consistent with the idea of “balance” (which is itself not precisely formulated) and thus FRAND in any given licensing situation may consist of a range of royalty rates. Non-FRAND

34. *See Unwired Planet Int’l Ltd. v. Huawei Techs. (UK) Co.* [2020] UKSC 37 [97]. The decision in *Unwired Planet* was a 2017 decision in the U.K. High Court, which determined that a U.K. court could set the FRAND rate for a worldwide licence.

35. *See In re Innovatio IP Ventures, LLC Pat. Litig.* No. 11 C 9308, 2013 WL 5593609, at *9 (N.D. Ill. Oct. 3, 2013) (“At the same time, the court finds Dr. Teece’s testimony regarding the difficulty of distinguishing between the intrinsic value of the technology and the value of standardization to be persuasive. Part of the intrinsic value of a technology may precisely be the ease with which it can be adopted into a standard. For example, a technology may more easily interface with other extant technologies by making more efficient use of an existing infrastructure or requiring less modification to other technologies.”). *See also Microsoft Corp. v. Motorola, Inc.*, No. C10-1823JLR, 2013 WL 2111217, at *13 (W.D. Wash. Apr. 25, 2013) (“Calculating incremental value for multi-patent standards ‘gets very complicated, because when you take one patent out of a standard and put another one in you may make other changes, the performance of the standard is multidimensional, different people value different aspects.’”) (citing Motorola’s expert’s testimony).

outcomes are defined by situations in which royalty rates are above or below this range.³⁶

We note that some have advocated that the very size of the pie—i.e., the incremental value contributed by the technology—should be measured relative to the next-best technology that could have been included in the standard. For example, under the “ex ante” approach, if two technologies A and B are in a “race” to be adopted as the new standard and A is only very slightly superior to B but both are much superior to the old standard, the correct royalty for A should reflect only the extent that it is superior to B. So, if A contributes a value of 6.01 cents relative to the old standard, and B contributes a value of 6.00 cents relative to the old standard, the royalty rate for A should not exceed 0.01 cents. We do not think that this almost complete transfer to the implementers of the value created in the course of the race between A and B is consistent with the idea of “balance” or indeed with any realistic account of how competition between rival standards actually occurs.³⁷

B. HOLD-UP: A REAL PROBLEM OR A FLAWED THEORY?

The historic focus of many economists and competition authorities was on the problem of hold-up. In this theory, implementers make sunk investments in standards-related products. They then negotiate for royalties after these investments are made. The SEP holder can use the threat of an injunction to extract not only the full surplus contributed by the technology but also to extract value related to the benefits of participating in the marketplace. This is because an injunction will exclude the implementer from implementing the entire standard unless the implementer is able to “work around” the specific SEPs that it has been found to infringe (on which basis it was enjoined). Thus, the SEP holder can extract from the implementer not just the value that its technology contributes but potentially the entire value of participating in the standards-driven market.

Of course, this theory ignores the possibility that implementers can negotiate for royalties before making standard-specific investments. Indeed, ETSI states that implementers should seek to contact SEP holders *before*

37. The view that competition between competing technologies would drive down royalty rates to zero is based on a model of “Bertrand competition” that does not apply to technology industries where firms must make large sunk investments up-front. *See In re Innovatio IP Ventures*, 2013 WL 5593609, at *20 (“The Court agrees [with Dr. Teece] that it is implausible that in the real world, patent holders would accept effectively nothing to license their technology....In other words, the existence of patented alternatives does not provide as much reason to discount the value of Innovatio’s patents as does the existence of alternatives in the public domain.”).

implementing SEPs.³⁸ Moreover, the SEP holders have already sunk their R&D dollars much earlier still. So they are vulnerable even if their technology does make it into the standard. Put differently, if there is an irreversible investment problem, it may be more severe for the upstream innovators than the downstream implementers because the investment is made much earlier.

While we agree that FRAND rates should not reflect hold-up value (i.e., be substantially based on what the implementer would pay to avoid being excluded from the standard), the existence of an actual hold-up problem has never been systematically established with respect to the licensing of telecom standards-essential technology.³⁹ Also, the use of the term “hold-up” is inapt in these circumstances. Hold-up, properly defined, would require that implementers make their investment under certain expectations about the availability of licenses on FRAND terms (and what those terms are) and then find that, ex post, licenses are available on very different and more adverse terms. Even setting this aside, it is not credible to think that sophisticated implementers in today’s licensing market—with decades of SEP licensing and negotiating experience—are naïve with respect to what SEP holders might demand by way of royalties and non-price terms. Thus, what is being termed hold-up is really just an assertion—which we will show is not well-founded—that when implementers plunge into making standards-compliant products before licensing the relevant SEPs, the SEP holder’s threat to enjoin the implementer confers bargaining power on the SEP holder.⁴⁰ Nonetheless, for convenience, we continue to use the term “hold-up.”

38. See *supra* note 20.

39. Damien Geradin points to the fact that, in the *Microsoft v. Motorola* litigation, economists for Microsoft—all of whom advanced a hold-up-based theory of the case—were unable to identify any actual cases of hold-up. For instance, Microsoft’s expert, Timothy Simcoe, was unable to point to a single license from any company that reflected hold-up. Damien Geradin, *The Meaning of ‘Fair and Reasonable’ in the Context of Third-Party Determination of FRAND Terms*, 21 GEO. MASON L. REV. 919, 941 n.93 (2014). Likewise, another expert for Microsoft was unable to conclude “from economic evidence” that patent hold-up was a real problem. *Id.*

40. “Opportunism” (or “self-interest seeking with guile”) is central to the idea of hold-up as defined by Nobel Laureate Oliver Williamson. Alexander Galetovic & Stephen Haber, *The Fallacies of Patent-Holdup Theory*, 13 J. COMP. L. & ECON. 1, 23 (2017). Galetovic and Haber point out that absent an element of opportunistic surprise, hold-up theory could be applied to any circumstance in which there are sunk investments, and an incomplete contract: “The elision of opportunistic surprise in standard-setting patent holdup matters because, if it is not necessary for one party to opportunistically surprise the other, then holdup could be claimed to be taking place any time that there is a relationship-specific investment and an incomplete contract.” The implication of their argument is that practically any disagreement over contractual terms and conditions could be labelled “hold-up.” For true hold-up to occur what must be demonstrated is that the SEP owner has taken advantage of the implementer’s

Alexander Galetovic, Stephen Haber, and Ross Levine provided the most sophisticated empirical analysis that we are aware of in regard to the hold-up issue in a 2015 paper. They found that “products that are SEP-reliant have experienced rapid and sustained price declines over the past 16 years” and observed that the “prices of SEP-reliant products have fallen at rates that are not only fast relative to a classic hold-up industry, they are fast relative to the patent-intensive products that are not SEP-reliant.”⁴¹ Using a quasi-natural experiment to study the effect of the *eBay Inc. v. MercExchange, L.L.C.*, 547 U.S. 388 (2006) decision (a U.S. Supreme Court decision that significantly limited the circumstances in which injunctive relief might be available) on relative price declines in SEP-reliant versus non-SEP-reliant industries, they also did not find that prices in SEP-reliant industries were more affected by the *eBay* decision (limiting the availability of injunctive relief) than in non-SEP-reliant industries.⁴² If hold-up was more of a problem in SEP-reliant industries, one would have expected to see a greater effect of the *eBay* decision in these industries than in those which are not driven by SEPs.

This is unsurprising: the presence of the FRAND commitment, the lack of availability of injunctive relief (particularly in the United States after the *eBay* decision), the repeat-game nature of standardization,⁴³ and the bargaining power of many implementers (e.g., their ability to prolong litigation) all militate against hold-up. Most fundamentally, hold-up is unlikely in a setting where the implementer or prospective licensee can use the technology without paying for it, and absent an injunction—whose availability is not automatic and which courts will often determine with reference to the FRAND-ness of the SEP holder’s conduct—there is no way that the SEP holder or licensor can exclude

sunk investment to attempt to extract terms that the implementer could not have anticipated at the time of making the investment. The authors also cite to Klein, Crawford and Alchian (1978) who point out that hold-ups are almost always surprises because the particular conditions that will lead to the hold-up are considered unlikely. *See generally* Benjamin Klein, Robert G. Crawford & Armen A. Alchian, *Vertical Integration, Appropriable Rents, and the Competitive Contracting Process*, 21 J. LAW & ECON. 297 (1978).

41. Alexander Galetovic, Stephen Haber & Ross Levine, *An Empirical Examination of Patent Hold-Up* 5 (Nat’l Bureau Econ. Rsch., Working Paper No. 21090, 2015), <https://www.nber.org/papers/w21090>.

42. *Id.* at. 5–6 (“In examining the quasi-natural experiment involving the eBay case, we also cannot reject the null hypothesis of no SEP hold-up. The difference-in-differences results do not indicate that quality-adjusted prices fall faster in SEP-reliant industries after the eBay case.”).

43. SEP holders who wish to continue participating in repeat rounds of standards-setting activities run the risk that other members will seek to exclude them from future standardization activities if they are seen to have violated their FRAND commitment.

this infringing use.⁴⁴ This is a fundamental difference between “ordinary” goods and services and intellectual property rights, a point that Germany’s Federal Court of Justice recently recognized:

[U]nlike buyers of goods and services—standards implementers are in the favorable position to be able to access protected technology needed for producing standard compliant products, even without an agreement with the patent holder.⁴⁵

C. HOLD-OUT: THE BIGGER ISSUE

1. *Why Hold-out Arises*

The German Federal Court’s observations are apt and address the heart of the matter. The implementer has use of the technology without needing to reach an agreement with the SEP holder. As we pointed out earlier, this situation is fundamentally different from the model of two parties bargaining over how to splice up a pie or split a dollar. In this real-world SEP scenario, one of the parties (the implementer) has no incentive to agree—unlike the position of the parties to a negotiation that happens before infringement. In this latter type of negotiation, reaching agreement is a precondition of being able to use the technology and so the implementer and SEP holder both have incentives to agree. Further, if an implementer can credibly threaten delay, this will (by itself) tend to reduce the royalty that the SEP holder might settle for, relative to the benchmark situation in which the parties must agree over how to split the pie before either of them can enjoy a bite of the pie. This is because time is money—if the implementer can threaten to deny the SEP holder’s fair slice of the pie until the pie has gone cold, the SEP holder might be better off accepting a smaller slice of the pie now.

The SEP holder does have the option of enforcing its rights through the courts. However, suppose (as is the case in the United Kingdom) that the relief available is a FRAND license award made by a court. In this case, the parties’ expectations about how the Court will determine the terms of the license will influence whether they will voluntarily agree a license, and whether such an agreement need be on FRAND terms. For example, if both parties expect that

44. As discussed *supra* note 16, it is possible to imagine a scenario in which a large, sophisticated SEP holder might be able to use the credible threat of an injunction or even a license award on supra-FRAND terms to extract supra-FRAND terms from a small, unsophisticated implementer. As discussed, however, there are limits to how credibly a SEP holder can make this threat in circumstances where litigation costs are large relative to the anticipated payoff.

45. See English language summary of *Sisvel v. Haier*, Case No. KZR 36/17 (May 5, 2020) (emphasis added), <https://caselaw.4ipcouncil.com/german-court-decisions/federal-court-of-justice-bgh/sisvel-v-haier-federal-court-justice-bundesgerichtshof>.

the Court will set royalties based on the “true” FRAND level, F , but that such relief will only arrive seven or eight years down the road, then this delay will lead the SEP holder to heavily discount the value of a Court-awarded license and potentially settle for something much lower than F instead. Thus, unless the parties to real-world licenses could expect to recover the economic costs of delay through the legal process, the likely result will be that many real-world licenses reflect at least some degree of hold-out, simply because in many of these licenses the licensee undoubtedly had a credible threat of being able to delay agreement.⁴⁶ Further, even if court awards can potentially correct for the cost of delay via the application of a suitable interest rate, this will still not address broader economic harms such as the damage that a recalcitrant licensee can inflict on the momentum of a licensing program. Such factors may put further downward pressure on rates that SEP holders might accept in order to achieve settlements now.

Delay may also allow a licensee to improve its bargaining position in other respects:

- A licensee that successfully holds out until most of its sales are in the past cannot be enjoined and the only claim against this licensee may be damages afforded on the infringement of individual national patents.
- There may also be limitations periods applicable to such damages, which means that the ability to delay taking a license potentially also reduces the number of units that are truly captured by the license. This also means that even in a regime wherein courts appropriately account for the “discount rate” effect on the value of a license, the threat of delay can be credible and can extract value from the SEP holder in non-FRAND ways.

46. The extent of the economic harm from delay alone will depend on the circumstances. The longer is the expected timeframe for receiving any court-determined relief, the more likely it is that the SEP holder’s use of the technology will be substantially in the past when any court award is made, and absent an appropriate correction for the cost of delay (i.e., interest applied at the SEP holder’s typical discount rate for cashflows), the greater is the depressive effect on the present value of royalties at the time when negotiations begin.

- The use of existing licenses, which may feature relatively depressed royalty rates, to determine FRAND rates may also have a self-perpetuating effect in terms of depressing future royalty rates.^{47,48}

In the real world, there may be other complexities that somewhat mitigate the incentives and effects discussed above. For example, parties have divergent expectations as to what is FRAND and even as to what a court might decide is FRAND,⁴⁹ so parties may hope to influence the thinking of courts. Factors such as the precedential value of an agreement or the need to establish a reputation as a tough negotiator may also play a role in determining to what parties do and do not agree.⁵⁰ But these complexities do not undermine the intuition that real-world negotiations which happen “after the bird has flown” are likely to be greatly more advantageous to the implementer than idealized negotiations in which the parties must agree to a split before receiving any reward from the technology.

47. For example, a SEP holder and implementer may arrive at an agreement relatively swiftly and “willingly”, if the SEP holder perceives that its only real option is a Court-awarded license in several years’ time and the expected value of this court-awarded license is \$1 per unit. However, the SEP holder may prefer the certainty of say seventy cents today relative to the discounted value of \$1 in the future. This seventy-cent rate may then form the basis for future royalty determinations by Courts, which can then put further downward pressure on royalties. While the danger of setting the wrong precedent in an early negotiation may give SEP holders some incentives to negotiate harder, there may also be significant value in achieving license deals that give the licensing program legitimacy and credibility. This is seen in the prevalence of “early bird” discounts in the licensing marketplace.

48. An additional asymmetry between SEP holder and implementer in this instance relates to litigation. The implementer’s position in subsequent litigation and negotiations will not be directly related to what it agrees to or is ordered to pay in respect of the SEP holder’s portfolio. By contrast, the outcome will affect all of the SEP holder’s subsequent licensing efforts. As a result, uncertainty over the outcome has a bigger effect on the SEP holder than on the implementer, which may mean that the SEP holder places a bigger premium on resolving such uncertainty. For a similar argument, see Michael P. Akemann, John A. Blair & David Teece, *Patent Enforcement in an Uncertain World: Widespread Infringement and the Paradox of Value for Patented Technologies*, 1 CRITERION J. ON INNOVATION 861, 877 (2016).

49. In the law and economics literature on the determinants of litigation, divergent expectations between plaintiff and defendant as to the probability of a “win” for the plaintiff are often used to explain why a small minority of cases do not settle, and instead proceed to trial. See Joel Waldfoegel, *Reconciling Asymmetric Information and Divergent Expectations Theories of Litigation*, 41 J.L. & ECON. 451 (1998).

50. The importance of establishing a reputation for toughness in order to influence other actors’ beliefs about a firm’s “type” is well understood in economics. For example, in the context of predatory pricing, it has long been understood that a seemingly irrational strategy of aggressively deterring early entrants may make sense in the context of a firm’s desire to induce doubts about its rationality, and thereby dissuade subsequent entrants.

Another factor that enables hold-out is the mirror image of the problem that others have diagnosed in the context of standards-related hold-up of implementers. Technology developers also have sunk costs at the time that they negotiate licenses—as noted, these costs have already been sunk by the time their technologies are included in the standard. This means that technology developers may accept royalty rates that provide some degree of return on their investment, but which rates may be below the levels that would have justified the original investment.⁵¹

2. *The Prevalence of Hold-out*

These facts of life explain why we frequently encounter situations in which agreements are reached only after several years of negotiation (and even more years of infringement). In some cases, agreements are never reached and in other cases, eventually agreement is either reached by dint of a court award of a license or injunction or a settlement at trial. The timeframe involved in some of these cases might be a decade or more since negotiations first began.

From an empirical perspective, Bowman Heiden and Nicholas Petit noted the emergence of a “long tail” of implementers or micro-vendors who are individually small but collectively account for a reasonable share of industry revenue and who are not licensed.⁵² Many of these implementers are based in China. They note in this context that “a systematic patent trespass effect can be deemed to occur when 30% or more of a relevant market is unlicensed.” They relate this to a collective action problem: “why take a license if your competitors do not?” They note that the “systemic effect of patent trespass is

51. See Luke Froeb & Mikhael Shor, *Innovators, Implementers and Two-Sided Hold Up*, ANTI-TRUST SOURCE (2015), <https://www.mikeshor.com/research/antitrustsource.pdf>. Froeb and Shor state that the “innovator’s hold-up problem is more difficult to overcome” than any hold-up problem facing the implementers. *Id.* at 3. The U.S. Department of Justice has also previously acknowledged that the hold-up of innovators is a more serious a problem than the hold-up of implementers. Former Assistant Attorney General Delrahim stated that, “[t]oo often lost in the debate over the hold-up problem is recognition of a more serious risk: the hold-out problem” emphasizing that “innovators make an investment before they know whether that investment will ever pay off. If the implementers hold out, the innovator has no recourse, even if the innovation is successful.” See *Assistant Attorney General Makan Delrahim Delivers Remarks at the USC Gould School of Law’s Center for Transnational Law and Business Conference*, U.S. DEP’T JUST. OFF. PUB. AFFS. (Nov. 10, 2017), <https://www.justice.gov/opa/speech/assistant-attorney-general-makan-delrahim-delivers-remarks-usc-gould-school-laws-center>.

52. Bowman Heiden & Nicolas Petit, *Patent Trespass and the Royalty Gap: Exploring the Nature and Impact of Patent Holdout*, 34 SANTA CLARA HIGH TECH L.J. 179, 228–29 (2017) (“Our interviews suggest a systematic patent trespass effect can be deemed to occur when 30% or more of a relevant market is unlicensed.”); *id.* at 229 (“Why take a license if your competitors do not?”).

primarily experienced through the impact on the technology market through the development of consensus-based standards.”⁵³ Heiden, Peters, and Padilla noted the presence of a similar “collective action” problem resulting in widespread hold-out in the IoT sphere.⁵⁴

These empirical observations echo the findings of Judge Essex of the U.S. International Trade Commission (as summarized by Michael Renaud, James Wodarski, and Sandra Badin):

[T]here is no evidence to support the notion that owners of SEPs have engaged in patent hold-up either in the investigations before him or in the telecommunications industry more generally. Rather, the evidence is all on the side of patent hold-out. The implementers of the standards are using the patented technology incorporated in the standards without authorisation [sic] and without even engaging in licensing negotiations because they know that the worst that can happen is that they get sued, are found to infringe and are made to pay the same FRAND rate that they would have had to pay for using the patented technology in the first place.⁵⁵

Judge Essex’s observations are confirmed by Vice President of Intellectual Property for a major implementer (Lenovo), Ira Blumberg, who in effect says that licenses are only negotiated when the licensor is willing to accept less than the expected pay-off from litigation:

[T]hat’s the number one thing I use to assess whether I want to sign a license, is a careful analysis of whether...the likely outcome of litigation plus the expense . . . is ultimately greater than or less than the negotiated alternative. And I’m very pragmatic; when the negotiated alternative is clearly less expensive, I’m happy to take a license. When the negotiated outcome is equal to or greater than the likely litigation outcome . . . I’m ready to keep negotiating and/or litigating as necessary.⁵⁶

This logic indicates that many implementers will only accept negotiated licenses at especially low rates. These low rates may then be used as benchmarks for “FRAND” rates in subsequent instances in which the SEP holder seeks to enforce its portfolio. Thus, absent corrective measures (discussed below), there is a real risk that hold-out will beget further hold-out,

53. *Id.* at 229.

54. Heiden, Padilla & Peters, *supra* note 29, at 15–16.

55. MICHAEL T. RENAUD, JAMES M. WODARSKI & SANDRA J. BADIN, INTELLECTUAL ASSET MGMT. 59 (2016). Judge Essex further concluded that this situation was “as unsettling to a fair solution as any patent hold up might be.” *Id.* at 68.

56. Findings of Fact and Conclusions of Law, at 179, *FTC v. Qualcomm Inc.*, Case No. 17-CV-00220-LHK (N.D. Cal. May 21, 2019).

reflected both in greater difficulty in negotiating licenses and a depression in royalty rates to below the level required to sustain healthy innovation in SEPs.

In summary, then, the very non-self-enforcing nature of patent rights directly indicates why hold-out rather than hold-up is the problem that we expect to see more often in licensing SEPs. Our own experience with examining the smartphone licensing landscape in the context of litigation and the empirical observations of other authors support this. Royalty revenues are a small share of the overall value-added from mobile telecommunications and a small share of smartphone implementers' revenues.⁵⁷ These findings contradict the predictions of "hold-up" theory and are potentially consistent with the reality that hold-out is an important characteristic of the licensing landscape today.

Thus far, the licensing marketplace associated with ETSI SEPs has functioned well enough to conclude that some type of "balance" has been struck. Successive standards have dramatically increased the functionality of mobile devices in relation to key features such as speed and reliability. Smartphone manufacturers and developers of operating systems have made significant complementary innovations and some have enjoyed enormous profitability as a result. Most major licensors that we have studied have achieved the significant majority of their licenses in the marketplace and not via the courtroom. Yet this relative balance is precarious and the system's obvious vulnerability to hold-out could yet prove its undoing. In the next Section, we discuss what can be done to counter the problem.

V. ADDRESSING HOLD-OUT: TOWARDS SOLUTIONS

Our primary concern in this Article is the threat posed to open consensus-based standards by hold-out behavior. We have noted the obvious attraction for most licensees of holding out, or even threatening to hold-out and by doing so, achieving depressed and potentially sub-FRAND royalty rates. As discussed, hold-out or even the threat of hold-out may significantly improve the licensee's bargaining position, even more so in cases when it can expect to extract heavily discounted terms for past infringement. The critical problem here is that as long as the implementer retains the option to sign a FRAND license (at least one without any adjustment for the cost of delay), then there may be no corrective to its ability to wield hold-out as a weapon that it can use

57. See Alexander Galetovic, Stephen Haber & Lew Zaretzki, *An Estimate of the Average Cumulative Royalty Yield in the World Mobile Phone Industry: Theory, Measurement and Results*, 42 TELECOMM. POL'Y 263, 266 (2018) (estimating that relative to smartphone manufacturer revenues of \$425.1 billion in 2016, royalties were around \$14.2 billion, or 3.3 percent).

to extract lower and potentially sub-FRAND rates for itself. This is true even in the case where the implementer risks being enjoined, as it retains the option to sign a FRAND license post-injunction.

We discuss some potential correctives for the situation. These correctives must naturally be implemented via the enforcement system, typically by courts, and they apply to how these courts approach the determination of FRAND license terms. Of course, one can reasonably expect that given the timeframe, costs, and risks of litigation, court cases will involve a subset of the most recalcitrant implementers who we might deem as truly “unwilling” while the others were somewhat “willing.” With this terminological clarification in hand, we discuss three potential corrective options for making the enforcement system work more robustly to ensure balance. This, in turn, will create better incentives in the marketplace and will reduce the risk that market outcomes will be tainted by hold-out.

The approaches that we discuss are:

- The relatively minimalist approach of recognizing at least that a licensee that is actively holding out should not get the “best” FRAND terms that other licensees got, i.e., even if the licensee maintains its entitlement to a FRAND license, the FRAND award can avoid putting it on the same footing as more “willing” licensees.
- Adjusting FRAND awards for the cost of delay, an approach implicitly recognized by the English High Court in the recent *Interdigital v. Lenovo* proceeding.
- Strengthening injunctive relief and potentially limiting the availability of FRAND licenses to unwilling licensees.

A. IF FRAND, WHICH FRAND RATE?

There is a minimal solution—which does not require a decision on whether or not FRAND applies or how a FRAND award can be adjusted to account for delay—but which could still valuably reduce the severity of hold-out. This solution draws upon the concept of the FRAND benchmark rate discussed previously in Section I and Section IV. As a practical matter, this FRAND benchmark rate can be set at the upper end of rates achieved in real-world licenses for the same patents or patent portfolio (some of the licensor’s negotiated rates are actually likely to already reflect the effects of implementers’ bargaining power and will thus likely be well within the FRAND range and

even perhaps below it).⁵⁸ Many other licenses may be well below this benchmark rate. Particularly in the context of lump-sum licenses for large sums of money, SEP holders may agree to trade-off rates against broader benefits to the licensing program. For example, a lump-sum license with a major implementer for a large sum of money delivers guaranteed revenues that can accrue to the licensor's income statement immediately; they are thus attractive from a risk, cashflow, and financial reporting perspective.⁵⁹ Likewise, such deals may beget other deals, as they confer credibility on the overall licensing effort. In addition, the enormous resources and ability to threaten delay or force the licensor into costly and arguably asymmetrically risky litigation of major implementers may also mean that some licenses were negotiated at sub-FRAND rates. Clearly, it would be wrong to assign to those licensees who were (especially) unwilling to negotiate the lower rates that were offered in return for benefits to the SEP holder's licensing program. Nor should they benefit from the bargaining power of other licensees by getting "best price" rates.

SEP holders may also, as part of a willingly negotiated license, accept lower rates for past use than are applied to forward-looking use. By definition, such past infringement cannot be disciplined by injunctive relief, and in some cases, license negotiations are concluded at a juncture in time when much of the implementer's use of the standard is in the past.⁶⁰ However, it would be

58. The true value contribution of the technology to the implementer's profits is typically not something that can be easily measured. As this is an important determinant of the FRAND range, we also do not generally expect to observe the "true" FRAND range. Instead, we rely on negotiated licenses as the best proxy for this FRAND range. However, these licenses form a conservative proxy in that the range of rates observed in these licenses is likely to be lower than the "true" FRAND range because of the bargaining power of implementers.

59. See Too Sigler, Ozer Teitelbaum & Keith Walker, *Licensing Structures and Compliance in An Evolving IP Landscape*, 56 LES NOUVELLES 50, 50 (2021) (discussing the practical benefits of different licensing structures, as licensing professionals perceive them). Note that following changes to accounting rules in 2018 (IFRS 15 and U.S. GAAP ASU Topic 606) different licensors may account for lump-sum licenses in different ways, depending on whether the license is classified as a "static" or "dynamic" license. See Accounting Standards Update No. 2014-09, *Revenue from Contracts with Customers* (Topic 606); IASB IFRS 15, *Revenue from Contracts with Customers*. This affects whether the lump-sum income is amortized over a period of time or is recognized immediately.

60. If the English Court's recognition in *Interdigital v. Lenovo* that FRAND royalties apply on all past infringement is widely reflected in subsequent licensing agreements, one might see this play out in practice. However, it is our impression that the sums agreed to date in many SEP license agreements have reflected some type of limitation on the scope of royalties to past infringement. Such a limitation also makes sense in that patent damages (certainly in the United States) are indeed subject to limitations and requirements of notice, and many SEP holders would have sought patent infringement damages as a principal remedy for infringement of their patents (especially as prior to the *Unwired Planet* series of judgments in

incorrect to allow the litigious infringer to benefit from reduced rates for past use that were given in the context of negotiated licenses.

Using the FRAND benchmark or “full freight” FRAND rate for license awards and damages awards will create a distinction between the position of willing and unwilling licensees. This distinction is not “discrimination” at all, but simply a recognition that there is no “best price” obligation on the licensor. In any case, the non-discrimination prong of FRAND cannot be used to justify putting the unwilling licensee on the same footing as the (more) willing ones, as this would severely undermine the “balance” envisioned in the ETSI IPR policy.

Addressing the past use issue is also important to restoring the FRAND balance. If lower rates for past use become a type of entitlement (and are embedded into court-determined rates) this creates two dangers for SEP holders and for the FRAND balance: (1) the implementer has ever stronger incentives to bank as much of its use in the past as possible, as it can then argue that this use should be at a heavily discounted rate; and (2) by delaying, the implementer can also reach the point where it can argue that the technology is less relevant than it was in the past, as patents are about to expire, and therefore it should pay lower rates on account of these factors too. By contrast, the incentives for delay are significantly reduced if lower rates for past use offered in the context of license negotiations are not available to implementers who force matters into litigation.⁶¹

the United Kingdom there was not an obvious mechanism by which the Court process could be used to determine the terms of a global license).

61. The English High Court in *Interdigital v Lenovo* suggests that one solution to the hold-out problem is to ensure that implementers pay for all their use of the SEP holders’ portfolio from the date of first infringement. This would reduce the attractiveness of delay to implementers. Relatedly, the Court stated that under FRAND, all use should be paid for, without any limitation as to how far back in the past one can go. As a point of principle, this recognition is welcome. On a strictly forward-looking basis, the Court’s clarification should make it less attractive to implementers to drag out negotiations. In and of itself, this will be beneficial to the licensing market going forward. However, the Court’s application of this principle to “unpacking” pre-existing lump-sum license agreements may be more of an issue. Existing lump-sum licenses may not have been negotiated under the assumption that the SEP holder could collect on all past infringement or even collect on past sales at the same royalty rate as future sales. The Court, however, ultimately derived “unpacked” rates from these lump-sum licenses based on including all infringing sales in the denominator, notwithstanding the evidence before it as to industry norms and expectations. Dividing these fixed lump sums with a larger base of sales than was actually considered risks producing especially low implied royalty rates. Even if these rates are applied to the entire, potentially lengthy, period of infringing use, this might still result in inappropriately low compensation to the SEP holder.

B. ADJUSTED FRAND AWARDS

As identified in Section I and Section IV, in a simple analysis of a negotiation “after the bird has flown,” the implementer has incentives to delay indefinitely and the SEP holder may accept a sub-FRAND offer because it anticipates that the alternative to negotiations is to seek out and receive a FRAND license from a court but with several years delay. If this license is based on an unadjusted FRAND fee, F , then the discounted value of this award may be less than F , even much less than F . This is one reason why we might see the SEP holder accepting a “sub-FRAND” rate.⁶²

A conceptually simple corrective in this case would be to adjust the court-awarded fee so that it returns the same present value (as of the date of infringement or at least the date negotiations began) as a FRAND fee paid at the appropriate date. This may involve applying interest at the date of the award to past sales, using the same discount rate that the licensor would have used to evaluate the financial investment case for its licensing program. In our experience, this would typically be something like the licensor’s weighted average cost of capital (WACC).⁶³ The approach of equalizing the present value by using the type of discount rate that the licensor would have used in formulating its investment case is consistent with the spirit of “balance” in FRAND. The goal of this “balance” is to ensure that SEP royalties are adequate to preserving the investment case.

This approach is not without its limitations and complications. In practical terms, the “FRAND” royalty may be gleaned from real-world licenses in which hold-out may have been a factor, in which case the task is not merely to adjust an agreed-on FRAND royalty for delay but instead also to minimize the effect of hold-out in previously agreed licenses. The narrow use of discount rates to correct for delay might not account for the broader economic harm that delay might have inflicted on the SEP holder’s licensing program. Thus, the potential for sub-FRAND compensation may still persist and so too will the attraction of delay.

62. Again, this discussion is framed in terms of a single FRAND rate for purposes of exposition. But the logic carries over into the more realistic situation in which a range of rates can be FRAND. In this case, delay is likely to translate into an agreement either lower in the FRAND range or below that range.

63. For example, if \$1 per unit is an appropriate FRAND royalty, the Court can apply this \$1 to all the implementer’s past and expected future sales and compute the present value (at the appropriate start date) of the award. It can then compare this present value to the present value of the hypothetical cash flow if royalties had actually been paid on sales as they had arisen. Applying, at the time of the award, the same discount/interest rate on royalties due on past and expected future sales will bridge the gap between the two present value streams. (Hypothetical example available from authors).

C. STRENGTHENING INJUNCTIVE RELIEF

An even stronger corrective option is to strengthen injunctive relief regimes around SEPs. In the last two decades, the hurdles in the way of obtaining SEP-related injunctions have become steeper. We are not aware of a single U.S. District Court that has granted an injunction in a case related to SEPs for any standard. The situation in Europe is better, and there is a well-developed framework (as laid out in *Huawei v. ZTE*) for assessing when injunctive relief is an appropriate remedy. However, even that framework does not prevent implementers from using validity and infringement challenges to delay or complicate the process. As a practical matter, SEP licenses are always at the portfolio level, and many recent licensing negotiations have involved portfolios that have been litigation-tested and licensed on numerous prior occasions. Even in these situations, the present regime permits implementers to use validity and infringement challenges and appeals as a potential tool of delay or to raise enforcement costs. One way to reduce this is for Courts to limit the scope for such challenges, perhaps by assessing on a case-by-case basis whether such challenges are justified in the circumstances, or by offering the option to skip straight to determination of FRAND issues.⁶⁴

Further, the “FRAND injunction” regime in the United Kingdom may also need strengthening. In this regime, a licensor can ask the English Court to determine the terms of a global FRAND license for its portfolio. The implementer then can elect whether to accept these terms or instead accept an injunction in the United Kingdom. There are two potential hold-out related problems this raises. First, if the licensor’s “threat point” against the implementer is that it can eventually secure a FRAND license, this is not much of a threat point. Unless the FRAND license is specifically corrected for the cost of delay, this essentially means that the worst fate that can befall an implementer is to eventually pay the royalty it should have paid in the first place. As explained in Sections I and IV, if the best the licensor can hope for is an eventual FRAND license after many years’ wait, then it will quite likely accept a sub-FRAND royalty today instead of exposing itself to prolonged uncertainty.

64. Note that our discussion of the hold-out issue has focused on the problematic situation in which a FRAND royalty paid with delay (and thus having a sub-FRAND present value) might be the worst-case scenario for the licensee. However, the licensor’s position might be even worse when one considers that many litigated FRAND proceedings (e.g., in the United Kingdom) involve issues of validity and infringement as well as royalties. Given that only a very small subset of patents within the SEP holders’ portfolio can be asserted in these circumstances, there is also a risk that invalidity or non-infringement of this subset of patents will itself stall the licensor’s quest for a license even though several other patents in the portfolio might still be infringed or valid (and hence a license may still be required).

Second, the relatively small size of the U.K. market for some implementers (especially some Chinese ones) means that some of these implementers may accept (or credibly threaten to accept) an injunction in the United Kingdom. By doing so, they can raise the costs of enforcement and threaten to force the licensor into country-by-country and patent-by-patent litigation. Again, this means delay, and the prospect of delay means downward pressure on the royalties that a licensor will settle for. A potential corrective for this is to link damages for infringement of U.K. patents to the hypothetical license that would have been agreed on first infringement—i.e., a license that was likely global in its scope.⁶⁵

To be sure, we are not calling for injunctive relief to be instantaneous and unqualified. The licensor's obligation to make FRAND licenses available and to engage in good-faith negotiations towards achieving such a license are also key components of the “balance” sought by ETSI. The issues we are concerned with are (1) it is difficult and perhaps arduous to obtain injunctive relief and (2) even if injunctive relief is available and obtainable, even an unwilling licensee retains its entitlement to a FRAND license.

The unqualified availability of FRAND terms negates or nullifies the threat of an injunction. In this case, the availability of an injunction may nudge the implementer towards accepting a license on FRAND terms, but unless these FRAND terms are “corrected” as discussed in the previous Section, this still makes the threat of delay an attractive strategy by which the implementer can extract lower and potentially sub-FRAND rates for itself. The injunction might be a useful lever by which to ensure that the implementer gives the licensor back its fair slice of the pie, but the slice that the licensor gets back may be significantly colder and less appetizing. As a result, the threat of delay remains a potent one for the implementer.

There are two alternatives: (1) is to attempt to correct the FRAND award for delay as discussed above; or (2) the second is to strip a licensee that has

65. For an overview of the issues around fragmented global enforcement, see Kalyan Dasgupta & David J. Teece, *The U.K.'s Role as a Venue for FRAND Litigation: Have the UK Courts Gone Far Enough?*, COMPETITION POL'Y INT'L (Dec. 21, 2020), https://www.pymnts.com/cpi_posts/the-uks-role-as-a-venue-for-frand-litigation-have-the-u-k-courts-gone-far-enough/. The authors propose that the correct approach to damages assessment—whose intention is to restore the parties to the position that they would have been in “but for” infringement—would involve looking at the hypothetical negotiation that might have transpired at first infringement. *Id.* In the first instance, we would expect such a negotiation to involve a global FRAND license, but if the implementer insisted on a license to just the U.K. patents, the SEP holder (having fulfilled its obligation to ETSI to make a FRAND license available) would be free to negotiate for a commercial license to the SEPs, unconstrained by FRAND.

been found unwilling of its entitlement to a FRAND license or to at least curtail or qualify the availability of this right. In this latter case, once a licensee has been found unwilling it must negotiate a license that is no longer subject to court intervention and no longer subject to FRAND. Doing so may allow a licensor to account for the broad economic costs to itself from a licensee's unwillingness. These costs are greater than the results of a mechanical "cost of delay" correction based on applying interest factors as discussed above and could account for broader harm to a licensor's licensing programme.

Further, the very bluntness of the alternatives available to the licensee in this situation make it a high-powered and likely effective solution to the problem of hold-out. The implementer knows that if it does not make FRAND counteroffers and negotiate in timely fashion, it risks losing the protection of FRAND and/or facing an injunction. FRAND royalties—even ones set at the top of the FRAND range—no longer serve as a bound for the implementer's worst-case scenario. The availability of this high-powered solution would serve as a powerful corrective to the incentives towards hold-out that are built into the licensing marketplace and ensure that negotiated outcomes are much more likely to be within the FRAND range than might be the case today.

If such a corrective qualification came from ETSI, rather than via courts, or via agencies such as the European Commission, it might also address the problem of fragmented global enforcement, and divergent paths taken by different countries. This may be particularly salient in light of the growing clashes over which courts have jurisdiction to adjudicate global FRAND terms. The problem is especially acute because Chinese implementers might strongly favor Chinese jurisdiction, whereas European and U.S. implementers might favor the opposite.⁶⁶ If the rules of the game indicated that efforts to avoid taking a FRAND license when offered would jeopardize the availability of FRAND in the future, this might prevent the type of situation that has arisen in the United Kingdom where implementers have either chosen to take an injunction in the United Kingdom or have threatened to do so, in an effort to lengthen or complicate the enforcement process for the SEP holder. In this case, refusing a FRAND license determination in the United Kingdom (for example) would leave open the possibility of a damages proceeding in the United Kingdom, but one that was not bound by the FRAND constraint. In

66. In the case of licensing in China, the European Union has recently instituted a suit at the World Trade Organization (WTO) alleging that China follows a conscious policy of suppressing royalty rates for cellular SEPs—for example, through the use of "anti-suit injunctions" that prevent SEP holders from going to non-Chinese courts to enforce their patents.

this case, SEP holders may be able to get damages based on simulating the outcome of a hypothetical negotiation in which the implementer had turned down a FRAND global license and the parties were negotiating over the terms of a U.K. license where the rate would not be bound by FRAND.

We do not think that these alternatives will substantially elevate the risk of injunction-driven *hold-up* by SEP holders. The SEP holder's offers and conduct will still be under scrutiny before injunctive relief is awarded or before any relaxation of the FRAND requirement is granted. The bar for obtaining injunctions and for findings of unwillingness will remain high. But by significantly unbounding the worst-case option for the implementer, our proposals offer a strong and potentially complete corrective of the current incentives to deploy hold-out strategies.⁶⁷

We appreciate that these proposals in relation to limiting the scope of the FRAND commitment might seem radical to some and might push courts into territory that seems controversial. After all, while there is nothing explicit in the ETSI IPR policy that suggests that the FRAND commitment applies regardless of the licensee's willingness, there is also no explicit provision that limits its application in the case of an unwilling licensee. To the extent that above-FRAND awards might contain a punitive or deterrent element, they may be seen as legally very difficult to justify.⁶⁸ It would be wrong, however, to see our proposals as punitive in nature—rather they are restorative in nature, as their goal is simply to correct or minimize the impact of the perverse incentives created by the “after the bird has flown” nature of SEP license negotiations today.

Finally, these proposals in relation to injunctive relief and limitations on the availability of FRAND can be deployed in conjunction with the other solutions mentioned above. For example, clear indications that an unwilling or litigious licensee is not entitled to the “best” or most favorable FRAND rate, and that the economic costs of delay can be accounted for in awarding a FRAND license, may themselves provide appreciable correctives to conduct

67. For pure-play licensors, who do not have downstream operations, injunctions are by themselves of little interest. The analysis in this Article focuses on correcting an asymmetry in bargaining power between SEP holders and implementers with injunctions or eventual limitations on the availability of FRAND licenses being a tool for doing so. There is a risk that once a vertically-integrated SEP holder has secured an injunction, it will not want to negotiate a license with an un-integrated downstream rival at all. Such exclusion concerns, as well as any concerns about raising rivals' costs, can be addressed by competition and antitrust law, on a case-by-case basis.

68. For example, in the United Kingdom, we understand that punitive or exemplary damages are rarely available, although deliberate or misleading conduct by the implementer to avoid taking a license might conceivably qualify.

witnessed in the marketplace today. These can be the options of “first resort.” However, the corrective effect can be made even more substantial by reserving the possibilities of injunctions and (as a last resort) of post-injunction limitations on the availability of FRAND.

VI. CONCLUSIONS

From the perspective of economic and legal scholarship, the hold-out problem deserves more attention. Given the confidential nature of license negotiations and license agreements, it is difficult to fully convey the extent of the problem with public domain information and to demonstrate just how much unwarranted bargaining power implementers can enjoy enabled by the law. In this context, courts that have access to confidential licensing materials should not accept theories of FRAND that assume that its only purpose is to prevent hold-up or provide protection against the bargaining power of SEP holders. They should instead use the opportunity to scrutinize whether the licensing history and conduct of the parties before it supports such theories, or whether it instead suggests quite the opposite.

Restoring “balance” requires recognizing the non-self-enforcing nature of patent rights. The most effective corrective action that can be taken with respect to the hold-out problem is the strengthening of possibilities for injunctive relief. However, there are other ways too in which hold-out can be made significantly less attractive to implementers. The distinction between willing and unwilling licensees is particularly important to appreciate in this context. While ideally the unwilling licensee should not benefit from FRAND—as it has not accepted the burden of taking a FRAND license in return for the benefit of being offered one—at a minimum it should not get anything like the “best FRAND rate.” Creating even this wedge between unwilling licensees and the rest will at least serve to partially restore the balance that is very much at the heart of ETSI’s IPR policy.

There are broader public policy issues related to standardization that this Article does not address. Chinese-based implementers seem to benefit from lower royalty rates which have never been robustly linked to a lower value of the technology to these implementers. Chinese implementers’ bargaining power may be linked to perceived difficulties in asserting SEPs against these implementers, especially in their home market. The European Union has recently taken issue with aspects of this at the WTO level. Beyond this, there are competing industrial policy goals and even national security issues associated with standards and whether any one company or country should have dominion over them. The public policy discussion of standards-related issues may thus have a much broader aperture than the FRAND-focused-

approach of this Article, but a rigorous analysis of the relative merits of hold-up and hold-out theory, and how this should affect the immediate issue of determining FRAND royalties and preventing an imbalance in the licensing marketplace, should still be of significant value. We have tried conducting such an analysis and highlighting some steps that can correct a growing imbalance in the relative bargaining power of SEP holders and implementers.

HOW WEAK ARE STRONG PATENTS: PATENT HOLDOUT AND SMALL(ER) TECHNOLOGY FIRMS

Bowman Heiden[†] and Matthew Rappaport^{††}

ABSTRACT

Most of the academic and policy attention in the past two decades has been focused on patent holdup theory that posits how weak patents asserted under the threat of injunctive relief can extract greater value than their true worth. This is peculiar given that the *eBay* ruling in 2006, and its subsequent interpretation by the courts, has greatly reduced the opportunity for injunctive relief in the United States. This Article presents a study that instead investigates the symmetrical theory of patent holdout whereby strong patents asserted in a regime of weak injunctive relief are only able to extract value below their true worth. The focus of the study is on small(er) technology firms (STFs), which are generally understood as critical to economic growth, in contention with much larger incumbent market actors.

The Article's study finds that because there are no patent police, the high cost and long timeframes of U.S. litigation combined with the subjective nature of patentability and infringement create an intrinsic patent holdout bias in the U.S. patent system, especially for STFs, as the burden of enforcement falls on the patent holder. In addition, this intrinsic bias is exacerbated by recent extrinsic judicial and legislative changes that reduce access to injunctive relief and increase opportunities for invalidity, which has created a systematic incentive for patent holdout beyond circumstantial bad-faith behavior by individual actors.

Preliminary statistical results show that: (1) both operating companies (OPCOs) and non-practicing entities (NPEs) litigate as a means to settle licensing-based infringement disputes; (2) very few small firms in the past ten years have received court-awarded damages, and fewer have ever received an actual payment; (3) the time in litigation ranged from 30 to 98 months, with most still ongoing; and (4) several \$100M+ cases were vacated after years of litigation over legal technicalities that could have been known at the outset. This implies that the more ways a patent holder can potentially lose, the more incentive for patent holdout.

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In addition, two case studies were conducted, *Sonos v. Google* and *Centripetal v Cisco*. The results described in this Article show that: (1) both *Sonos* and *Centripetal* provide evidence of systematic patent holdout that incentivizes litigation over settlement; (2) the court in the *Centripetal* case also cited bad-faith behavior leading to enhanced damages for willful infringement; (3) both STF and large companies are willing to use the Patent Trial and Appeal Board (PTAB) in litigation (e.g. *Sonos* as well as *Google* and *Cisco* filed IPRs); (4) the result of the appeal of *Sonos's* preliminary win at the International Trade Commission (ITC) will provide evidence on whether extra-judicial orders can facilitate settlements in place of traditional court injunctions; and (5) the enhanced damages award in the *Centripetal* case raises the question as to whether the use of willful infringement can provide adequate remedies in equity for a patent holder and disincentivize patent holdout *ex ante*.

The study also develops an enhanced theoretical framework for patent holdout in the STF context. Further empirical research is required to better measure the systematic scale and systemic economic impact of patent holdout for STFs, especially given that much of the evidence of systemic patent holdout will manifest in STFs unable to litigate, accepting forced settlements, or failing to receive venture capital (VC) investment.

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I. THE WEAKENING OF THE U.S. PATENT SYSTEM AND THE IMPACT ON SMALL(ER) TECHNOLOGY FIRMS (STFS)

From 10,000 feet, the patent system appears to be an elegantly designed institutional marvel that facilitates innovation by balancing ownership and access through a time-limited property right. However, on the ground, especially when conflict arises, it is a complex system of trench warfare—expensive, lengthy, and unpredictable, which can be an invitation for bad-faith behavior by both patent holders and infringers. In parallel, the jurisprudence of patent enforcement continues to oscillate over time between states of relative strength and weakness. Thus, it could be said that the patent system faces challenges both intrinsic and extrinsic in nature:

- Intrinsic challenges—fundamental difficulties inherent in the nature of a technology-based property right system, including¹:
 - The cost of judicial action
 - The length of time of adjudication
 - The subjective nature of patentability and infringement
- Extrinsic challenges—the evolution of technology as well as patent jurisprudence, legislation, and political appointments that can impact the

1. The cost and timeframe of patent litigation is different in other countries (e.g., Germany and China), but are treated as fundamental feature of the U.S. legal system in the context of this Article.

efficacy of existing and future R&D investments and patents, including²:

- Changes to patentability criteria, such as eligibility and non-obviousness
- Changes to equitable remedies, such as injunctions, damages, and declaratory judgment availability
- Changes to administrative procedures at the USPTO or district courts
- Technological change and convergence

In addition, these challenges can be exacerbated by globalization as patent system norms differ across countries and regions with their own intrinsic and extrinsic challenges as well as potential geopolitical strategies. All-in-all, an effective patent system needs to manage equity in the face of growing actor heterogeneity and technology and political change.

However, the patent system has historically fluctuated between eras of strength and weakness. In recent years, starting at the beginning of this century, the pendulum began to swing again toward a weaker patent regime, departing from the formerly pro-patent era that began in the early 1980s with the establishment of the Court of Appeals for the Federal Circuit (CAFC). This swing, starting roughly with the *eBay* decision in 2006, was primarily prompted by the rise in litigation by non-practicing entities (NPEs), who could sue operating companies (OPCOs) for patent infringement without the risk of counter-assertion. This patent-based business model launched the narrative of the “patent troll,” characterized as wielding low-quality patents in an overly patent-friendly legal environment to extract unfair settlements from innocent OPCOs. While bad-faith actors existed, the patent troll narrative painted the entire patent licensing ecosystem with a pejorative brush. As political support mounted, the rhetoric changed from patents as a tool to incentivize innovation to patents as a thicket to block innovation.

Starting with the *eBay* decision in 2006, both the U.S. Supreme Court and Congress have generated opinions and legislation that, in aggregate, have weakened the patent system by:

- Reducing the scope of patentable subject matter (e.g. *Mayo*, *Bilski*, *Alice*, *Myriad*)³

2. For example, the *Alice* case on patent eligibility of software-related patents not only impacted future R&D and patenting decisions, but also previous decisions that were made in good-faith in a pre-*Alice* world. See *Alice Corp. Pty. Ltd. v. CLS Bank Int'l*, 573 U.S. 208 (2014).

3. *Mayo Collaborative Servs. v. Prometheus Lab's, Inc.*, 566 U.S. 66, 67–69(2012); *Bilski v. Kappos*, 561 U.S. 593, 593–96 (2010); *Alice Corp. Pty. Ltd. v. CLS Bank Int'l*, 573

- Increasing the ease and opportunity to invalidate patents (e.g. *KSR*, *AIA/PTAB*, *Nautilus*)⁴
- Reducing the availability of injunctive relief (e.g. *eBay*)⁵
- Reducing the availability of venue choice (e.g. *TC Heartland*)⁶
- Increasing the ease to bring declaratory judgment actions by those accused of infringement (e.g. *Medimmune*)⁷

Table 1.1 below provides an overview of several key judicial and legislative changes to the U.S. patent system in the past two decades with empirical evidence of the impact to the patent system.

Table 1.1: Summary of key judicial and legislative changes impacting the patent system from 2006.

| Precedent | Date | Subject matter | Impact on patent system |
|--------------------------|------|------------------------|--|
| <i>eBay</i> ⁸ | 2006 | Injunctive relief | Reduced injunctive relief as a remedy ⁹ : Total injunction rate reduction: From 95% to 72.5% Patent assertion entity (PAE) injunction rate reduction: From 95% to 16% |
| <i>KSR</i> ¹⁰ | 2007 | Validity (Obviousness) | Greater invalidation by obviousness ¹¹ : CAFC invalidation: From 40% to 57.4% District court invalidation: From 6.3% to 40.8% |

U.S. 208, 212–14 (2014); *Ass’n for Molecular Pathology v. Myriad Genetics, Inc.*, 569 U.S. 576, 578 (2013).

4. *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 400–404 (2007); Leahy-Smith America Invents Act, Pub. L. 112-29, 125 Stat. 284-853, at 313–15(2011); *Nautilus, Inc. v. Biosig Instruments, Inc.*, 572 U.S. 898, 899–900 (2014).

5. *eBay Inc. v. MercExchange, L.L.C.*, 547 U.S. 388, 388 (2006).

6. *TC Heartland L.L.C. v. Kraft Foods Group Brands L.L.C.*, 581 U.S. 258, 262 (2017).

7. *MedImmune, Inc. v. Genentech, Inc.*, 549 U.S. 118, 118–19 (2007).

8. *eBay Inc. v. MercExchange, L.L.C.*, 547 U.S. 388 (2006).

9. Christopher B. Seaman, *Permanent Injunctions in Patent Litigation After eBay: An Empirical Study*, 101 IOWA L. REV. 1949, 1983–88 (2016).

10. *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398 (2007).

11. Ali Mojibi, *An Empirical Study of the Effect of KSR v. Teleflex on the Federal Circuit’s Patent Validity Jurisprudence*, 20 ALB. L.J. SCI. & TECH. 559, 581–84 (2010).

| | | | |
|-----------------------------------|------|---------------------------|--|
| AIA ¹² | 2011 | Validity | Increased invalidation at USPTO ¹³ : PTAB challenged claims: 20,247 claims (2019) PTAB invalidated claims: 25% (2019) |
| <i>Alice</i> ¹⁴ | 2014 | Validity (Eligibility) | Reduced patent applications at USPTO and increased Federal Circuit invalidation rate: USPTO application reduction: 29.6% ¹⁵ CAFC § 101 invalidations: 78.8% ¹⁶ |
| <i>TC Heartland</i> ¹⁷ | 2017 | Venue | Shifted venue choice from plaintiffs to defendant's jurisdiction. |

However, not all judicial rulings during this period have negatively impacted patent holders. The CAFC's ruling in *Berkheimer* may reduce early invalidation orders based on eligibility, the *Microsoft* case affirmed that invalidity must be proven by clear and convincing evidence, and the *Halo Electronics* case lowered the barrier for enacting enhanced damages for willful infringement.¹⁸ Some rulings also have differentiated impacts on specific industries (e.g., *Alice* on IT, *Mayo* on medical diagnostics, *Bowman* on agricultural biotech, and *Myriad* on genetics). Furthermore, a more detailed investigation is necessary to better

12. Leahy-Smith America Invents Act, Pub. L. 112-29, 125 Stat. 284-853 (2011).

13. USPTO, BOARDSIDE CHAT: NEW DEVELOPMENTS (2020), https://www.uspto.gov/sites/default/files/documents/PTAB_boardside_chat_new_trial_stats_sas_and_operational_faqs_06_11_2020.pdf.

14. *Alice Corp. Pty. Ltd. v. CLS Bank Int'l*, 573 U.S. 208 (2014).

15. Jay P. Kesan & Runhua Wang, *Eligible Subject Matter at the Patent Office: An Empirical Study of the Influence of Alice on Patent Examiners and Patent Applicants*, 105 MINN. L. REV. 527, 563 (2020).

16. See C. Graham Gerst & Paul Choi, *Lessons From a Quantitative Analysis of the Federal Circuit's Section 101 Decisions Since Alice*, IP WATCHDOG (Sept. 2, 2020), <https://ipwatchdog.com/2020/09/02/lessons-quantitative-analysis-federal-circuits-section-101-decisions-since-alice/id=124790/>; see also Mark A. Lemley & Samantha Zyontz, *Does Alice Target Patent Trolls?*, 18 J. EMPIRICAL LEGAL STUD. 47, 63 (2021) (finding a 63.1% invalidation rate in U.S. federal court).

17. *TC Heartland L.L.C. v. Kraft Foods Group Brands L.L.C.*, 581 U.S. 258 (2017).

18. See Michael Cicero, *Piercing Halo's Haze at Year Five: Smoke Clearing on Enhanced Damages*, IP WATCHDOG (June 13, 2021), <https://ipwatchdog.com/2021/06/13/piercing-halos-haze-year-five-smoke-clearing-enhanced-damages/id=134534/> for preliminary evidence of an increase in enhanced damage awards post-*Halo*.

understand the likely varied impact of the current patent system across the heterogeneous actors that use the patent system.

Figure 1.1: Overview of U.S. patent litigation activity from 2005–2020.¹⁹

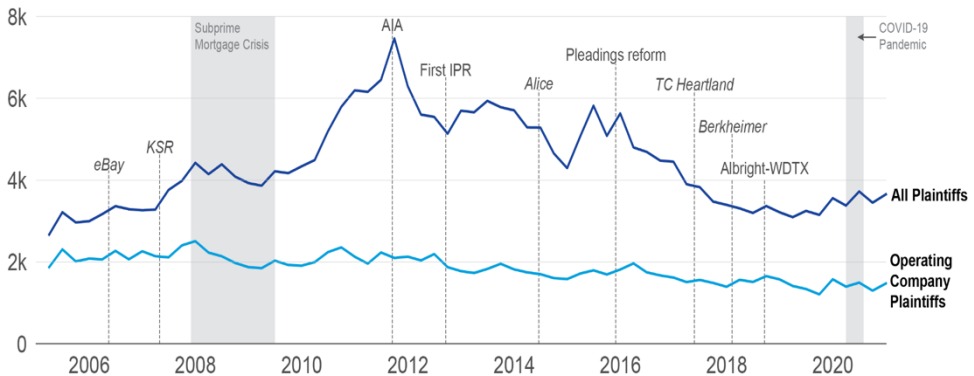


Figure 1.1 above provides an overview of patent litigation activity in the United States from 2005–2020, annotated with key judicial and legislative events that have impacted the patent system over that period.²⁰ In the aggregate, OPCO-initiated litigation is rather flat, with a small overall decline, while NPE-initiated litigation has both risen and fallen during the period. However, digging deeper into the litigation details reveals two insights that are important for this study²¹:

1. 70–80% of the NPE litigation involved patents from OPCOs, which means that between 82–92% of all the litigation in the period involved technology developed by OPCOs.
2. The growth of litigation finance to support high-quality patent portfolios.

One of the most important constituents of the patent system is the small(er) technology firm (STF) that often relies on patent protection as an important tool to compete against larger incumbent actors that can have much greater market power.²² While the patent system is a means to democratize

19. *What 15 Years of US Patent Litigation Data Reveal About the IP Market*, RPX INSIGHTS (Jan. 25, 2021), <https://insight.rpxcorp.com/news/65081-what-15-years-of-us-patent-litigation-data-reveal-about-the-ip-market>.

20. *See id.*

21. *See id.*

22. *See* JONATHAN M. BARNETT, *INNOVATORS, FIRMS, AND MARKETS: THE ORGANIZATIONAL LOGIC OF INTELLECTUAL PROPERTY* (2020). Elon Musk’s statement that “patents are for the weak” is one key reason why they are important and necessary for many small technology firms in competition with larger established actors. *See* Nicolas Vega, *Elon Musk Says ‘Patents Are for the Weak’ As He Talks Starship Rocket, Tours SpaceX Starbase With Jay*

invention and facilitate innovation, the high cost and inherent delay in the U.S. court system discussed above is a deterrent to efficient enforcement, especially for smaller actors lacking both time and money. A patent system that does not provide for adequate enforcement for actors with valid patents in a timely manner is not economically effective in its primary objective to facilitate investment in innovation. While efficient enforcement is important for all actors, it is existential for STFs to attract financing, enter markets, and deliver innovation and economic growth to society.²³ In addition, STFs are also likely to face greater challenges from an uncertain property rights system as they are less able to participate in policy development and control their intellectual property through other means, especially in relation to companies with much greater resources.

One could argue that the patent system's intrinsic challenges mentioned above, such as high costs and long timeframes of uncertainty over key assets, already place a very high burden on STFs to compete. Unfortunately for STFs who rely on patents, the legislative and judicial changes of this new patent era have further weakened the entire patent system for all actors, not only bad-faith actors. The question now is whether the attempt to reduce the strength of weak patents in the hands of PAEs has concomitantly lowered the strength of the entire patent system, making it effectively impossible for small(er) firms to enforce strong patents. To mix metaphors, have we thrown the golden goose out with the bath water?

Building on previous research on patent holdout in the context of standard essential patents (SEPs), the focus of this Article's study explores the nature and potential economic impact of patent holdout on STFs.²⁴ The Article is divided into six Parts, including: Part I, this introduction to the weakening of the U.S. patent system and the impact on small(er) technology firms (STFs); Part II, a presentation of several foundational elements of patent holdout theory; Part III, a description of the empirical scope of analysis; Part IV, the *Somos*

Leno, CNBC (Sept. 21, 2022), <https://www.cnbc.com/2022/09/21/why-clon-musk-says-patents-are-for-the-weak.html>.

23. Previous research has shown that larger firms can rely on other sources of market power beyond patents to maintain competitive advantage. *See, e.g.*, BARNETT, *supra* note 22; Welsey M. Cohen, Richard R. Nelson & John P. Walsh, *Protecting Their Intellectual Assets: Appropriability Conditions and Why U.S. Manufacturing Firms Patent (or not)*, (Nat'l Bureau of Econ. Rsch., Working Paper No. 7552, 2000).

24. *See generally* Bowman Heiden & Nicolas Petit, *Patent Trespass and the Royalty Gap: Exploring the Nature and Impact of Patent Holdout*, 34 SANTA CLARA HIGH TECH. L. J. 179 (2017) (describing patent holdout in the context of standard essential patents in the information and communication technology (ICT) sector).

and *Centripetal* case studies; Part V, the development of a theory of patent hold-out in the STF context; and finally Part VI, a conclusion.

II. PATENT HOLDOUT THEORY

A. PENDULUM SHIFT FROM PATENT HOLDUP TO HOLDOUT

The concepts of opportunism and holdup have their origin in the study of transaction cost economics associated with contracting versus vertical integration.²⁵ Klein, Crawford, and Alchian describe opportunism (and holdup) as a case of appropriable quasi-rents to contracted specific assets, where opportunism can take place in either direction (i.e., the buyer or the seller).²⁶ The concept of opportunism not only implies transactional issues of rent shifting of producer surplus among market actors but also systemic issues of economic inefficiency that raise antitrust concerns.

The development of patent holdup theory evolved out of the anticommons and patent thicket literature in the late 1990s,²⁷ growing into its own theory in the mid-2000s,²⁸ with the latter only loosely associated with the

25. See generally R.H. Coase, *The Nature of the Firm*, 4 *ECONOMICA* 386 (1937) (building a transaction cost economic theory to explain the fundamental reasons for the organization of activities within a firm as opposed to contractual market transactions); Oliver Williamson, *The Vertical Integration of Production: Market Failure Considerations*, 61 *AM. ECON. REV.* 112 (1971) (describing the link between hold-up opportunities and relationship-specific assets).

26. See generally Benjamin Klein, Robert G. Crawford & Armen A. Alchian, *Vertical Integration, Appropriable Rents, and the Competitive Contracting Process*, 21 *J. L. & ECON.* 297 (1978).

27. See generally Michael A. Heller, *The Tragedy of the Anticommons: Property in the Transition from Marx to Markets*, 111 *HARV. L. REV.* 621 (1998) (describing the tragedy of anticommons as a situation when too many rights owners lead to the underuse of a resource); Michael A. Heller & Rebecca S. Eisenberg, *Can Patents Deter Innovation? The Anticommons in Biomedical Research*, 280 *SCI.* 698 (1998) (suggesting that the proliferation of intellectual property rights in biomedical research may lead to fewer useful products for improving human health); Carl Shapiro, *Navigating the Patent Thicket: Cross Licenses, Patent Pools, and Standard-Setting*, 1 *INNOVATION POLICY & ECON.* 119 (Adam B. Jaffe, Josh Lerner & Scott Stern eds., 2001) (describing collective market mechanism to overcome the anticommons problem associated as patent thickets in the ICT sector).

28. Compare Mark A. Lemley & Carl Shapiro, *Patent Holdup and Royalty Stacking*, 85 *TEX. L. REV.* 1991 (2007) (first to define the concept of “patent holdup”), and Joseph Farrell, John Hayes, Carl Shapiro & Theresa Sullivan, *Standard setting, patents, and hold-up*, 74 *ANTITRUST L. J.* 603 (2007) (further extending the concept of “patent holdup” to the context of technology standards), with Alexander Galetovic & Stephen Haber, *The Fallacies of Patent-Holdup Theory*, 13 *J. COMPETITION L & ECON.* 1 (2017) (questioning the theoretical foundation of “patent holdup”), and Bowman Heiden & Nicolas Petit, *Patent trespass and the royalty gap: Exploring the nature and impact of patent holdout*, 34 *SANTA CLARA HIGH TECH. L. J.* 179 (2017) (showing the incongruence of “patent holdup” in relation to both hold-up and hold-out in mainstream economic theory).

received economic theory on holdup and opportunism described above.²⁹ The seminal paper on patent holdup theory by Lemley and Shapiro in 2007 links the potential for patent holdup to the availability of injunctive relief, stating “the threat of an injunction can enable a patent holder to negotiate royalties far in excess of the patent holder’s true economic contribution.”³⁰ The logic of their economic model is built on the business model of patent assertion entities (PAEs), which they define as “patent trolls” in their paper.³¹ A typical PAE is characterized in their model as a patent owner with minor or weak patents covering one feature of a multi-technology product that is seeking an injunction against the infringing producer.

Several authors have challenged the theoretical model and highlighted the lack of empirical evidence of patent holdup.³² The extrapolation of patent holdup theory from the context of PAEs to the open innovation ecosystem of standard essential patents (SEPs) has also drawn significant scrutiny.³³ To date, the authors are not aware of any study that empirically shows the existence of patent holdup in the market beyond the anecdotal case. Interestingly, the main component of patent holdup theory, injunctive relief, was largely curtailed in the United States in the *eBay* case in 2006—the year before the formal publication of the paper by Lemley and Shapiro.³⁴

Given that injunctive relief is a major pillar of remedies in equity for any property right system, the *eBay* ruling and its subsequent application by the courts introduced a major systemic change to patent enforcement. In effect, the decision altered the patent system from a property-based to a liability-based

29. Galetovic & Haber, *supra* note 28, at 11–12; Heiden & Petit, *supra* note 28, at 191–209.

30. Lemley & Shapiro, *supra* note 28, at 1993.

31. *Id.* at 2008. It should be noted that there is no requirement in Article 1, Section 8 of the U.S. Constitution requiring the owner of a U.S. patent to make, use, or sell the patented invention.

32. See Einer Elhauge, *Do Patent Holdup and Royalty Stacking Lead to Systematically Excessive Royalties?*, 4 J. COMPETITION L. & ECON. 535 (2008) (questioning the conclusion that patent remedies result in systematically excessive royalties due to patent holdup and royalty stacking problems); J. 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 (2007) (showing the results of the patent holdup and royalty stacking theory are unsupported as it does not take into account the potential loss to dynamic efficiency); Alexander Galetovic, Stephen Haber & Ross Levine, *An Empirical Examination of Patent Holdup*, 11 J. COMPETITION L. & ECON. 549 (2015); Galetovic & Haber, *supra* note 28 (providing empirical evidence that disputes the predictions of patent holdup).

33. See, e.g., Damien Geradin and Miguel Rato (2007), *Can Standard-Setting Lead to Exploitative Abuse? A Dissonant View on Patent Hold-Up, Royalty Stacking and the Meaning of FRAND*, 3 EUR. COMPETITION J. 101 (2007); Heiden & Petit, *supra* note 28.

34. *eBay Inc. v. MercExchange, L.L.C.*, 547 U.S. 388 (2006).

entitlement system. This decision, combined with numerous other decisions described in Table 1.1 above, effectively ended the pro-patent era that started in the early 1980s and swung the pendulum from concerns over the strength of the patent system to concerns over its weakness.

This weakening of patent enforcement ushered in theories of patent holdout, built symmetrically but oppositely to the contentions of patent holdup theory.³⁵ In general, patent holdout is described as the opportunistic delay or refusal to take a license by a producing firm that is infringing on another's patent(s).³⁶ Epstein and Noroozi provide greater specificity in defining patent holdout as the case when

an implementer refuses to negotiate in good faith with an innovator for a license to valid patent(s) that the implementer infringes, and instead forces the innovator to either undertake significant litigation costs and time delays to extract a licensing payment through a court order, or else to simply drop the matter because the licensing game is no longer worth the candle.³⁷

Others have described this practice as reverse patent holdup,³⁸ patent trespass,³⁹ and efficient infringement.⁴⁰

B. PATENT HOLDOUT—BAD FAITH, RATIONAL BEHAVIOR, OR BOTH

Bad faith is both a legal and political concept in that bad-faith behavior has both historical statutory implications as well as future policy consequences that can impact new legislation and renewed interpretation of existing statutes. As described in Part I, the “patent troll” narrative as a bad-faith PAE spurred the creation of patent holdup theory and laid the foundation for much of the judicial and legislative decisions of the past two decades. Even numerous states

35. The authors acknowledge that patent holdup and holdout are not perfectly symmetrical given their different treatment in patent, contract, and antitrust law. This is beyond the scope of this Article.

36. See Anne Layne-Farrar, *Why Patent Holdout Is Not Just a Fancy Name for Plain Old Patent Infringement*, COMPETITION POL'Y INT'L N. AMERICA COLUMN 2, 3 (2016); Richard A. Epstein & Kayvan B. Noroozi, *Why Incentives for 'Patent Holdout' Threaten to Dismantle FRAND, and Why It Matters*, 32 BERKELEY TECH. L.J. 1381, 1384 (2017); Heiden & Petit, *supra* note 28, at 182.

37. Epstein & Noroozi, *supra* note 36, at 1384.

38. Damien Geradin, *Reverse Hold-Ups: The (Often Ignored) Risks Faced by Innovators in Standardized Areas*, SWEDISH COMPETITION AUTH. (Nov. 12, 2010), <http://dx.doi.org/10.2139/ssrn.1711744>.

39. Heiden & Petit, *supra* note 28, at 182.

40. David Kappos, Richard Ludwin & Marc Ehrlich, *From efficient licensing to efficient infringement*, N.Y.L.J. (Apr. 4, 2016).

have passed laws in an attempt to curtail the “bad faith assertion of patent infringement.”⁴¹

The focus of the bad-faith patent troll narrative can be premised on three foundational claims:

1. The illegitimacy of their granted patent rights—based on the conjecture that the asserted patents are either minor, weak, or invalid.
2. The use of deception against weaker parties—by using their information asymmetry and advantaged litigation position.
3. The demand for unreasonably high royalty payments in an unreasonably short time period—leveraging the cost and time aspects of litigation to generate a superior bargaining position.

Certainly, beyond any potential bad-faith behavior, the first claim is a swipe at patent eligibility and capabilities of the U.S. Patent and Trademark Office (USPTO), while the second and third claims are a consequence of the complexity and cost of the U.S. legal system (i.e., intrinsic challenges). While much of the patent troll narrative is publicly focused on the harm to small, mom-and-pop companies, the greatest value of limiting patent assertion is gained by large technology firms. Ironically, the weakening of the patent system based on the troll narrative benefited the same operating companies that were responsible for supplying 70–80% of all patents litigated by PAEs as described in Part I.

However, the goal here is not to investigate the validity or propriety of these claims, but instead, to build a symmetric model of patent holdout based on the current patent system that has resulted from the belief in these claims. Therefore, if the claims of bad-faith PAEs above were legitimate enough to foster patent reform, then the following symmetric claims—and questions—by current patent holders also merit consideration and investigation in the current liability-based patent system⁴²:

1. *The legitimacy of granted patent rights.*

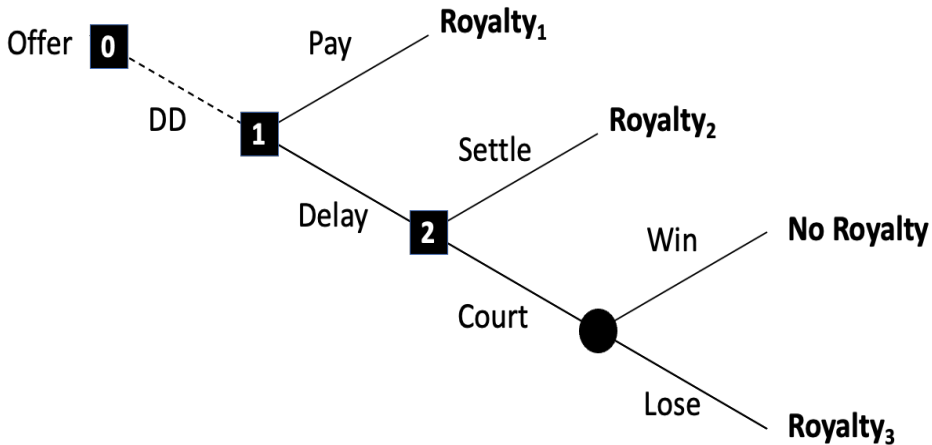
41. Jason E. Stach & C. Brandon Rash, *States Take on Bad-Faith Patent Assertion*, FINNEGAN (Sept. / Oct. 2014) (quoting VT. STAT. ANN. tit. 9 § 4197), <https://www.finnegan.com/en/insights/articles/states-take-on-bad-faith-patent-assertion.html>.

42. For further research on the nature and impact of PAEs, see FEDERAL TRADE COMMISSION, PATENT ASSERTION ENTITY ACTIVITY (2016), <https://www.ftc.gov/reports/patent-assertion-entity-activity-ftc-study>, and EUROPEAN COMMISSION JOINT RESEARCH CENTRE, PATENT ASSERTION ENTITIES IN EUROPE: THEIR IMPACT ON INNOVATION AND KNOWLEDGE TRANSFER IN ICT MARKETS (Nikolaus Thumm & Garry Gibson eds., 2016), <https://publications.jrc.ec.europa.eu/repository/handle/JRC103321>.

- a. Are all patents now treated as minor, weak, or invalid (i.e. are even strong, valid patents considered weak in the current patent regime?)
 - b. Is there an incentive for alleged infringers to challenge all patents given the likelihood of success across multiple legal venues?
 - c. If so, does this implicitly suggest that only firms that can successfully litigate have valid patents?
 - d. When does the challenging of an alleged infringement become bad-faith behavior or is bad-faith behavior now institutionalized in the system?
2. *The use of market power against weaker actors.*
- a. Does the lack of injunctive relief asymmetrically benefit actors with greater market power?
 - b. Do greater financial resources create an unfair advantage with respect to patent enforcement (i.e., fundamentally alter the risk-reward balance of the system in favor of the firm with more money and market power)?
 - c. When does the use of a superior market power position constitute bad-faith behavior or is bad-faith behavior now institutionalized in the system in the form of “rational” infringement?
3. *The lack of reasonable royalty payments in a reasonable period of time.*
- d. Do the high costs and long timeframes of litigation implicitly indemnify infringers from liability up to the level of transaction costs?
 - e. Are there sufficient remedies in equity for the patent holder to receive reasonable economic value?
 - f. Are there sufficient penalties and costs for alleged infringers to avoid unnecessary delay and litigation?
 - g. When does the delay of payment for an alleged infringement become bad-faith behavior or is bad-faith behavior now institutionalized in the system through its inherent complexity, cost, and lack of timeliness?

One key recurring theme in patent holdout is whether the strategic use of the intrinsic challenges of the patent system (see Part I) represents bad-faith behavior or simply rational decision-making in the face of risk and uncertainty. In other words, is there a point where the patent system is so weak that holdout is built into the system? Figure 2.1 below provides a simple patent holdout decision model to test the conditions where this is theoretically possible.

Figure 2.1: Patent holdout decision model.⁴³



The model depicts an initial offer (Royalty₁) at (point 0), after which a reasonable due diligence (DD) phase is initiated, followed by the decision to accept or delay (point 1). The current royalty offer is viewed in comparison with the risk-adjusted value of what the future royalty payment would be given further delay in negotiation or litigation. If delay is chosen, this strategy continues until a settlement is agreed upon (Royalty₂) or a final court decision is adjudicated (Royalty₃). When Royalty₃ ≤ Royalty₂ ≤ Royalty₁ is perceived as true, delay and litigation will be preferred over payment until the point when the certainty of the outcome (e.g., in relation to court decision) makes settlement a better financial choice than delay or delay in no longer avoidable.⁴⁴

As the U.S. patent system weakens (e.g., through a decreased opportunity for injunctive relief, increased opportunity for patent invalidation, decreased patent damages, etc.), the lower the future risk-adjusted value of patents becomes, which in turn strengthens the incentives for patent holdout. Taken to the extreme, the value of patents is zero in a system where enforcement is not

43. Adapted from Heiden & Petit, *supra* note 28, at 218.

44. It should be noted that it is not unreasonable for such a scenario to take ten or more years if the Supreme Court ultimately hears the case.

possible (i.e., everyone would hold out and refuse to pay).⁴⁵ This is due to the nature of the time value of technology being a function of both its (1) functionality and (2) exclusivity or control. Take the clear example of a patented small molecule drug. The value of the drug is the product of both the efficacy of the molecular compound and its exclusivity on the market. Once the patent lapses, the drug may continue to be efficacious, but the business value drops appreciably (e.g., over 90% depending on the number of generic competitors).⁴⁶ Below are several direct and indirect consequences of the removal of injunctive relief that significantly weakened patent enforceability and the value of patents as a whole, thus tipping the scale towards patent holdout as a rational business strategy:

- The removal of injunctive relief lowers the risk of litigation for the potentially infringing actor and disincentivizes settlement. Without injunction as a remedy, the only downside is the cost of litigation, which is also borne by the patent holder in the United States and other common law jurisdictions.
- The application of enhanced damages, which could provide a disincentive for patent holdout, has not often been successfully argued in patent litigation, historically.⁴⁷
- Given the probabilistic nature of patents, extended litigation offers many opportunities to either invalidate the patent or delay to the point where the patent holder is willing to settle for less.⁴⁸ Once the threat of injunction is reduced, all other measures that reduce validity only increase the incentive to litigate given the increased opportunity to invalidate a patent leveraged over serial legal motions, venues, and appeals (i.e., probabilistic patents are a product of different probabilities that have been reduced by recent court decisions, etc. that are reduced even further by multiple bites at the apple). Probability of validity $p = (a*b*c*d*e\dots)^N$, where N is the number of serial adjudications and a, b, c, d, e , etc. are the individual probabilities that each respective

45. The same would be true for commercial agreements if the government stopped enforcing contracts.

46. See RYAN CONRAD & RANDALL LUTTER, *GENERIC COMPETITION AND DRUG PRICES: NEW EVIDENCE LINKING GREATER GENERIC COMPETITION AND LOWER GENERIC DRUG PRICES* 3 (2019), <https://www.fda.gov/media/133509/download>.

47. See Karen E. Sandrik, *An Empirical Study: Willful Infringement & Enhanced Damages in Patent Law After Halo*, 28 MICH. TECH. L. REV. 61, 112 (2021).

48. This is true because patent validity is an institutional fact with no absolute objective measurement combined with the many ways an infringer has for invalidating a patent in the current system.

adjudication maintains the patent's validity.⁴⁹ In essence, *eBay* has a multiplier effect on other decisions as it incentivizes rolling the dice. In other words, litigation in a post-*eBay* world creates a valuable put option for the alleged infringer.

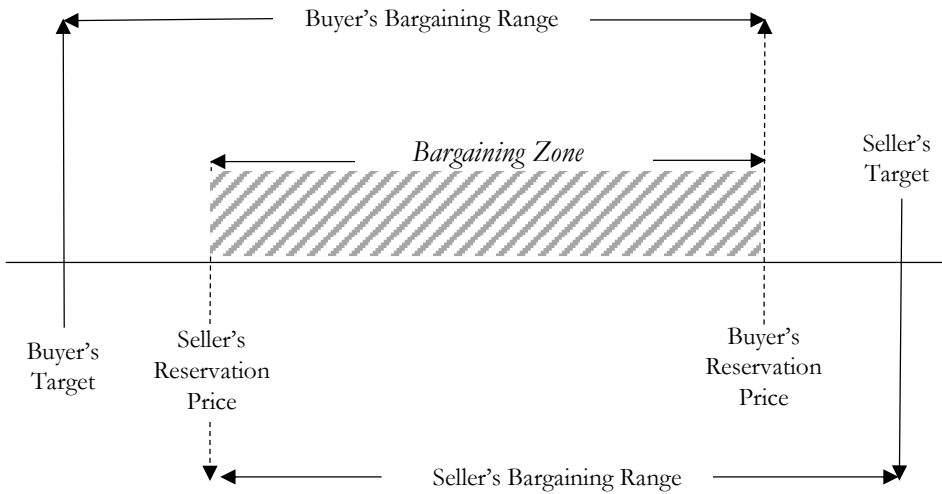
- Without injunction, the rational decision is to delay no matter whether the patent is considered strong or weak. In other words, all patents look weak without the downside risk of injunction.
- Financially, the lack of injunctive relief combined with a weakened patent system increases the discount rate on the future risk-adjusted value of potential royalty payments. This makes it more likely that $\text{Royalty}_3 \leq \text{Royalty}_2 \leq \text{Royalty}_1$ in the decision model shown in Figure 2.1.

C. THE ECONOMICS OF BARGAINING AND THE IMPACT OF PATENT HOLDOUT

The basic components of the economics of bargaining are shown in Figure 2.2 below. As is typical, the buyer's target price is much lower than the seller's target price when the price is not set by the market. There is then a bargaining zone determined by the buyer's reservation price (i.e., maximum price) and the seller's reservation price (i.e., minimum price) or the overlap of the buyer's and seller's bargaining ranges. If a settlement is reached within this bargaining zone, the surplus value for the buyer and seller is calculated as the difference between the settlement price and respective reservation prices.

49. See Matteo Sabattini, *PTAB Challenges and Innovation: A Probabilistic Approach* (Aug. 6, 2020) (working paper) at 2, <http://dx.doi.org/10.2139/ssrn.3668216>.

Figure 2.2: Simple bargaining model in an imperfect market.



In the theoretical case of patent holdup, the licensor (i.e., the seller) is hypothetically able to use its bargaining power to compel the licensee (i.e., the buyer) to accept a settlement price near or above the patent implementer’s reservation price based on the threat of injunctive relief. Symmetrically, in the theoretical case of patent holdout, the licensee (i.e., the buyer) is hypothetically able to use its bargaining power to compel the licensor (i.e., the seller) to accept a settlement price near or below the patent holder’s reservation price based on the lack of injunctive relief and the intrinsic time, cost, and uncertainty of patent litigation.⁵⁰

Figure 2.3: Patent bargaining power spectrum.⁵¹

| | | | | | |
|---|------------|----------------|--|------------|----------|
| Patent Licensor Bargaining Power (Patent Holdup) | | | Patent Licensee Bargaining Power (Patent Holdout) | | |
| Systemic | Systematic | Circumstantial | Circumstantial | Systematic | Systemic |

50. It should be noted in the context of patent holdout, injunction is not necessarily meant to block sales but to more importantly equalize buyer bargaining power to facilitate a reasonable settlement.

51. Adapted from Heiden & Petit, *supra* note 28, at 228.

As with patent holdup theory, limited empirical investigations of patent holdout have been conducted to understand the impact on society.⁵² Figure 2.3 above provides a holistic patent bargaining power spectrum creating a theoretical range of market impact from systemic patent holdup to systemic patent holdout, briefly defined below:

1. *Circumstantial effect*

A bargaining position is determined by the specific circumstances of the parties. A purely circumstantial effect produces a surplus that is evenly distributed between licensors and licensees (i.e., sellers and buyers).

2. *Systematic effect*

A pattern of settlement prices based on an institutional context in the market or policy sphere (e.g., the patent system). A systematic effect produces a surplus that favors a specific class of market actors (i.e., either licensors or licensees) predominantly.

3. *Systemic effect*

A systematic effect that significantly reduces economic welfare through either a loss in static or dynamic efficiency. A systemic effect would likely entail systematic settlement pricing beyond the reservation price level could enhance the surplus of certain actors at the expense of aggregate economic welfare both in the short and long term.

The importance of this framework is to discipline the economic analysis toward societal impact instead of a rhetorical battle of anecdotal (i.e., circumstantial) stories as a foundation for evidence-based policy formation. The goal of this Article's study is to investigate potential cases of circumstantial patent holdout from which to build a framework to test for evidence of both a broader systematic and systemic impact.

III. DEFINING THE EMPIRICAL SCOPE OF ANALYSIS

The focus of this Article's study is on developing a better qualitative understanding of the nature of patent holdout in the context of STFs from which to further investigate the systemic level of economic impact from a broader quantitative approach. To achieve this study's goal, two in-depth case studies

52. In the context of FRAND, see Heiden & Petit, *supra* note 28, for a survey-based quantitative investigation; and Brian J. Love & Christian Helmers, *Patent Hold-Out and Licensing Frictions: Evidence from Litigation of Standard Essential Patents*, INT'L J. OF INDUS. ORG. (2023) (studying pre- and in-litigation hold-out using data from U.S. patent cases filed from 2010 to 2019).

were chosen based on their relevance and availability of public information. Below is a discussion on the overall perimeter required to investigate patent holdout in STFs, a list of potential case study candidates, and the two chosen case studies.

A. THE STF EMPIRICAL SCOPE OF ANALYSIS

Figure 3.1 below provides a graphical characterization of the overall pool of market actors that seek to license or otherwise monetize their patented technology, which could experience patent holdout. There are two key dimensions: (1) the origin of the intellectual property (IP) and (2) the organization type. The origin of the IP refers to whether the actor is the original inventor of the patented technology that they are seeking to enforce or a third-party acquirer. The organizational type is differentiated by operating companies (OPCOs) and non-practicing entities (NPEs) as simply a distinction of the primary business model of the firm. The arrows in the figure represent how patented technology flows from the original inventors to third-party actors. Below is a short description of the different types of actors represented by this model:

1. *Hybrid firms*

These are operating firms that produce products and services but also seek to enforce their own IP to receive compensation for their commercial use (e.g., through licensing). As patent holdout is a transactional concept based on compensation for use, the focus here is on OPCOs that seek to license in addition to sell products and services (i.e., a hybrid technology business model). Examples of larger firms that employ this hybrid model include IBM and Qualcomm. Smaller firms include companies such as Sonos and Centripetal.

2. *Specialized R&D Organizations*

These are organizations that specialize in research and technology development but do not produce and sell products and services on the market. In other words, patented technology is their product, and licensing is their business model. This includes specialized R&D firms (e.g., ARM, Palo Alto Research Center, Interdigital, and most small and medium sized biotech ventures), universities, and individual inventors, among others.

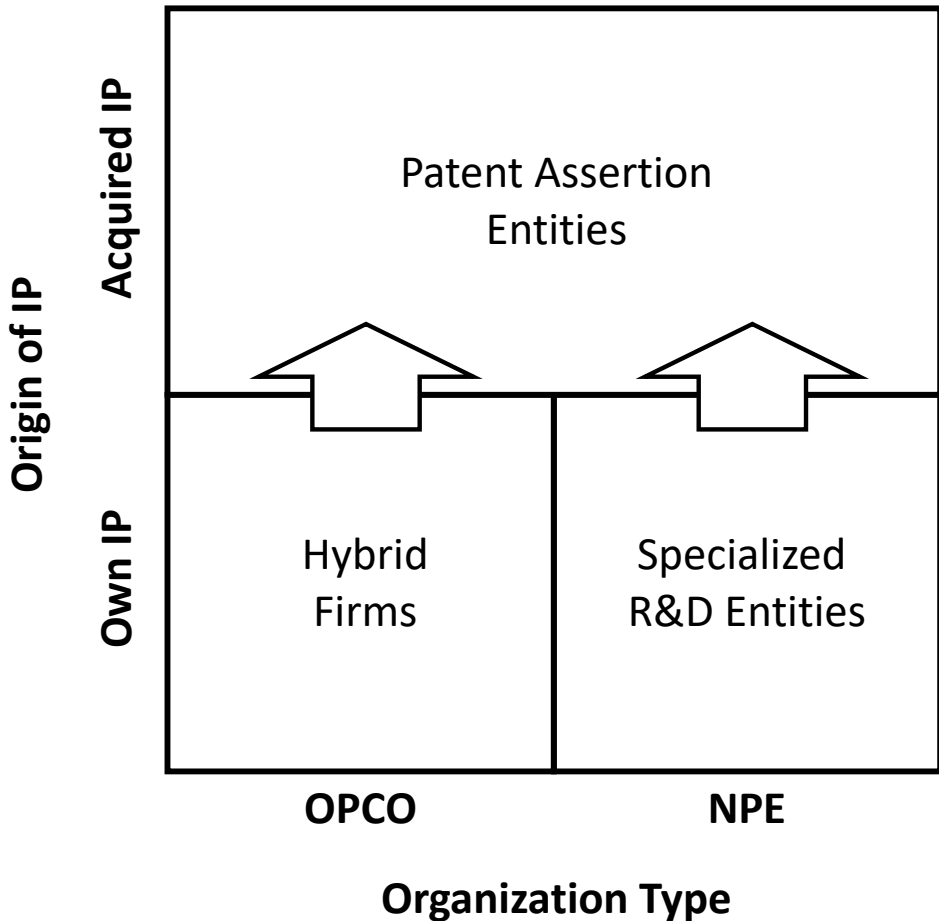
3. *Patent Assertion Entities (PAEs)*

These entities are typically commercial firms that acquire (buy or consign) patents from OPCOs and NPEs and assert them against other OPCOs on the global market. When hybrid firms and specialized R&D organizations sell or

consign their patents, the PAE acts primarily as an agent, facilitating the original firm's business model. PAEs can also acquire patents from failed OPCOs as well as from successful OPCOs looking to monetize part of their portfolio.

Technically, both specialized R&D organizations and patent assertion entities are NPEs if "practicing" is defined as the production of products and services. In other words, NPEs trade in knowledge, not in physical or virtual goods.

Figure 3.1: Patent monetization contexts.



While the scope of patent holdout could cover all patent enforcement contexts, the primary interest of this Article is to ultimately ascertain whether the current patent system is capable of adequately supporting markets for technology in the context of innovative STFs. Therefore, the scope of STFs for this study is delineated by the following characteristics:

- The firm should be a small-medium sized enterprise (SME) or a much smaller company compared to its infringing competitor. This scopes the market power imbalance that the patent system is meant to address by leveling the playing field for STFs.

- The firm should have created its own patented technology for commercialization as a hybrid OPCO or an NPE.⁵³

To summarize, the scope of this study is focused on technology firms enforcing their own IP that are small or much smaller than the opposing infringing firm (i.e., lower quadrants of Figure 3.1 above).

B. IDENTIFYING THE REFERENCE CASE STUDIES

To identify potential case study targets, a search of patent litigations in U.S. district courts was conducted and parsed with the following parameters:

1. Plaintiff is an operating company or non-practicing entity;
2. Defendant is a large highly patent-litigated firm in the IT or consumer electronics industry;⁵⁴
3. Plaintiff is orders of magnitude smaller than the defendant; and
4. The case resulted in court-awarded damages or consent decree in the ITC.

The decision to choose cases with court-awarded damages or ITC consent decree was done to ensure that sufficient public documentation was available to investigate the full litigation strategy of both parties and to interpret the nature of patent holdout in the context of the intrinsic challenges of the patent system. Including cases resulting in damage awards was helpful in understanding the ability of the patent system to provide adequate remedies to infringed patent holders through financial compensation. In other words, can patent holders that win in court still be victims of patent holdout?

Table 3.1 below is a subset of cases involving STFs between 2012-2020 that resulted in multimillion-dollar patent damage awards or ITC consent decrees:

53. To comprehensively examine the impact of patent holdout on STFs, one should also include STFs that relied on a PAE as a monetization agent. The latter category is important as the cost, time, and expertise required for litigation is difficult for most STFs to manage themselves.

54. For example, one of the searches screened for the following specific firms: Alphabet, Amazon, Apple, AT&T, Cisco, Dell, HP, HTC, Intel, LG, Meta, Microsoft, Samsung.

Table 3.1 List of significant STF patent litigation cases.

| Start Date | Plaintiff | Defendant | Type | Venue | Award | Time (m) | Status |
|------------|---|-----------|------|-------|---------|----------|-------------------------------------|
| 2012-11-06 | VirnetX ⁵⁵ | Apple | NPE | EDTX | \$368M | 98+ | Appeal pending |
| 2013-04-02 | Mobile Communications Technology ⁵⁶ | Apple | NPE | EDTX | \$24M | 25 | Settlement |
| 2015-07-03 | Personalized Media Communications ⁵⁷ | Apple | NPE | EDTX | \$308M | 73 | Unenforceable by prosecution laches |
| 2016-05-17 | Prisua Engineering ⁵⁸ | Samsung | NPE | SDFL | \$4.3M | 56 | Invalidated by PTAB |
| 2018-02-13 | Centripetal ⁵⁹ | Cisco | OPCO | EDVA | \$2.75B | 56+ | Vacated for conflict of interest |
| 2019-03-01 | Express Mobile ⁶⁰ | Shopify | NPE | DE | \$40M | 30+ | Appeal pending |

55. VirnetX Inc. v. Apple Inc., 925 F. Supp. 2d 816, 825 (E.D. Tex. 2013).

56. Mobile Telecommunications Technologies, L.L.C. v. Apple, Inc., Case No. 2:13-cv-258-RSP (E.D. Tex. Nov. 21, 2014) at 2.

57. Personalized Media Communications, L.L.C. v. Apple, Inc., 552 F. Supp. 3d 664, 668 (E.D. Tex. 2021), *aff'd*, 57 F.4th 1346 (Fed. Cir. 2023).

58. Prisua Engineering Corp. v. Samsung Electronics Co., Ltd., 472 F. Supp. 3d 1183 (S.D. Fla. 2020). Damage award is found at Civil Action No.1-16-CV-21761-KMM S.D. Florida.

59. Centripetal Networks, Inc. v. Cisco Sys., Inc., 492 F. Supp. 3d 495, 608 (E.D. Va. 2020), *vacated*, 38 F.4th 1025 (Fed. Cir. 2022).

60. Shopify, Inc. v. Express Mobile, Inc., 2021 WL 4288113 (D. Del. Sept. 21, 2021). Damages verdict cited in case 1:19-cv-00439-RGA.

| | | | | | | | |
|------------|--------------------------|--------|------|----------|--------|-----|------------------------------|
| 2019-04-16 | Vocalife ⁶¹ | Amazon | OPCO | EDTX | \$5M | 39 | Vacated on appeal |
| 2019-04-25 | Cirba ⁶² | VMWare | OPCO | DE | \$235M | 41+ | Vacated for lack of standing |
| 2019-11-15 | VideoShare ⁶³ | Google | NPE | WDT X | \$26M | 34 | Final judgement |
| 2020-01-07 | Voxer ⁶⁴ | Meta | OPCO | WDT X | \$175M | 33+ | Verdict Appeal likely |
| 2020-01-07 | Sonos ⁶⁵ | Google | OPCO | CDCA | N/A | 33+ | Stay pending ITC appeal |
| 2020-01-31 | Ecofactor ⁶⁶ | Google | OPCO | WDT X | \$20M | 32+ | IPR appeal pending |

61. Vocalife L.L.C. v. Amazon.com, Inc., 534 F.Supp.3d 698 (E.D. Tex. 2021), *reversed in part, dismissed in part*, 2022 WL 2986786 (Fed. Cir. 2022). Damage verdict cited in case 2:19-cv-00123-JRG.

62. Cirba Inc., v. VMWare, Inc., 2020 WL 2992348 (D. Del. June 3, 2020), *petition for writ of mandamus denied*, In re Cirba, Inc., 2021 WL 4302979 (Fed. Cir. 2021). Damage verdict cited in case 1:19-cv-00742-LPS.

63. VideoShare, L.L.C. v. Google, L.L.C., 2021 WL 4712692 (W.D. Tex. Oct. 8, 2021). Damage verdict cited in case 6:19-cv-00663-ADA.

64. Voxer, Inc. v. Meta Platforms, Inc., 2023 WL 2806283 (W.D. Tex. Feb. 21, 2023). Damage verdict cited in case 1:20-cv-00655-LY.

65. Joint Status Report, Sonos, Inc. v. Google L.L.C., No. 20-169 (C.D. Cal. June 23, 2022), ECF No. 49. One of Sonos' infringement suits resulted in a \$32.5 million verdict at the district court. *See* By Emma Roth & Chris Welch, *Sonos Wins \$32.5 Million Patent Infringement Victory Over Google*, VERGE (May 26, 2023), <https://www.theverge.com/2023/5/26/23739273/google-sonos-smart-speaker-patent-lawsuit-ruling>.

66. EcoFactor, Inc., v. Google L.L.C., 2022 WL 2380332 (W.D. Tex. May 26, 2022). Damage verdict cited in case 6:20-cv-00075-ADA.

A quick review of Table 3.1 above provides the following insights:

1. A mix of OPCO (hybrid) and NPE (pure licensing) plaintiffs.
2. Significant litigation history ranging from 30 to 98 months and counting.
3. Only one case has resulted in an actual payment to the STF (*MCT v. Apple*).
4. Three cases were vacated on procedural grounds after years of litigation (*Centripetal*, *Cirba*, and *Personalized Media Communications*).
5. Defendants in most cases employed PTAB to invalidate the patents in suit.
6. One case involved the ITC (*Sonos*).

IV. CASE STUDIES

The following two STFs were chosen for in-depth case analysis:

1. *Sonos*: a public OPCO with substantial revenue up against a bigtech competitor operating in the same product market. The *Sonos* case also allows for the investigation of the use of multiple jurisdictions and the ITC as part of holistic litigation strategy by both parties. Furthermore, the significant financial resources of *Sonos* allow for an understanding of the minimum capital needed for patent enforcement in a full litigation campaign with a corporation with nearly unlimited resources.
2. *Centripetal*: a VC-backed OPCO with multi-use technology up against a very large telecommunication actor operating in a large adjacent market. The *Centripetal* case provides a better understanding of the role that the limited resources of SMEs play in effective patent enforcement against a large incumbent actor. In addition, the case allows for the investigation of willful infringement and enhanced damages as an adequate remedy for patent infringement.

The two case studies represent significant and current examples of litigation between smaller and larger technology actors in the context of hybrid business models where the defendant is both a potential collaborator and competitor.

A. SONOS V. GOOGLE

1. *Commercial Context*

The general commercial context of this case is characterized as a small operating company (Sonos) seeking licensing revenue for the infringement of patented technology from a very large direct competitor and collaborator (Google). With over 1,500 employees and \$1.3B in revenue in 2021, Sonos is not technically a small to medium-sized enterprise (SME). However, its relative size difference in relation to Google, which has over 100x as many employees, approximately 200x more revenue, and a market cap over 700x greater, is the relevant factor for this study—see Table 4.1 below.

Table 4.1: Comparative company information for Sonos and Google (2021).⁶⁷

| Firm | Founded | Employees | Revenue | Patents | Mkt Cap |
|--------|---------|-----------|---------|---------|---------|
| Sonos | 2002 | 1,844 | 1.3B | ~500 | 3.8B |
| Google | 1998 | 156,500 | 257B | 33,000+ | 1,960B |

Sonos was founded in 2002 as a pioneer in the development of multi-room wireless audio products, now referred to as smart speakers or smart home sound systems.⁶⁸ Their main competitors include traditional audio equipment manufacturers, such as Bang & Olufsen, Bose, Samsung (and its subsidiaries Harman International and JBL), Sony, and Sound United (and its subsidiaries Denon and Polk), as well as voice-enabled smart speakers from Big Tech firms, such as Amazon, Apple, and Google.⁶⁹ Sonos launched its first product in 2005.⁷⁰ In 2021, Sonos held a 92% market share in the wireless speaker

67. *Alphabet Inc. (GOOG)*, STOCKANALYSIS, <https://stockanalysis.com/stocks/goog/> (last visited July 27, 2023); *Sonos, Inc. (SONO)*, STOCKANALYSIS, <https://stockanalysis.com/stocks/sono/> (last visited July 27, 2023); GOOGLE PATENTS, <https://patents.google.com/?assignee=sonos&country=US&status=GRANT&type=PATENT&oq=assignee:sonos+country:US+status:GRANT+type:PATENT> (last visited July 27, 2023); GOOGLE PATENTS, <https://patents.google.com/?assignee=google&country=US&status=GRANT&type=PATENT> (last visited July 27, 2023).

68. Sonos, Inc., Annual Report (Form 10-K) (Oct. 2, 2021), at 4, <https://d18m0p25nwr6d.cloudfront.net/CIK-0001314727/1fd393f1-f7a5-4c9d-8ce1-4e6adfd53205.pdf>.

69. *Id.* at 9.

70. *Id.* at 4.

category among audio industry professionals but less than 2% share of the consumer smart speaker market.⁷¹ Figure 4.1 shows the growth of product sales for Sonos of 3.4–6.5 million units from 2015–2021.

Figure 4.1: Sonos unit sales (2015–2021).⁷²

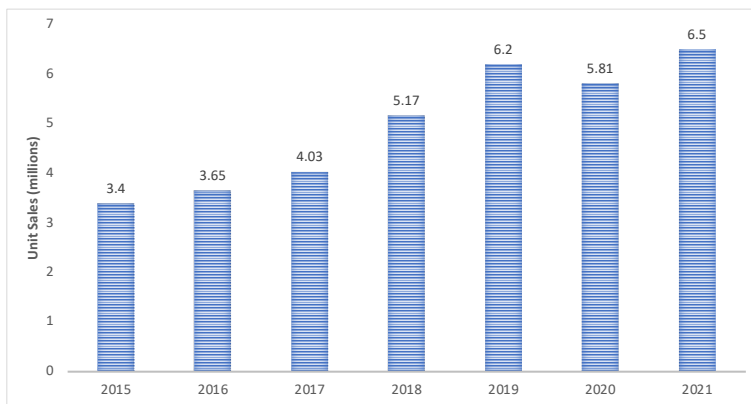
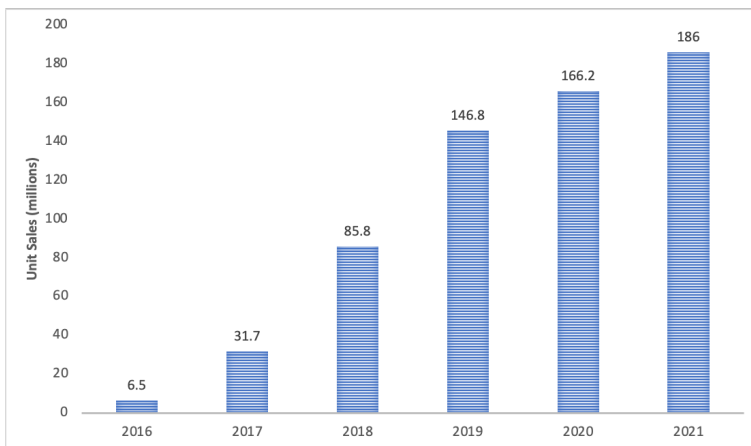


Figure 4.2: Global smart speaker unit sales (2016–2021).⁷³



Google was founded in 1998 and has grown to become an Internet giant focused originally on search technology but now diversifying into many technology fields through its parent company, Alphabet, which was established in 2015. Google entered the smart speaker market in 2015 with the launch of

71. *Id.* at 7.

72. *Unit Sales of Sonos' Audio Products Worldwide from Fiscal Year 2015 to 2022*, STATISTA, <https://www.statista.com/statistics/1109203/global-unit-shipment-sonos-products>.

73. Statista. 2021 is a forecast.

Chromecast Audio.⁷⁴ In the following year, 2016, they introduced the Google Home product line, which is now sold under the name Google Nest.⁷⁵ In 2021, Google held a 25% share of the installed base in the U.S. smart speaker market.⁷⁶ Figure 4.2 above shows the rapid growth of global smart speaker sales from 2016–2021.

2. *Overview of Collaboration and Litigation Activities*

Sonos and Google had a history of collaboration regarding smart speaker functionality from 2013 to 2019, including the following key activities⁷⁷:

1. 2013–14: Integration of Google Play Music into the Sonos platform.
2. 2016–19: Integration of Google Assistant into the Sonos platform.

The second collaboration starting in 2016 also coincided with Google's launch of its own smart speaker products, Chromecast Audio (2015) and Google Home (2016), which competed directly with Sonos in the consumer segment. In particular, Sonos contends that Google integrated Sonos's multi-room audio technology in their products after learning of the technology during their first collaboration in 2013–14.⁷⁸ In 2016, Sonos first put Google on notice of infringing 28 patents, adding notice of over 100 more patents in 2018–19.⁷⁹

In 2020, after failed licensing negotiations to settle the dispute, Sonos filed a patent infringement lawsuit against Google in the Central District of California, which in turn has generated a number of subsequent lawsuits and legal

74. Complaint at 1, *Sonos, Inc. v. Google L.L.C.*, No. 2:20-cv-00169 (C.D. Cal. Jan. 7, 2020).

75. Frederic Lardinois, *Google Home Will Go On Sale Today for \$129, Shipping November 4*, TECHCRUNCH (Oct. 4, 2016), <https://techcrunch.com/2016/10/04/say-hello-to-google-home/>.

76. Todd Bishop, *Amazon Maintains Big Lead Over Google and Apple in U.S. Smart Speaker Market, New Study Says*, GREEKWIRE (Aug. 4, 2021), <https://www.geekwire.com/2021/amazon-maintains-big-lead-google-apple-u-s-smart-speaker-market-new-study-says/>.

77. *See* Complaint at 1, *Sonos, Inc. v. Google L.L.C.*, No. 2:20-cv-00169 (C.D. Cal. Jan. 7, 2020); Complaint at 2–3, *Google L.L.C. v. Sonos, Inc.*, No. 3:20-CV-3845 (N.D. Cal. June 11, 2020).

78. *See* Complaint at 7, *Sonos, Inc. v. Google L.L.C.*, No. 2:20-cv-00169 (C.D. Cal. Jan. 7, 2020).

79. *See* Complaint at 12, *Sonos Inc. v. Google L.L.C.*, No. 2:20-cv-00169 (C.D. Cal. Jan. 7, 2020).

actions.⁸⁰ Table 4.2 below provides an overview and status of the different U.S. litigation activities filed by both Sonos and Google at California district courts, the International Trade Commission (ITC), and the Patent Trial and Appeal Board (PTAB) at the U.S. Patent and Trademark Office (USPTO).

Currently, only the ITC complaint filed by Sonos under the Tariff Act of 1930 § 337, 19 U.S.C. § 1337 (2006) (“section 337”), has reached a decision. In January 2022, the ITC found that specific claims of each of the five patents-in-suit were valid and infringed by Google, which led to an exclusion order. Both Google and Sonos have filed appeals on certain aspects of the ITC decision to the Federal Circuit. Google has also developed ITC-approved, non-infringing alternate solutions that it has started to implement through software updates to its smart speaker product line. In June 2022, U.S. Customs and Border Protection ruled that Google was violating its importation ban.⁸¹ In August 2022, Google retaliated by filing two new patent infringement complaints in the Northern District of California that cover seven patents in total on voice-assistant technology and added that it would file a related complaint at the ITC.⁸²

Sonos has also previously litigated its patents against D&M Holdings and Lenbrook Industries, where the former settled after 43 months⁸³ and the latter settled after ten months.⁸⁴

80. Daisuke Wakabayashi, *Google Infringed on Sonos Speaker Technology*, *Trade Court Rules*, N.Y. TIMES (Jan. 6, 2022), <https://www.nytimes.com/2022/01/06/technology/google-sonos-patents.html>.

81. Ashley King, *Google Is Actively Violating Sonos Patents, Rules US Customs Service*, DIGITAL MUSIC NEWS (July 4, 2022), <https://www.digitalmusicnews.com/2022/07/04/google-violating-sonos-patents-us-customs>.

82. Blake Brittain, *Google Sues Sonos Over New Voice-assistant Technology*, REUTERS (Aug. 8, 2022), <https://www.reuters.com/legal/litigation/google-sues-sonos-over-new-voice-assistant-technology-2022-08-08>.

83. Richard Lloyd, *Sonos Settlement with Denon Underlines the Strength of Its Patents in Burgeoning Speaker Market*, IAM (May 25, 2018), <https://www.iam-media.com/article/sonos-settlement-denon-underlines-the-strength-of-its-patents-in-burgeoning-speaker-market>.

84. Press Release, Sonos, Sonos and Lenbrook Reach Settlement in Patent Infringement Case (July 30, 2022), <https://investors.sonos.com/news-and-events/investor-news/latest-news/2020/Sonos-and-Lenbrook-Reach-Settlement-In-Patent-Infringement-Case/default.aspx>.

Table 4.2: Overview of U.S. litigation between Sonos and Google.

| Case | Date | Patents | Venue | Status |
|--------------------------------------|------------|---|---------------------------------|--|
| <i>Sonos v. Google</i> ⁸⁵ | 01-07-2020 | 8,588,949 9,195,258 9,219,959 10,209,953 10,439,896 | Central District of California | Stay pending ITC appeal |
| Sonos section 337 ⁸⁶ | 01-07-2020 | As above | ITC | Exclusion order granted under appeal |
| <i>Google v. Sonos</i> ⁸⁷ | 06-11-2020 | 7,899,187 8,583,489 10,140,375 7,065,206 10,229,586 | Northern District of California | Ongoing discovery for '187 only |
| Sonos IPRs ⁸⁸ | 05-20-2021 | 10,140,375 10,229,586 | PTAB | All but one petitioned claims unpatentable |
| <i>Sonos v. Google</i> ⁸⁹ | 09-29-2020 | 9,967,615 10,779,033 9,344,206 10,469,966 | Northern District of California | Jury verdict for Sonos awarding |

85. *Sonos, Inc. v. Google L.L.C.*, No. 2:20-cv-00169 (C.D. Cal. Jan. 7, 2020).

86. *Certain Audio Players and Controllers, Components Thereof, and Products Containing the Same*, Inv. No. 337-TA-1191, 2022 WL 100272 (Jan. 6, 2022).

87. *See* Complaint, *Google L.L.C. v. Sonos, Inc.*, No. 3:20-CV-3845 (N.D. Cal. June 11, 2020).

88. *Sonos, Inc. v. Google L.L.C.*, No. IPR 2021-00962, 2022 WL 16704720 (P.T.A.B. Nov. 3, 2022); *Sonos, Inc. v. Google L.L.C.*, No. IPR 2021-00964, 2022 WL 5265117 (P.T.A.B. Oct. 6, 2022).

89. Jury Verdict, *Sonos, Inc. v. Google L.L.C.*, No. 3:21-cv-07559 (N.D. Cal. May 26, 2023).

| | | | | |
|--------------------------------------|------------|---|---------------------------------|------------------------------------|
| | | 10,848,885 | | \$32.5M in damages ⁹⁰ |
| Google IPR ⁹¹ | 09-28-2021 | 9,967,615 | PTAB | All petitioned claims unpatentable |
| <i>Google v. Sonos</i> ⁹² | 08-08-2022 | 10,593,330 10,134,398 7,705,565 11,024,311 9,812,128 9,632,748 11,050,615 | Northern District of California | Stay pending ITC decision |
| Google section 337 ⁹³ | 08-09-2022 | As above | ITC | Pending before ALJ |
| Sonos IPR ⁹⁴ | 09-29-2022 | 11,024,311 9,812,128 | PTAB | Pending final decision |
| Sonos IPR ⁹⁵ | 10-27-2022 | 10,593,330 10,134,398 | PTAB | Pending final decision |
| Sonos IPR ⁹⁶ | 04-05-2023 | 11,050,615 | PTAB | Pending institution decision |

90. The final judgement was vacated to allow for decisions regarding injunctive relief and affirmative defenses. Order Vacating Final Judgment, *Sonos, Inc. v. Google L.L.C.*, No. 3:21-cv-07559 (N.D. Cal. June 14, 2023).

91. *Google L.L.C. v. McMillin, Terrence*, No. IPR 2021-01563 (P.T.A.B. Apr. 10, 2023).

92. *Google L.L.C. v. Sonos, Inc.*, No. 3:22-cv-04552 (N.D. Cal. Aug 8, 2022); *Google L.L.C. v. Sonos, Inc.*, No. 3:22-cv-04553 (N.D. Cal. Aug 8, 2022).

93. ITC Certain Audio Players and Components Thereof I, Inv. No. 337-TA-1329 (Sept. 9, 2022); ITC Certain Audio Players and Components Thereof II, Inv. No. 337-TA-1330 (Aug. 9, 2022).

94. *Sonos, Inc. v. Mixer*, No. IPR 2022-01592 (P.T.A.B. Sept. 29, 2022); *Sonos, Inc. v. Mixer*, No. IPR 2022-01594 (P.T.A.B. Sept. 29, 2022).

95. *Sonos, Inc. v. Sharifi, Matthew*, No. IPR 2023-00118 (P.T.A.B. Oct. 27, 2022); *Sonos, Inc. v. Sharifi, Matthew*, No. IPR 2023-00119 (P.T.A.B. Oct. 27, 2022).

96. *Sonos, Inc. v. Matthews, Jeffrey*, No. IPR 2023-00806 (P.T.A.B. Apr. 5, 2023).

In addition to the U.S., Google and Sonos filed international lawsuits in Germany, Canada, France, and the Netherlands in 2020. In summary, the patent infringement cases initiated by Google have been dismissed or found non-infringing pending appeals. In Europe, these results have been consistent for the two patents (EP 491 and EP 621) asserted in all three jurisdictions. At the end of 2020, Sonos responded with an infringement suit of its own in Germany. Their preliminary injunction was withdrawn, and validity is pending. Table 4.3 below provides information on the specific cases and their current status.⁹⁷

Table 4.3: Overview of international litigation between Sonos and Google.

| Case | Date | Patents | Venue | Status |
|---|---------|------------------------------------|---|--|
| <i>Google v. Sonos</i> Europe ⁹⁸ | 07/2020 | EP 27 64 491 EP 1 579 621 | Munich Higher Re- gional Court | EP 491: validity challenge pending. EP 621: Dis- missed; appeal pending. |
| <i>Google v. Sonos</i> Europe | 08/2020 | EP 27 64 491 EP 15 79 621 | France | EP 491 validity pending, infringement claims dropped. EP 621 found non-infringed, appeal pending. |
| <i>Google v. Sonos</i> Europe | 08/2020 | EP 27 64 491 EP 15 79 621 | District Court for Central Netherlands | EP 491: found non-infringed. EP 621: Dis- missed |

97. See Sonos, Inc., Annual Report (Form 10-K) (Nov. 22, 2021), <https://d18rn0p25nwr6d.cloudfront.net/CIK-0001314727/1fd393f1-f7a5-4c9d-8ce1-4e6adfd53205.pdf>; Amy Sandys, *Dutch Judges Deny Google Injunction Request Against Sonos*, JUVE PATENT (Feb. 11, 2022), <https://www.juve-patent.com/news-and-stories/cases/dutch-judges-deny-google-injunction-request-against-sonos/>.

98. Oberlandesgericht [OLG] München [Munich Higher Regional Court] June 23, 2021, No. 21 O 7265/20, <https://www.gesetze-bayern.de/Content/Document/Y-300-Z-GRURRS-B-2021-N-44671?hl=true>.

| | | | | |
|--|---------|--------------|------------------------|---|
| | | | | as infringement claims not substantiated; appeal pending. |
| <i>Google v. Sonos</i> ⁹⁹ | 08/2020 | CA 2,545,150 | Canada | Found non-infringed, appeal pending. |
| Sonos v. Google Germany ¹⁰⁰ | 12/2020 | EP 35 54 005 | Hamburg Regional Court | PI applications withdrawn. Validity pending. |

3. *Specific Litigation Behavior and Results*

This Section IV.A.3 provides a deeper look into the specific legal proceedings that define the overall litigation campaign between Sonos and Google in the United States. In particular, this includes specific information regarding the venue, patents-in-suit, key dates, key motions, and current status/results that define the litigation behavior in the commercial context of a small operating company (Sonos) versus a very large operating company (Google). Figure 4.3 below summarizes much of this information.

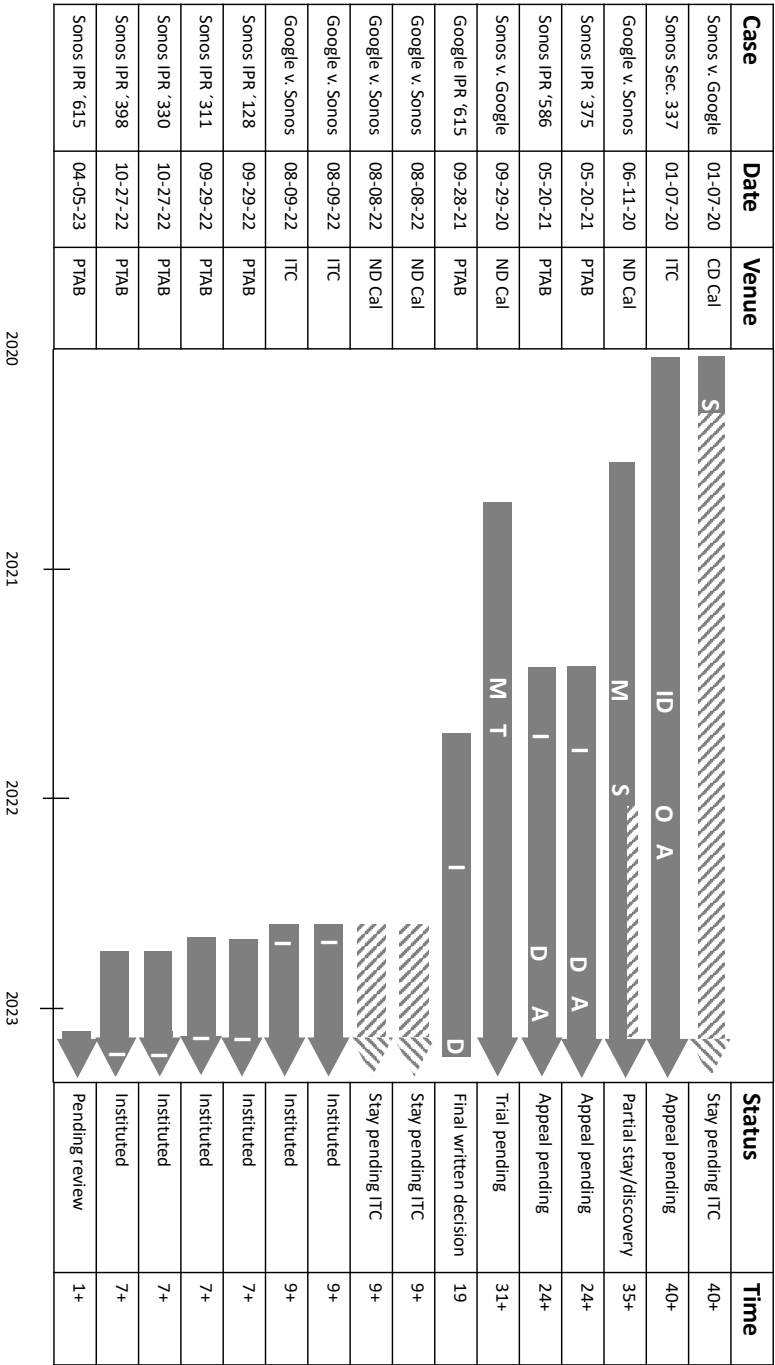
There have been four patent infringement lawsuits filed in the U.S. district court system—two by each Sonos and Google. Each lawsuit has asserted a specific set of patents. Section IV.A.3 is organized around these four asserted patent sets, including the associated proceedings at the ITC and PTAB in order to better understand the litigation behavior at the patent level.

Figure 4.3: Timelines of specific U.S. litigation activities between Sonos and Google. Time = months.

99. *Google L.L.C. v. Sonos, Inc.*, 2021 FC 1462 (Can.), <https://decisions.fct-cf.gc.ca/fc-cf/decisions/en/item/521052/index.do>.

100. Landgericht Hamburg [LG] [Hamburg District Court] Feb. 2, 2021, 327 O 378/20, <https://www.landesrecht-hamburg.de/bsha/document/KORE209052021>; Landgericht Hamburg [LG] [Hamburg District Court] Apr. 29, 2021, 327 O 36/21, <https://www.landesrecht-hamburg.de/bsha/document/KORE224092021>.

(S=Stay, O=Opinion, A=Appeal, I=Instituted, M=Markman, T=Trial, D=Decision, ID=Initial Determination)



a) *Sonos v. Google*: January 2020

On January 7, 2020, Sonos filed a patent infringement complaint in the Central District of California against Google.¹⁰¹ Simultaneously, Sonos also filed a second complaint against Google alleging a violation of section 337 of the Tariff Act of 1930 to the U.S. International Trade Commission (ITC).¹⁰² Both complaints claimed infringement of the five patents shown below in Table 4.4. The '949, '258, and '959 patents were also previously asserted in previous litigation against D&M Holding (2016) and Lenbrook Industries (2019). Google answered claiming non-infringement and invalidity of all patents-in-suit under §§ 101, 102, 103, and 112.¹⁰³

Table 4.4: *Sonos v. Google* patents-in-suit (CDTX and ITC).

| U.S. Patent # | Prior-ity/ Grant | Description | Total Claims (Independent Claims) | Validity/ Infringement |
|---------------|---------------------|--|-----------------------------------|---|
| 8,588,949 | 2003/ 2013 | Method and apparatus for adjusting volume levels in a multi-zone system. | 20 (1,8,15) | ITC: claims 1, 2, 4–5 valid and infringed. |
| 9,195,258 | 2003/ 2013 | System and method for synchronizing operations among a plurality of independently clocked digital data processing devices. | 26 (1,11,17) | ITC: claims 17, 21, 24, 26 valid and infringed. |

101. *Sonos, Inc. v. Google L.L.C.*, No. 2:20-cv-00169 (C.D. Cal. Jan. 7, 2020).

102. *Certain Audio Players and Controllers, Components Thereof, and Products Containing the Same*, Inv. No. 337-TA-1191, 2022 WL 100272 (Jan. 6, 2022).

103. *Google's Answer to Sonos's Complaint*, *Sonos, Inc. v. Google L.L.C.*, No. 2:20-cv-00169 (C.D. Cal. Mar. 11, 2022).

| | | | | |
|------------|---------------|--|-----------------|---|
| 9,219,959 | 2006/ 2015 | Multi-channel pairing in a media system. | 22 (1,14) | ITC: claim 10 valid and infringed. |
| 10,209,953 | 2003/ 2019 | Playback device. | 30 (1,7,25) | ITC: claims 7, 14, 22–24 valid and infringed. |
| 10,439,896 | 2004/ 2019 | Playback device connection. | 20 (1,13,20) | ITC: claims 1, 5, 6, 12 valid and infringed. |

In March 2020, the parties agreed to stay the district court case pending the completion of the proceedings at the ITC.¹⁰⁴ Sonos’s complaint to the ITC was instituted in February 2020, and an Initial Determination (ID) was issued in August 2021. In January 2022, the ITC issued its order establishing a section 337 violation on specific claims of all five patents-in-suit as shown in table 4.4 above.¹⁰⁵ In total, the ITC found 17 of the 118 claims-in-suit (14.4%) valid and infringed. The remedies included a limited exclusion order and cease-and-desist order.¹⁰⁶ The limitation was based on Google’s implementation of the ITC-approved product redesigns that were determined not to infringe the asserted patents.¹⁰⁷ In March 2022, following the completion of the Presidential Review, the Federal Circuit undertook Google’s appeal and granted Sonos’s motion to intervene the following month.

b) *Google v. Sonos*: June 2020

On June 11, 2020, Google filed a patent infringement suit against Sonos in the Northern District of California.¹⁰⁸ The suit includes the five patents shown in Table 4.5 below, which covers a broad range of technical fields associated with smart speakers. Two of the patents were removed—one for eligibility (’489) and one by joint dismissal (’206)—while two others were instituted by the PTAB (’375 and ’586). The PTAB found unpatentable all the claims

104. Joint Status Report at 1, *Sonos, Inc. v. Google L.L.C.*, No. 2:20-cv-00169 (C.D. Cal. June 23, 2022).

105. *Id.*

106. *Id.*

107. *Id.* at 1–2.

108. Complaint, *Google L.L.C. v. Sonos, Inc.*, No. 3:20-CV-3845 (N.D. Cal. June 11, 2020).

challenged by Sonos for both patents. The final patent ('187) is pending discovery in the district court.

Table 4.5 *Google v. Sonos* patents-in-suit (NDCA and PTAB).

| U.S. Patent # | P/G | Description | Total Claims (Independent Claims) | Validity/ Infringement |
|---------------|-----------|---|-----------------------------------|--|
| 7,899,187 | 2002/2011 | Domain-based digital-rights management system with easy and secure device enrollment. | 17 (1,7,10) | Pending discovery. |
| 8,583,489 | 2011/2013 | Generating a media content availability notification. | 20 (1,8,15) | Ineligible under § 101 (<i>Allice</i>). ¹⁰⁹ |
| 10,140,375 | 2003/2018 | Personalized network searching. | 20 (1,17) | IPR: C1–11, 13–17 all found unpatentable. ¹¹⁰ |
| 7,065,206 | 2003/2006 | Method and apparatus for adaptive echo and noise control. | 20 (1,9,19) | Joint dismissal. ¹¹¹ |
| 10,229,586 | 2004/2019 | Relaying communications in a wireless sensor system. | 20 (1,9,15) | IPR: C1–5, 7–12, 14–16, 18, 20 all found |

109. Order Granting Defendant's Motion to Dismiss, *Google L.L.C. v. Sonos, Inc.*, No. 3:20-CV-3845 (N.D. Cal. Nov. 2, 2020).

110. *Sonos, Inc. v. Google L.L.C.*, No. IPR 2021-00962, 2022 WL 16704720 (P.T.A.B. Nov. 3, 2022).

111. Stipulation of Dismissal of '206 Infringement Claim, *Google L.L.C. v. Sonos, Inc.*, (docket number or case reporter?) (N.D. Cal. June 4, 2021).

| | | | | |
|--|--|--|--|------------------------------|
| | | | | unpatentable. ¹¹² |
|--|--|--|--|------------------------------|

c) *Sonos v. Google*: September 2020

On September 29, 2020, Sonos filed a second patent infringement suit against Google in the Western District of Texas.¹¹³ Google's writ of mandamus was granted by the Federal Circuit, which moved the case to the Northern District of California on September 27, 2021. Table 4.6 below shows the additional five patents asserted by Sonos. One patent ('206) was jointly dismissed by the parties. The '615 patent had all challenged claims invalidated by the PTAB, while claim 13 was found not infringed and invalid by the district court. The '033 patent was also found invalid. On summary judgement, the '885 patent survived a Google motion for noninfringement and invalidity, and the court granted Sonos's motion regarding infringement of claim 1, which was eventually found valid and infringed by the jury, resulting in an award of \$32.5 million. On June 14, 2023, the judge vacated the judgement to allow for the determination of injunctive relief and affirmative defenses.¹¹⁴

Table 4.6: *Sonos v. Google* patents-in-suit (NDCA and PTAB).

| U.S. Patent # | P/G | Description | Total Claims (Independent Claims) | Validity/Infringement |
|---------------|-----------|---------------------------|-----------------------------------|---|
| 9,967,615 | 2011/2018 | Networked music playback. | 29 (1,13,25) | NDCA: C13 found not infringed and invalid (§ 103) but not |

112. *Sonos, Inc. v. Google L.L.C.*, No. IPR 2021-00964, 2022 WL 5265117 (P.T.A.B. Oct. 6, 2022).

113. Complaint, *Sonos, Inc. v. Google L.L.C.*, No. 6:20-cv-881 (W.D. Tex. Sept. 29, 2020).

114. Order Vacating Final Judgment, *Sonos, Inc. v. Google L.L.C.*, No. 3:21-cv-07559 (N.D. Cal. June 14, 2023).

| | | | | |
|------------|---------------|---|-----------------|---|
| | | | | invalid under § 102. ¹¹⁵ IPR: C1, 2, 6–14, 18–25, and 27–29 held unpatentable. ¹¹⁶ |
| 10,779,033 | 2011/ 2019 | Systems and methods for networked music playback. | 16 (1,12,15) | Found invalid. ¹¹⁷ |
| 9,344,206 | 2006/ 2016 | Method and apparatus for updating zone configurations in a multi-zone system. | 20 (1,12,17) | Joint dismissal. ¹¹⁸ |
| 10,469,966 | 2006/ 2019 | Zone scene management | 20 (1,9,17) | Found non-infringed ¹¹⁹ |
| 10,848,885 | 2006/ 2020 | Zone scene management | 20 (1,8,15) | Claim 1 found valid and infringed. ¹²⁰ |

d) *Google v. Sonos*: August 2022

On August 8, 2022, Google filed an additional two patent infringement suits against Sonos in the Northern District of California, implicating seven patents in total. Google followed up the next day with two parallel complaints

115. Order Granting Motion for Partial Summary Judgment, *Sonos, Inc. v. Google L.L.C.*, No. 3:20-cv-06754 (N.D. Cal. Aug. 2, 2022).

116. *See Google L.L.C. v. Coburn*, No. IPR 2021-01563 (P.T.A.B. Apr. 10, 2023).

117. Order Regarding Motions for Summary Judgment, *Sonos, Inc. v. Google L.L.C.*, No. 3:21-cv-07559 (N.D. Cal. Apr. 13, 2023).

118. Joint Stipulation and Order of Partial Dismissal, *Sonos, Inc. v. Google L.L.C.*, No. 3:21-cv-07559 (N.D. Cal. Feb. 5, 2022).

119. Jury Verdict Form, *Sonos, Inc. v. Google L.L.C.*, No. 3:21-cv-07559 (N.D. Cal. May 26, 2023).

120. *Id.*

to the ITC. On September 29 and October 27, 2022, Sonos challenged five of the seven patents at the PTAB. Table 4.7 below describes the patents in suit and the current status regarding validity and infringement.

Table 4.7: *Sonos v. Google* patents-in-suit (NDCA).

| U.S. Patent # | P/G | Description | Total Claims (Independent Claims) | Validity/ Infringement |
|---------------|---------------|--|-----------------------------------|---|
| 10,593,330 | 2014/ 2020 | Hotword detection on multiple devices. | 18 (1,9,17) | ITC: pending. IPR: 1–18 pending. |
| 10,134,398 | 2014/ 2020 | Hotword detection on multiple devices. | 21 (1,9,16) | ITC: pending. IPR: 1–5, 7–13, 15–20 pending. |
| 7,705,565 | 2003/ 2010 | Method and system for wireless charging. | 18 (1, 8, 9, 16-18) | ITC: pending. |
| 11,024,311 | 2014/ 2021 | Device leadership negotiation among voice interface devices. | 20 (1, 10, 16) | ITC: pending. IPR: 1–3, 8–12, 14–18, 20 pending. |
| 9,812,128 | 2014/ 2017 | Device leadership negotiation among voice interface devices. | 15 (1, 6, 11) | ITC: pending. IPR: 1–3, 5–8, 10–13, 15 pending. |
| 9,632,748 | 2014/ 2017 | Device designation for audio input monitoring. | 20 (1, 7, 11) | ITC: pending. |
| 11,050,615 | 2019/ 2021 | Apparatus and method for | 20 (1,11,21) | ITC: pending. IPR: 1–3, 5–12, 15–19 pending. |

| | | | | |
|--|--|---|--|--|
| | | seamless commis- sioning of wireless devices. | | |
|--|--|---|--|--|

4. Case Discussion

Below is a short discussion of several key aspects of the Sonos-Google litigation from a patent holdout perspective.

a) Intrinsic Patent Holdout Challenges

Sonos v. Google is a classic example of the intrinsic challenge in settling patent disputes through the U.S. court system in a timely and cost-effective manner. The initial action at the ITC is now greater than 33 months old and pending appeal at the Federal Circuit. Given that Sonos put Google on notice in 2016, the dispute is soon in its seventh year without a settlement. Additionally, the total cost of litigation across all venues is likely tens of millions of dollars on both sides. While Sonos is orders of magnitude smaller than Google, it appears big enough to manage the extensive costs and timeframe necessary to participate effectively in U.S. patent enforcement.

b) Extrinsic Patent Holdup Challenges

The extrinsic challenges impacting the patent system over the past two decades are visible in the litigation behavior in this dispute, including the following:

- The use of the ITC exclusion order as a substitute for the difficulty to obtain injunctive relief in federal court after *eBay*.
- The use of the PTAB to challenge patent validity through an IPR at the USPTO instead of federal court, which applies a higher burden of proof.
- The growth in multi-technology convergence from wireless speakers to smart speakers has created both new business opportunities and increased patent exposure, facilitating both collaboration and competition on overlapping, adjacent market segments.¹²¹ Given the cross-exposure between Sonos and Google products, both parties could exchange patent

121. For a discussion of the growing interrelationship of different product, features, and services in the smart speaker value chain, see Jack Nicas & Daisuke Wakabayashi, *Sonos, Squeezed by the Tech Giants, Sues Google*, N.Y. TIMES (Aug. 13, 2021), <https://www.nytimes.com/2020/01/07/technology/sonos-sues-google.html>.

infringement suits indefinitely at five to seven patents per suit.¹²² However, Google has by far the greater exposure due to its much larger sales base across multiple potential infringing products.

c) Patent Holdout Behavior

Google has specifically been accused of bad-faith patent holdout behavior in its dispute with Sonos.¹²³ While the potentiality for bad-faith behavior exists on the part of Google, without the benefit of discovery, it is difficult to make a clear determination of intent as Google's behavior in this case can be seen as rational given the current weakened state of the U.S. patent system. It is also possible that a district court could determine that the former collaboration and notice, combined with a finding of validity and infringement, rises to the level of willful infringement. However, without an understanding of the range of the settlements offered by both sides during negotiations, the current ITC ruling under appeal is insufficient alone to make a determination of bad-faith patent holdout. Given that no large patent damage awards to STFs have resulted in actual payments in the past ten years (see Table 3.1), it is rational for Google to set a lower target price and choose litigation over settlement for offers significantly above this price.

On November 20, 2020, Judge Alsup gave the following admonition to both parties in his ruling.¹²⁴

This action and the accompanying international campaign are emblematic of the worst aspects of patent litigation. In just nine months, these parties have managed to escalate their dispute seemingly without bound, filing suits in the ITC, twice in this district, in the Central District of California, in the Western District of Texas, in Canada, France, Germany, and the Netherlands, all about home speaker systems. The resources invested into this dispute already are doubtless enormous. By the end, our parties' legal bills will likely

122. Nigel Swycher, *Look Before You Leap – Is Litigation the Best Strategy for Sonos?*, LINKEDIN (June 18, 2023), <https://www.linkedin.com/pulse/look-before-you-leap-litigation-best-strategy-sonos-nigel-swycher/>.

123. See Eddie Lazarus, *When it Comes to Patent Reform, Watch What Google Does – Not What it Says*, IP WATCHDOG (July 7, 2022), <https://www.ipwatchdog.com/2022/07/07/comes-patent-reform-watch-google-not-says/id=150090/>; Adam Mossoff, *Google's Loss to Sonos Settles It: Big Tech Has an IP Piracy Problem*, TECHCRUNCH (Jan. 13, 2022), <https://techcrunch.com/2022/01/13/googles-loss-to-sonos-settles-it-big-tech-has-an-ip-piracy-problem/>.

124. Order Staying Case, *Google L.L.C. v. Sonos, Inc.*, No. 3:20-cv-06754 (N.D. Cal. Nov. 20, 2020).

have been able to build dozens of schools, pay all the teachers, and provide hot lunches to the children.

While this statement is directed to the behavior of the litigants, it is likely better understood as an indictment of the patent system itself.

d) Patent Holdout Impact

Whether bad-faith or inherent in the patent system, an argument can be made for circumstantial patent holdout, whereby Sonos may be unable to obtain the actual economic benefit commensurate to the breadth and strength of its patented technology. The following factors could exacerbate the impact of patent holdout:

1. **Cost of litigation**—as U.S. litigants rarely receive compensation for litigation costs, even a reasonable damage award will be under-compensated by the cost of litigation. For this case, that number will be in the tens of millions of dollars.
2. **Disruption of business operations**—the impact of the length and importance of the case is asymmetrically more disruptive to Sonos than Google. By comparison, the case isn't even mentioned in Google's 10-K report. The cost of the disruption to Sonos's business operations, including the direct loss of delayed payment and the indirect costs of ongoing uncertainty, must be subtracted from any final award or settlement.
3. **Loss of product market share**—because Sonos and Google also compete directly on the product market, patent infringement also can result in a loss of market share. This occurs when Sonos's products must compete against infringing features in competing products. This market share loss has both a short- and long-term component due to switching costs and lock-in once customers have chosen a specific brand. The loss of market share was cited by the court in *Pilot v. Coolman* as justification for injunctive relief.¹²⁵

The following factors could mitigate the impact of patent holdout:

1. Settlement under threat of exclusion order or international injunction.
2. Enhanced damages.

Even with a finding in U.S. court of valid and infringed patents, the damages are typically limited to the level of a reasonable royalty, which would not

125. "Unfair competition through patent infringement is contrary to the interests of the public." *Pilot Inc. v. Coolman Outdoor Corp.*, 2019 WL 2620723, at *5 (C.D. Cal. Apr. 10, 2019).

compensate Sonos for the costs and business impacts discussed above. This implies that a liability-based system requires enhanced damages to adequately compensate a patent owner and incentivize early settlements over extended litigation. However, the ability of potential infringers to wait and redesign their products through software updates, if necessary, based on any exclusion order or foreign injunction reduces its incentive to settle early before rolling the dice in litigation.¹²⁶

In addition, the U.S. district courts could add enhanced damages based on willful infringement that could overcome the total economic impact of the cost and delay of litigation.

B. CENTRIPETAL V. CISCO

1. *Commercial Context*

The general commercial context of this case is characterized as a VC-backed startup, Centripetal Networks (Centripetal) up against Cisco Systems (Cisco), a publicly held behemoth of network infrastructure. Centripetal was initially seeking a partnership or a strategic investment from Cisco, which sells switches and routers. Centripetal does not market and sell switches and routers; however, Cisco embedded the patented software functionality from the Centripetal patents into the infringing switches and routers that provides the same functionality as Centripetal's RuleGate product.

According to Pitchbook, Centripetal has raised approximately \$34M to date and has approximately 100 employees.¹²⁷ Cisco, on the other hand, has nearly 80,000 employees and \$50B in annual revenue.¹²⁸ The size difference between Centripetal Networks and Cisco is the relevant factor for this study - see table 4.8 below.

Table 4.8: Comparative company information for Centripetal and Cisco (2022).

126. This ability to redesign, in particular, through software updates limits any potential patent holdup impact from injunctive relief or similar measures. If inventing around causes a loss of functionality related directly to the patents in suit, this is a sign that the infringed patents were of some value. See Lauren Goode, *Sonos' Patent Win Will Change Google's Smart Speakers— for Now*, WIRED (Jan. 7, 2022), <https://www.wired.com/story/sonos-google-patents/>; Mitchell Clark, *Your Google Home Speakers Are About to Get Slightly Worse Because Sonos Sued and Won*, VERGE (Jan. 7, 2022), <https://www.theverge.com/2022/1/6/22871304/google-home-speaker-group-volume-control-changes-sonos-patent-decision>.

127. *Centripetal*, PITCHBOOK, <https://my.pitchbook.com/profile/59179-78/company/profile#>, <https://perma.cc/L4AB-2XKD> (last accessed July 20, 2023).

128. *Id.*

| Firm | Founded | Employees | Revenue | Patent Families | Mkt Cap |
|---------------|---------|-----------|----------|-----------------|----------------------|
| Centripetal | 2009 | 100 | \$10-20M | 24 | \$92M ¹²⁹ |
| Cisco Systems | 1984 | 80,000 | \$52B | 16,000+ | \$187B |

Centripetal was founded in 2009 and claims to maintain the “largest threat intelligence partner ecosystem, providing community based solutions to defeat sophisticated cyberattacks.”¹³⁰ Their main competitors include cybersecurity and threat intelligence software firms such as ThreatConnect, CarbonBlack, Attivo Networks, Aruba Networks, and publicly traded companies such as CrowdStrike.¹³¹ Centripetal launched its RuleGate Network Protection System (NPS) 2.4 in 2015, building on earlier NPS products going back to 2014.¹³²

Cisco was founded in 1984 and is the world’s largest provider of network infrastructure. Beyond networking equipment, including switches and routers, Cisco markets and sells wireless access points, controllers, and network management devices, along with a variety of security solutions, including firewalls and endpoint protection software. Cisco sells many products that use its IOS XE 16.6 Networking software. These include Cisco’s Catalyst Switches, Cisco’s ASR and ISR Series Routers, Cisco ASA with FirePOWER Services Products, and Cisco’s Stealthwatch Products.¹³³ Each of these product lines contains several models that Centripetal alleged infringed its patents.

2. Overview of Collaboration and Litigation Activities

Centripetal and Cisco had several interactions between 2014 and 2018 prior to Centripetal asserting its patents against Cisco. The earliest interactions discussed in the complaint started on or around 2014, when Centripetal

129. Post valuation after last funding round in 2016.

130. See Complaint at 1, *Centripetal Networks, Inc. v. Cisco Systems, Inc.*, No. 2:18-cv-0094 (E.D. Va. Feb. 13, 2018).

131. *Centripetal*, PITCHBOOK, <https://my.pitchbook.com/profile/59179-78/company/profile#>, <https://perma.cc/L4AB-2XKD> (last accessed July 20, 2023).

132. Press Release, Centripetal Networks, Centripetal Networks Announces the Latest Release of RuleGate® Network Protection System (Apr. 20, 2015), <http://www.prweb.com/releases/2015/04/prweb12664218.htm>.

133. See Complaint at 9, *Centripetal Networks, Inc. v. Cisco Sys., Inc.*, No. 2:18-cv-0094 (E.D. Va. Feb. 13, 2018).

partnered with ThreatGRID. ThreatGRID sold threat intelligence technology that Centripetal integrated with their own patented products. Cisco later acquired ThreatGRID in 2016. Centripetal believes that Cisco benefited from its acquisition of ThreatGRID through “increased exposure to Centripetal’s patented technology as a result of the acquisition of ThreatGRID.”¹³⁴

After Centripetal and Cisco signed an NDA, in February 2016, Centripetal presented detailed, highly sensitive, confidential information about its patented technology and products to Cisco during a WebEx conference call. This presentation included details of its patented technology for the Asserted Patents. For example, Centripetal detailed how its “patented filter algorithms eliminate the speed and scalability problem,” how its “patented system, live update, and correlation technologies ‘automate workflow’” and how its “patented” “instant host correlation” conveys “real time analytics.”¹³⁵

After the WebEx meeting, a Cisco engineer, who attended the meeting, wrote an internal email, stating the team should “look at these algorithms” that Centripetal had and “study their [patent] claims.”¹³⁶ The next day, on February 5, 2016, a Centripetal employee sent an e-mail to Cisco summarizing the WebEx meeting, noting that Cisco “seemed to hone in on our filter technology and algorithms. The algorithms are a significant networking technology with broad application that we’ve productized for security. There were also a few questions on our patents”¹³⁷

There were a number of follow-up meetings with Cisco, including a request from Cisco’s security architect, who was very interested in Centripetal’s patented technology. He requested and received a demonstration of Centripetal’s patented RuleGate product, which he described in an online blog that educates Cisco employees entitled “Cool Tool: Centripetal Networks RuleGate—Threat Intelligence Tool,” and where he stated, “I found this tool to be a pretty cool new approach to leveraging threat data.”¹³⁸

Later in 2016, Cisco invited Centripetal to participate in Cisco Live, Cisco’s annual trade show. Centripetal was asked to demonstrate its technology in Cisco’s Security Partner Village booth. Centripetal attended the Cisco Live conference and demonstrated its patented RuleGate Threat Intelligence Gateway product, which included some of the asserted patents. At the time, Cisco

134. *Id.* at 23.

135. *See* Centripetal Networks, Inc. v. Cisco Sys., Inc., 492 F.Supp.3d 495, 598 (E.D. Va. 2020).

136. *Id.*

137. *Id.*

138. *Id.*

listed Centripetal on its website, as part of a partner ecosystem whose “[t]hreat intelligence platforms use Threat Grid.”¹³⁹

Near the end of 2016, Cisco had several meetings with the investment bank Oppenheimer & Co. about Centripetal. These meetings stemmed from Centripetal’s engagement with Oppenheimer to evaluate companies who were interested in making a strategic investment in Centripetal. During the meetings Oppenheimer presented Cisco with additional information about Centripetal, “including a list of Centripetal’s patents issued at the time, product offerings that practice the patents, and a highly sensitive, detailed technical disclosure which detailed the core RuleGate functionalities covered by the Asserted Patents.”¹⁴⁰

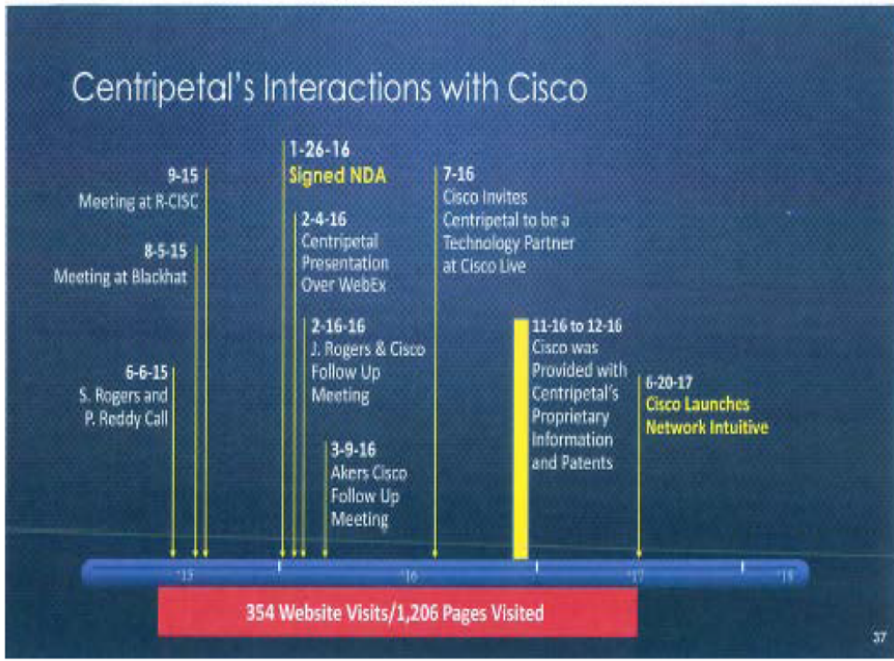
Below in Figure 4.4 is Slide 37, which Centripetal presented during its opening statements at trial. It summarizes in a timeline Centripetal and Cisco interactions leading up to Cisco’s launch of “network of the future” products that incorporate Centripetal’s patented technology.¹⁴¹

139. Amended Complaint at 24, *Centripetal Networks, Inc. v. Cisco Sys., Inc.*, No. 2:18-cv-0094 (E.D. Va. Oct. 5, 2020).

140. *See* Opinion and Order at 150–51, *Centripetal Networks, Inc. v. Cisco Sys., Inc.*, No. 2:18-cv-0094 (E.D. Va. Oct. 5, 2020).

141. *Id.* at 151–52.

Figure 4.4: Timeline of interactions between Centripetal and Cisco.



Then on February 13, 2018, Centripetal filed a complaint against Cisco for infringement of several of Centripetal's patents in the Eastern District of Virginia. Table 4.9 below provides an overview and status of the U.S. litigation activities in federal district court, the Court of Appeals for the Federal District (CAFC), and the Patent Trial and Appeal Board (PTAB) at the U.S. Patent and Trademark Office (USPTO).

To summarize, eleven patents were asserted against Cisco. Eight claims from four patents were found valid and infringed. Damages of about \$756M were awarded and enhanced due to willful infringement by 2.5 times for a total damages award of about \$1.9B. Pre-judgement interest of \$14M and a running 10% royalty on apportioned sales for the next three years and 5% for the subsequent three years resulted in a total award of about \$2.75B in favor of Centripetal.¹⁴²

Of the nine patents that Cisco challenged through the PTAB's IPR program, two were denied institution, seven were instituted, and nearly all claims

142. See Opinion and Order at 166, *Centripetal Networks, Inc. v. Cisco Sys., Inc.*, No. 2:18-cv-0094 (E.D. Va. Oct. 5, 2020).

were found unpatentable. In total there were 190 total claims challenged, and 185 claims found unpatentable.¹⁴³

The case was appealed by Cisco to the CAFC in April 2021, and the CAFC published its decision in June 2022.¹⁴⁴ In the end, the three-judge panel from the CAFC reversed the Opinion & Order denying Cisco's Motion for Miscellaneous Relief, vacated the Opinion & Order regarding Infringement and Damages and the Opinion & Order Denying Post-Judgment Motions & Declaring the Case Final, and remanded for further proceedings before a newly appointed judge, who shall decide the case without regard for the vacated opinions and orders. The CAFC decision, which disqualified the District Judge Henry C. Morgan, stemmed from the finding that Judge Morgan's wife held 100 shares of Cisco stock while the case was pending before Judge Morgan. The total value of the stock held by Judge Morgan's wife for which the \$2.75B decision was reversed was about \$4,000.¹⁴⁵ As a percentage of Cisco's market cap, the impact of the decision would hypothetically result in a \$60 investment loss to Judge Morgan's wife on a \$4,000 stock holding.¹⁴⁶

143. *Id.* at 2–3, 166.

144. *See* Defendant's Notice of Appeal, *Centripetal Networks, Inc. v. Cisco Sys., Inc.*, No. 2:18-cv-0094 (E.D. Va. Apr. 14, 2021); *Centripetal Networks Inc. v. Cisco Sys. Inc.*, 38 F.4th 1025 (Fed. Cir. 2022).

145. *Centripetal Networks, Inc. v. Cisco Sys., Inc.*, 38 F.4th 1025, 1027 (Fed. Cir. 2022).

146. Calculation: Judge Morgan's wife's investment loss = (patent damages/market cap) * (value of shares held).

Table 4.9 Overview of U.S. litigation between Centripetal and Cisco.

| Case | Date | Patents | Venue | Status |
|-----------------------------|------------|---|-------|--|
| <i>Centripetal v. Cisco</i> | 02-13-2018 | 9,686,193 9,560,176 9,560,077 9,413,722 9,203,806 9,160,713 9,124,552 9,565,213 9,137,205 9,674,148 9,917,856 | EDVA | At trial, Centripetal asserted that Cisco infringes Claims 63 and 77 of '205, Claims 9 and 17 of '806, Claims 11 and 21 of '176, Claims 18 and 19 of '193, and Claims 24 and 25 of '856. Opinion issued October 5, 2020: '856, '176, '193, '806 valid and infringed. '205 not infringed. Damages of \$755,808,545. Willful infringement enhanced damages 2.5x to \$1,889,521,362.50. Pre-judgement interest of \$13,717,925. Total of \$1,903,239,287.50. Running 10% royalty on apportioned sales for three years, 5% royalty for following three years. |

| | | | | |
|-----------------------------|---------------------------------------|--|------|--|
| Cisco IPRs | Filed between 3-31-2020 and 7-27-2020 | Denied: 9,686,193 9,560,176 Instituted: 9,160,713 9,124,552 9,565,213 9,674,148 9,560,077 9,413,722 9,137,205* | PTAB | For Instituted: All claims invalidated. Some appealed; all affirmed on appeal. *205 unasserted claims invalidated. |
| <i>Centripetal v. Cisco</i> | 4-19-2021 | Appeal | CAFC | Reverse Opinion & Order denying Cisco's motion for Miscellaneous Relief (Recusal of Judge due to wife holding 100 shares of Cisco stock), Vacate order regarding infringement and damages and the Opinion & Order Denying Post-Judgment Motions & Declaring the Case Final, and remand for further proceedings before a newly appointed judge, who shall decide the case without regard for the vacated opinions and orders. |

There was also at least one case filed by Centripetal in the German courts, according to Cisco's 10-K for the fiscal year ending July 30, 2022.¹⁴⁷ In total, Centripetal filed complaints asserting six patents against Cisco in the District Court of Düsseldorf, Germany.¹⁴⁸

These cases are in various stages:

- Centripetal asserted three European patents, seeking both injunctive relief and damages against Cisco in April of 2020. Two of the three European patents are counterparts to two U.S. patents Centripetal asserted one of which has been invalidated by the PTAB.¹⁴⁹
- In June of 2021, Centripetal amended one of its complaints to assert one additional European patent and one additional German Utility Model patent.
- Later in 2021 the German Court rejected Centripetal's complaints on two of the asserted patents; Centripetal appealed.¹⁵⁰
- A hearing for a Cisco nullity action in the Federal Patent Court in Germany on one of those two patents occurred on August 1, 2022. At the time of writing, the Court's opinion has yet to be published.¹⁵¹
- On December 21, 2021, the German Court stayed its decision on infringement of the third patent pending a decision by the Federal Patent Court in a related nullity proceeding.¹⁵²
- On May 17, 2022, Centripetal withdrew its complaint for infringement of the German Utility Model patent. The proceedings on Centripetal's European patent filed on June 22, 2021 remains pending.¹⁵³
- On February 14, 2022, Centripetal filed an additional complaint asserting infringement of another patent issued by the European Patent Office. Centripetal seeks both injunctive relief and damages on these patents.¹⁵⁴

147. *See* Cisco Systems, Inc., Annual Report (Form 10-K) (July 30, 2022), <https://d18rn0p25nwr6d.cloudfront.net/CIK-0000858877/3ba9f4b0-a7e6-496e-8c94-78b0ae2c026c.pdf>.

148. *Id.* at 91.

149. *Id.*

150. *Id.*

151. *Id.*

152. *Id.*

153. *Id.*

154. *Id.*

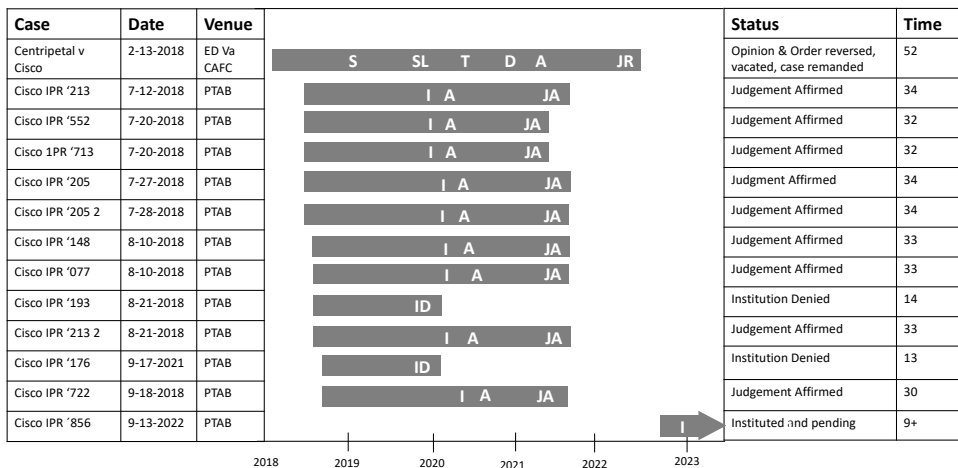
3. *Specific Litigation Behavior and Results*

This Section IV.B.3 provides a deeper look into the specific legal proceedings that define the overall litigation campaign between Centripetal and Cisco in the US. This includes specific information regarding the venue, patents-in-suit, key dates, key motions, and current status or final disposition that define the litigation behavior in the commercial context of a small, VC-funded operating company (Centripetal) versus a very large operating company (Cisco).

There has been one patent infringement lawsuit filed in the U.S. district court system—by Centripetal against Cisco. The lawsuit has asserted a specific set of patents. This Section IV.B.3 is organized around the asserted patent sets, including the associated proceedings at the PTAB and CAFC in order to better understand the litigation behavior at the patent level.

Figure 4.5: Timelines of specific U.S. litigation activities between Centripetal and Cisco. Time = months.

(S=Stay, SL=Stay Lifted (for non IPR patents and claims), O=Opinion, A=Appeal, I=Instituted, M=Markman, T=Trial, D=Decision, ID=Institution Denied, JA=Judgement Affirmed, JR=Judgement Reversed)



On February 13, 2018, Centripetal filed a patent infringement complaint in the Eastern District of Virginia against Cisco, followed by an amended complaint on March 29, 2018, asserting infringement of eleven U.S. patents shown in Table 4.10.¹⁵⁵ Both the '205 patent and the '856 patent were previously asserted in a case against Keysight Technologies, and the '176, '193, and '806

155. See Opinion and Order at 1-2, Centripetal Networks, Inc. v. Cisco Sys., Inc., No. 2:18-cv-0094 (E.D. Va. Oct. 5, 2020).

patents are in the same patent family and covered similar fields of technology as the patents that were asserted in the previous case.¹⁵⁶

Between July 12, 2018 and September 18, 2018, Cisco filed numerous petitions for IPR before the PTAB against nine of the eleven Centripetal patents originally asserted against Cisco shown in Table 4.10.¹⁵⁷ Cisco also filed a motion to stay pending resolution of IPR proceedings,¹⁵⁸ which was granted by the court on February 25, 2019.¹⁵⁹ Upon the motion of Centripetal, on September 18, 2019, the Court issued an order lifting the stay in part with respect to patents and claims not currently subject to IPR proceedings and setting the case for trial in April 2020.¹⁶⁰ The parties later waived a jury trial following the jury trial limitations resulting from the COVID-19 pandemic.¹⁶¹

At the 22-day bench trial beginning April 2020, Centripetal asserted that Cisco infringed claims 63 and 77 of the '205 patent, claims 9 and 17 of the '806 patent, claims 11 and 21 of the '176 patent, claims 18 and 19 of the '193 patent, and claims 24 and 25 of the '856 patent.¹⁶² Of the claims not at issue for trial, the PTAB granted institution of IPR on all of the claims of the '552, the '713, the '213, the '148, the '077, and the '722 patents and granted institution of IPR of claims of the '205 patent that were not the subject of the bench trial.¹⁶³

The PTAB invalidated all of the claims of the '552, the '713, the '213, the '148, and the '077 patents and invalidated the unasserted claims of the '205 patent. Centripetal appealed the PTAB decisions regarding the '552, the '713, the '213, the '148, and the '077 patents as well as the unasserted claims of the '205 patent.¹⁶⁴ All PTAB decisions were affirmed by the CAFC between March 10, 2021 and May 12, 2021.¹⁶⁵

For the '176 patent and the '193 patent, institution was denied by the PTAB. Finally, for the '722 patent, 20 claims were held unpatentable, while five claims were deemed not unpatentable by the PTAB. After an appeal, the PTAB decisions were affirmed by the CAFC.¹⁶⁶

156. *Id.* at 128; Centripetal Networks, Inc. v. Keysight Techs., Inc., 2018 BL 401352 (E.D. Va. Sept. 25, 2018).

157. Opinion and Order at 2, Centripetal Networks, Inc. v. Cisco Sys., Inc., No. 2:18-cv-0094 (E.D. Va. Oct. 5, 2020).

158. *Id.*

159. *Id.*

160. *Id.*

161. *Id.*

162. *Id.*

163. *Id.*

164. *Id.* at 3.

165. *See* Centripetal Networks, Inc. v. Cisco Sys., Inc., 847 Fed. Appx. 869 (Fed. Cir. 2021); Centripetal Networks, Inc. v. Cisco Sys., Inc., 847 Fed. Appx. 927 (Fed. Cir. 2021).

166. *Id.*

On October 5, 2020, Judge Morgan issued a 167-page Opinion and Order containing his findings of fact and conclusion. He wrote:

For the reasons stated within, the Court FINDS the '856 Patent, the '176 Patent, the '193 Patent, and the '806 Patent claims valid and literally INFRINGED and the '205 Patent NOT INFRINGED. The Court FINDS the actual damages suffered by Centripetal as a result of infringement total \$755,808,545; that the infringement was willful and egregious and shall be enhanced by a factor of 2.5x to equal \$1,889,521,362.50. The Court awarded pre-judgment interest of \$13,717,925 applied to the actual damages before enhancement plus its costs. This, accordingly, equals a total award of \$1,903,239,287.50 payable in a lump sum due on the judgment date. The Court, additionally, imposes a running royalty of 10% on the apportioned sales of the accused products and their successors for a period of three years followed by a second three-year term with a running royalty of 5% on said sales upon the terms described supra. It DENIES any further relief to Centripetal at the termination of the second three-year term.¹⁶⁷

Table 4.10: *Centripetal v. Cisco* patents-in-suit (EDVA and PTAB).

| U.S. Patent # | P/G | Description | Claims | Validity |
|------------------|---------------|--|--------|---|
| <u>9,565,213</u> | 2012/ 2017 | Methods and systems for protecting a secured network | 16 | IPR—All challenged claims unpatentable. |
| <u>9,124,552</u> | 2013/ 2015 | Filtering network data transfers | 21 | IPR—All challenged claims unpatentable. |
| <u>9,160,713</u> | 2013/ 2015 | Filtering network data transfers | 20 | IPR—All challenged claims unpatentable. |

167. Opinion and Order at 166, *Centripetal Networks, Inc. v. Cisco Systems, Inc.*, No. 2:18-cv-0094 (E.D. Va. Oct. 5, 2020).

| | | | | |
|------------------|---------------|--|----|---|
| <u>9,137,205</u> | 2012/ 2015 | Methods and systems for protecting a secured network | 97 | IPR—57 challenged claims Unpatentable; District court—claims 63 & 77 valid but not infringed. |
| <u>9,674,148</u> | 2013/ 2017 | Rule swapping in a packet network | 20 | IPR—All challenged claims unpatentable. |
| <u>9,560,077</u> | 2012/ 2017 | Methods and systems for protecting a secured network | 20 | IPR—All challenged claims unpatentable. |
| <u>9,413,722</u> | 2015/ 2016 | Rule-based network-threat detection | 25 | IPR—Claims 1–7, 10–12, 14–21, 24, 25 unpatentable; claims 8, 9, 13, 22, 23 not unpatentable. |
| <u>9,560,176</u> | 2015/ 2017 | Correlating packets in communications networks | 21 | IPR—Institution denied; District Court—Claims 11 & 21 valid and infringed. |
| <u>9,686,193</u> | 2015/ 2017 | Filtering network data transfers | 20 | IPR—Institution denied; District Court—Claims 18–19 valid and infringed. |
| <u>9,203,806</u> | 2013/ 2015 | Rule swapping in packet network | 24 | District Court—Claims 9 & 17 valid and infringed. |

| | | | | |
|-----------|---------------|--|----|--|
| 9,917,856 | 2015/ 2018 | Rule-based network-threat detection for encrypted communications | 25 | District Court— Claims 24 & 25 valid and infringed. |
|-----------|---------------|--|----|--|

On April 14, 2021, Cisco appealed the decision to the Federal Circuit from the Eastern District of Virginia, citing many of the fundamental decisions and rulings from the case.¹⁶⁸ Cisco also moved for amended findings and judgment under Federal Rule of Civil Procedure 52(b) with respect to direct infringement and damages and for a new trial under Rule 59(a)(2).¹⁶⁹ The court denied those motions on March 17, 2021.¹⁷⁰ However, on June 23, 2022, Cisco's appeal regarding the question of whether the district judge should have recused himself under 28 U.S.C. § 455(b) was decided by the CAFC, who vacated the district court's decision and remanded the case for further proceedings before a newly appointed judge, who shall decide the case without regard for the vacated opinions and orders.¹⁷¹ One day later on June 24, 2022, Cisco filed an IPR on the '856 patent, which was instituted by the PTAB on January 4, 2023.¹⁷² In the interim, on September 13, 2022, Centripetal filed a petition for writ of certiorari, which was denied on December 5, 2022.¹⁷³

4. Case Discussion

Below is a short discussion of several key aspects of the *Centripetal v. Cisco* litigation from a patent holdout perspective.

a) Intrinsic Patent Holdout Challenges

Centripetal v. Cisco is another classic example of the intrinsic challenge in settling patent disputes through the U.S. court system in a timely and cost-effective manner. The litigation initiated at the Eastern District of Virginia took over 52 months through appeal, resulting in a vacated multibillion-dollar

168. See Defendant's Notice of Appeal, *Centripetal Networks, Inc. v. Cisco Sys., Inc.*, No. 2:18-cv-0094 (E.D. Va. Apr. 14, 2021).

169. See *Centripetal Networks, Inc. v. Cisco Sys., Inc.*, 526 F. Supp. 3d 137, 139–40 (E.D. Va. 2021).

170. *Id.*

171. *Centripetal Networks, Inc. v. Cisco Sys., Inc.*, 38 F.4th 1025, 1040 (Fed. Cir. 2022).

172. *Cisco Sys., Inc. v. Ahn*, No. IPR 2022-01151 (P.T.A.B. May 23, 2023).

173. *Centripetal Networks, Inc. v. Cisco Sys., Inc.*, 143 S. Ct. 487 (2022).

judgement over a \$4,000 stock position by the judge's wife that, if anything, would be negatively affected by the court's decision. Given the court's infringement date of June 2017, the dispute is now ongoing for over five years without a settlement. Additionally, the total cost of litigation across all venues is likely tens of millions of dollars. The case also further highlighted the fundamental difficulty in finding agreement even on common language in a contentious proceeding. Appendix A provides an example of testimony by experts over the meaning of the terms "immediately" and "also." In addition, the fundamental difficulty in overcoming validity and infringement challenges was exemplified when the court cited "Cisco's lockstep strategy of denying any infringement of any of the elements of the four claims where infringement is found, and backstopping this position by contending that if the Court found infringement the patents were ipso facto invalid, led to a number of factual conflicts in its presentation of its evidence."¹⁷⁴ While Centripetal is orders of magnitude smaller than Cisco, it appears to have been able to use its VC funding to manage the extensive costs and timeframe necessary to participate effectively in U.S. patent enforcement.

b) Extrinsic Patent Holdout Challenges

The extrinsic challenges impacting the patent system over the past two decades are visible in the litigation behavior in this dispute, including the following:

- The difficulty to obtain injunctive relief in federal court after *eBay*.
- The use of the PTAB to challenge patent validity through an IPR at the USPTO instead of federal court, which applies a higher burden of proof.¹⁷⁵ In this case, Cisco requested an IPR on nine of the eleven patents in suit, succeeding to institute and invalidate seven patents. The court added that the "many requests for inter partes review, by necessity, delayed the trial."¹⁷⁶
- The convergence of cybersecurity technology into network infrastructure was clear driver of value to Cisco given the increase of approximately \$5.575 billion in Cisco's revenue over three years by adding the infringing functionality to their non-

174. Centripetal Networks, Inc. v. Cisco Sys., Inc., 492 F. Supp. 3d 495, 519 (E.D. Va. 2020).

175. See *Novartis AG v. Noven Pharm. Inc.*, 853 F.3d 1289, 1294 (Fed. Cir. 2017).

176. Centripetal Networks, Inc. v. Cisco Sys., Inc., 492 F. Supp. 3d 495, 518 (E.D. Va. 2020).

infringing product lines.¹⁷⁷ Cisco has a long history of acquiring small startup firms with valuable technology, which explains the initial collaboration and vetting.

c) Patent Holdout Behavior

In *Centripetal v. Cisco*, the court took on the issue of bad-faith behavior directly in its determination of willful infringement and enhanced damages. Specifically, the court applied the following nine *Read* factors to the evidence in the case:¹⁷⁸

1. **Deliberate copying**—Cisco’s release of products with Centripetal’s functionality within a year of meetings where Centripetal provided demonstrations and confidential information as “beyond mere coincidence.”¹⁷⁹
2. **Defendant’s investigation and good-faith belief of invalidity or non-infringement**—Cisco presented no evidence of any such investigation and its own technical and marketing documents suggest it would have been difficult to form such a belief.¹⁸⁰
3. **Litigation behavior**—“Cisco had to shield the engineers who authored its current technical documents and the executives who praised its new security functionality for ‘solving problems previously thought unsolvable’ from answering to their own writings and statements.”¹⁸¹ Furthermore, the court added that “[m]ost of Cisco’s challenges amounted to no more than conclusory statements by its experts without evidentiary support.”¹⁸²
4. **Defendant’s size and financial condition**—“Cisco’s immense size and commercial success with the infringing products.”¹⁸³
5. **Closeness of the case**—“the rulings on the four patents that were found infringed and valid were clear and not a close call.”¹⁸⁴

177. *Centripetal Networks, Inc. v. Cisco Sys., Inc.*, 492 F. Supp. 3d 495, 603 (E.D. Va. 2020).

178. *Read Corp. v. Portec, Inc.*, 970 F.2d 816, 826-27 (Fed. Cir. 1992).

179. *Centripetal Networks, Inc. v. Cisco Sys., Inc.*, 492 F. Supp. 3d 495, 602 (E.D. Va. 2020).

180. *Id.*

181. *Id.*

182. *Id.* at 523.

183. *Id.* at 603.

184. *Id.*

6. **Duration of the misconduct**—the “infringing conduct has been continuous and unabated without any form of remedial action from June 20, 2017, to the present time.”¹⁸⁵
7. **Remedial action by the defendant**—the court noted no remedial action by Cisco even after the suit was filed.¹⁸⁶
8. **Defendant’s motivation for harm**—not cited by the court.
9. **Attempted concealment of the misconduct**— “Cisco, through its course of conduct, continually gathered information from Centripetal as if it intended to buy the technology from Centripetal. Cisco, then, appropriated the information gained in these meetings to learn about Centripetal’s patented functionality and embedded it into its own products.”¹⁸⁷ The court further noted the use of new technical and marketing that differed from their own official technical and marketing documentation that was admitted into evidence by Centripetal.

d) Patent Holdout Impact

As noted in Table 3.1, no STF in the past ten years is yet to receive a payment after a very large damage award on the district court level. This case falls into the pattern as well. However, for the sake of argument, one important question that this case highlights is whether a patent holder can truly be made whole through court-determined compensation (i.e., a liability rules based system). While the court found that Cisco ticked most of the *Read* boxes to justify a finding of bad-faith patent holdout behavior (see above), one could make an argument that the 2.5x enhanced damages is a sufficient remedy, thus resulting in no patent holdout impact in this particular case. Instead, the vacated and remanded ruling adds another data point in support of the hypothesis of systematic patent holdout as inherent in the current patent system.

V. TOWARD A THEORY OF PATENT HOLDOUT IN THE SMALL(ER) TECHNOLOGY FIRM (STF) CONTEXT

While the development of patent holdout theory has primarily grown out of the context of standards and SEPs, it is argued that the general principles can be applied to any IP right enforcement situation involving opportunistic behavior.¹⁸⁸ Similarly, Lemley and Shapiro argued primarily for the case of

185. *Id.* at 603–4

186. *Id.*

187. *Id.* at 604.

188. Epstein & Noroozi, *supra* note 36, at 1384.

patent holdup in the context of PAEs. Thus, building symmetrically on Lemley and Shapiro’s definition of patent holdup: if weak patents in a system of strong injunctive relief can hypothetically create increased bargaining power for patent holders (i.e., patent holdup), then strong patents in a system of weak injunctive relief can hypothetically create increased bargaining power for potential infringers (i.e., patent holdout) and lead an infringing firm to negotiate royalties far below the patent holder’s true economic contribution. Concomitantly, if Farrell and Shapiro can ask “how strong are weak patents?” in 2008, then we must also be able to ask “how weak are strong patents?” in 2023. Below are a number of key theoretical propositions to better define patent holdout in the STF context.

A. TYPOLOGY OF PATENT HOLDOUT FOR STFs

To understand the nature and impact of patent holdout for STFs, a holistic typology is required to identify the different STF contexts and behaviors resulting from patent holdout. Below is a list of specific types and behaviors that define STFs faced with a patent holdout situation:

1. *Types of STFs that Can Experience Patent Holdout*

- **Hybrid Operating Companies (OPCOs):** Smaller operating companies that deploy a hybrid business model to extract value from their patented technology that covers multiple application areas and geographies where they may not be best suited to compete directly on the product/service market.
- **Non-Practicing Entities (NPEs)**¹⁸⁹: Companies who seek solely to license their own patented technology instead of vertically integrate onto the product/service market by choice or due to the lack of complementary assets.
- **Patent Assertion Entities (PAEs) by proxy:** Companies that collaborate with or have acquired patents from hybrid OPCOs or NPEs discussed above. This may be a necessity for STFs that don’t have the financial strength to litigate themselves—see below.

2. *Types of STF Behavior in Response to Patent Holdout*

- **Forced to litigate:** The most obvious outcome is that STFs will be forced to litigate using their own financial resources or financial backing. As many STFs won’t have the financial resources to cover the high litigation costs over the extended timeframe of U.S. litigation, many

189. The term of art “non-practicing” is used descriptively, not pejoratively, to denote firms that do not commercialize their technology through the sale of products and services.

will need to turn to either litigation financiers or collaborate with PAEs for support. As both actors will take a large cut of any award or settlement from litigation, one could argue that the STF, even under the best circumstances, will likely receive less value than the true contribution of their patent technology. Subsequently, licensees could discount any pre-litigation offer by the amount of the cost of litigation and/or equity lost through the need to engage third-party litigation support, which could facilitate a systemic hold-out effect for the subcategory of STFs with less financial resources.

- **Unable to litigate or settle:** Many STFs may be unable to or choose not to litigate for the financial reasons discussed above or for other commercial reasons (e.g., the alleged infringer is an important actor in the value chain). The high transaction costs associated with litigation can serve as an indemnification for infringement. When the value of successful litigation is adjusted for risk (and shared equity), this indemnification can be quite high from the STF perspective (e.g., potentially ranging from \$10-100M depending on the number of patents and different venues). This should produce an observable empirical impact unless STFs are able to mitigate the loss of patent enforcement with other sources of competitive advantage.
- **Forced to settle:** Similar to reasons above, STFs that are unable to litigate may be forced financially to settle for an amount lower than the true value of their patented technology. This information is difficult to observe due to the lack of transparency of settlement deals and the challenge in calculating “true” value as reference.
- **Firm failure:** The STF fails for lack of investment based on the critical need for patent protection and the perception of uncertain patentability and ineffectual patent enforcement by venture financiers.

B. HOLDOUT BEHAVIOR BY ALLEGED INFRINGERS – BAD-FAITH VS. SYSTEMATIC INCENTIVES

Both patent holdup and holdout behaviors are often described in pejorative terms that imply bad faith. For example, firms accused of patent holdup are “trolls” and firms accused of patent holdout are “predatory infringers.” When these terms are applied broadly to all circumstances of patent licensing that are contentious, the fundamental challenges facing markets for technology are lost in the rhetoric. Below is a description of specific characteristics that define patent holdout by alleged infringers from good-faith to bad-faith to systemic:

1. *Good-Faith Behavior (i.e., Not Patent Holdout)*

The intrinsic challenges of the patent system require a certain amount of cost, time, and uncertainty to be regarded as within the bounds of good-faith behavior by potential licensees. For example, validity and infringement will likely never be fully agreed even when there is an ongoing negotiation, as doing so would open the licensor to willful infringement should there be litigation. Furthermore, actors can have target prices differing by orders of magnitude based on legitimate perceptions of the apportionment of value of the patented technology in relation to the overall value of a new, complex infringing product or service. This can become even more difficult to determine if the infringing product or service is on the subsidized side of a multi-sided market business model. Below are specific yet subjective circumstances that could be considered a good-faith behavior by a licensee:

- A reasonable time spent conducting due diligence on asserted patents (e.g., actors can legitimately disagree regarding validity and infringement).
- A reasonable time spent negotiating over price and terms.
- Refusal to accept an unreasonable offer or settlement.¹⁹⁰
- Petitioning a court or employing other ADR methods to resolve legitimate legal and factual uncertainties.

2. *Bad-Faith Behavior*

The line between good-faith and bad-faith behavior can be difficult to ascertain completely without formal discovery unless the licensee's behavior is particularly obvious. Below are several examples of bad-faith behavior that are subjective but possible to ascertain either informally or formally through judicial proceedings:

- Willful infringement.
- Refusal to negotiate.
- Refusal to accept a reasonable offer based on well-accepted market norms.¹⁹¹
- Conducting sham litigation for the sole purpose to delay and increase the litigation costs for the patent holder.

190. This is, of course highly subjective. Even when courts award damages, one or both of the parties is often unsatisfied.

191. This requires knowledge of the range of the settlements offered by both sides. If the range of offers was well above or below the buyers and sellers target price, litigation or other dispute resolution methods are appropriate behaviors.

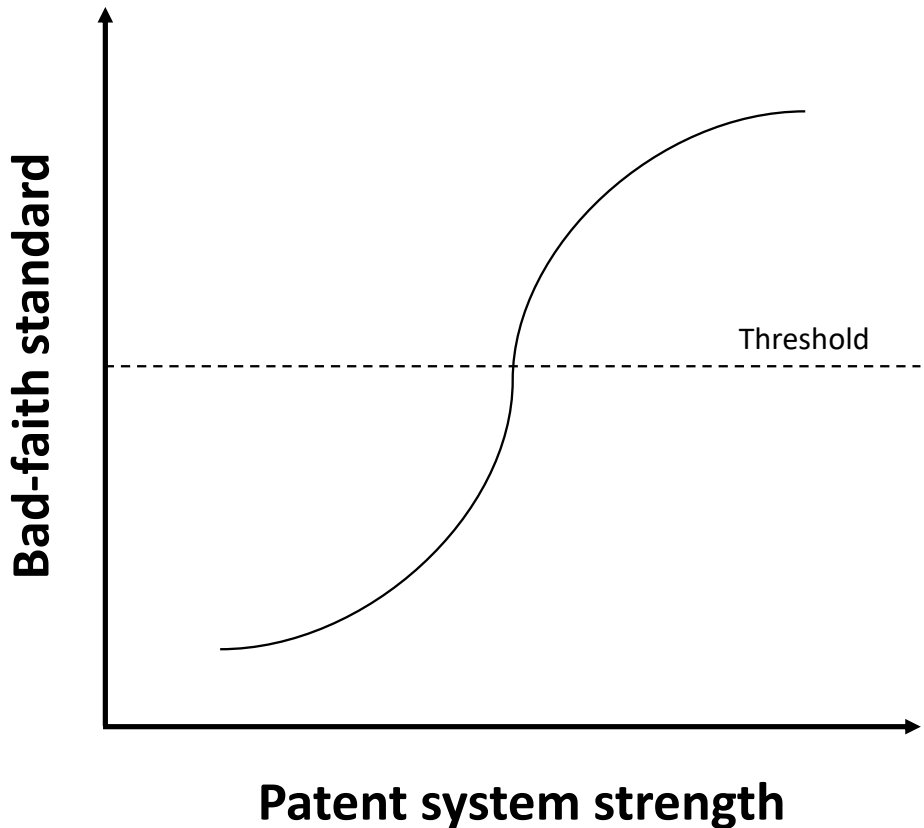
A key question is where the line is between patent due diligence and opportunism (i.e., between a willing licensee conducting reasonable due diligence and an unwilling licensee or willing infringer deploying a patent holdout strategy).

3. Rational Behavior Incentivized by the Patent System

While acknowledging the possibility for change, it is difficult not to put forward the proposition that patent holdout is inherent in the U.S. patent system based on the intrinsic challenges of high costs, long timeframes, and probabilistic patent validity. The theoretical probability for systematic patent holdout is further enhanced when injunctions are reduced, granted patents are easier to invalidate, and damages are more difficult to uphold.

Figure 5.1 below shows the relationship between bad-faith behavior and the weakening of the patent system. At some point, it is difficult to separate bad-faith behavior from rational behavior incentivized by the system, which is depicted by the “threshold” in the figure. For example, if there was no enforcement possibility, would it be bad faith for an infringer not to pay?

Figure 5.1: The relationship between bad-faith behavior and patent system strength.



4. *Rational Behavior Incentivized by Market Forces*

In addition to patent system incentives, market forces also create powerful incentives that impact patent holdout behavior, including:

- **Collective action problems**
 1. **Refusal to license**—when paying a royalty would put a potential licensee at a pricing disadvantage with an unlicensed competitor, it will refuse to take a license until all its competitors are also licensed, creating a collective holdout effect.
 2. **Disperse political power**—while society could benefit as a whole from increased patent enforcement opportunities for STFs, the organization of these small firms to collectively impact the political process is limited against bigger actors.
- **Adverse signaling**—potential licensees are disincentivized to take a license and settle without a fight if this would signal weakness and

attract a greater group of firms seeking a license. It would both incentivize actors asserting patents as well as generating evidence of comparable licenses.

- **Positive externalities**—the use of IPRs and other invalidity proceedings generates a positive externality as an invalid patent benefits all potential licensees. This can lead to direct or indirect collusion by potential licensees, especially when a patent holder is asserting its patents against multiple actors.

C. PATENT HOLDOUT IMPACT

Even if patent holdout behavior is present, it is still necessary to measure the economic impact of that behavior to understand the effect on social welfare. Below is a model describing the different levels of patent holdout impact and the theoretical propositions informed by this Article's study.

- a. **Circumstantial effect**—there is preliminary empirical evidence of circumstantial patent holdout based on the small sample of STF litigation in this study. If the primary impact is circumstantial, further research should produce an even distribution of cases where STFs asserting patents experience appropriate settlements or damage awards in relation to those STFs that are compelled to accept compensation lower than the actual value of their patented technology.
- b. **Systematic effect**—there are theoretical prerequisites of a systematic effect based on the logical incentives produced by a patent system with both intrinsic and extrinsic challenges, but confirmation requires further quantitative empirical evidence. Below are several indicators that support the potential existence of systematic patent holdout:
 - The weakening of the patent system with respect to reduced injunctive relief and increased opportunities for patent invalidity.
 - Collective action problems that incentivize potential licensees to holdout and limit that political power of STFs.
 - The difficulty for STF patent holders who have won damage awards to actually receive compensation.

The fact that only one of the cases in Table 3.1 has received an actual payment even after years of litigation and damage awards does not incentivize decision-makers of alleged infringing firms to settle. Of course, further empirical investigation of STF settlement data is needed to draw any clear conclusions. Below are further theoretical

propositions that would be helpful to test the systematic nature of patent holdout:

- How has the invalidity rate of asserted patents changed for STFs during the past 20 years?
 - How does the reduction of injunctive relief alter the bargaining power of STFs in litigation against much larger actors with deep pockets? For example, the litigation with Sonos is not significant enough to be mentioned in Google's 10-K report.
 - Given the lack of very large damage awards that have not been overturned, what is the highest settlement amount that a large actor has paid pre-litigation?
- c. **Systemic effect** – theoretical preconditions exist for a systemic effect for industries where patent protection is critical for investment and leverage to enter markets with large incumbent firms, but confirmation requires further quantitative empirical evidence. Below are several criteria that are important in investigating the potential existence of systemic patent holdout:
- Holdout must include a compulsion to accept a settlement below the real economic value of the patent (e.g., below the reservation price) that has an impact on dynamic efficiency. For example:
 1. The rate of innovation of STFs in an industry is reduced (ex post holdout).
 2. The rate of investment in STFs in an industry is reduced (ex ante holdout).
 - Holdout mitigating factors that lower the systemic impact by balancing bargaining power and incentivizing settlements, including:
 1. The leverage of injunctive relief in foreign countries to generate increased patent owner bargaining power (e.g., Germany, UK, China, and the upcoming EU Unified Patent Court).
 2. The increased use of enhanced damages by district courts that directly and adequately compensate patent holders and indirectly facilitate earlier settlements.

VI. CONCLUSIONS

There are no patent police. This means that patent owners must pay to surveil the market for potential infringers and pay to enforce their patents if

negotiations fail. In a patent system with low transaction costs and speedy, reliable results, this would not be a problem, but, unfortunately, the U.S. patent system is very expensive, lengthy, and uncertain. While large firms can carry this burden, STFs cannot. In addition, the main attribute of any property right system—injunctive relief—has been weakened significantly in the US, thus removing the main instrument STFs have to balance the power in negotiations with larger actors and incentivizing patent holdout behavior as a rational strategy. Below are several key insights resulting from this Article's study:

- The high cost and long timeframes of U.S. litigation combined with the subjective nature of patentability and infringement create an intrinsic patent holdout bias in the U.S. patent system, especially for small(er) technology firms (STFs), as the burden of enforcement falls on the patent holder.
- This intrinsic bias is exacerbated by recent extrinsic judicial and legislative changes that reduce access to injunctive relief and increase opportunities for invalidity, creating a systematic incentive for patent holdout beyond circumstantial bad-faith behavior by individual actors.
- Preliminary statistical results show that:
 - Both OPCOs and NPEs litigate as a means to settle licensing-based infringement disputes.
 - Very few small firms in the past ten years have received court-awarded damages and fewer have ever received an actual payment.
 - The time in litigation ranged from 30-98 months, with most still ongoing.
 - Several \$100M+ cases were vacated after years of litigation over legal technicalities that could have been known at the outset, including the \$2.75B *Centripetal* ruling based on the judge's wife ownership of \$4,000 of Cisco stock. The more ways a patent holder can potentially lose, the more incentive exists for patent holdout.
- Preliminary case study results show that:
 - Both *Sonos* and *Centripetal* show evidence of systematic patent holdout that incentivizes litigation over settlement. The court in the *Centripetal* cases also cited bad-faith behavior leading to enhanced damages for willful infringement.
 - Both STFs and large companies are willing to use the PTAB in litigation (e.g., *Sonos* as well as *Google* and *Cisco* filed IPRs)

- The result of the appeal of Sonos's preliminary win at the ITC will provide evidence on whether extra-judicial orders can facilitate settlements in place of traditional court injunctions.
- The enhanced damages award in the Centripetal case raises the question as to whether the use of willful infringement can provide adequate remedies in equity for a patent holder and disincentivize patent holdout.

Further empirical research is required to better measure the systematic scale and systemic economic impact of patent holdout for STFs, especially given that much of the evidence of systemic patent holdout will manifest in STFs unable to litigate, accepting forced settlements, or failing to receive VC investment.

**APPENDIX A: EXCERPTS OF EXPERT TESTIMONY
FROM *CENTRIPETAL V. CISCO***

The following pages include some of the expert testimony from Cisco's expert, Dr. Douglas Schmidt, an independent expert witness in networking and network security who opined regarding non-infringement, invalidity, and damages of the '856 Patent. The goal of the Appendix is to illustrate the intrinsic challenge of the patent system regarding the subjective nature of patentability and infringement built on the foundation of language.

The following snippet of the transcript from the trial starts on page 47 where Dr. Schmidt is being questioned by Centripetal's counsel¹⁹²:

Q. So we go to 1287. This is a document describing the Catalyst 9000 switch. "Foundation for a New Era of Intent-based Networking." Do you see that, Dr. Schmidt?

A. I do.

Q. Okay. You know Dr. Cole relied on this document in his direct testimony of infringement, correct?

A. I believe so.

Q. Okay. Now if we turn to Page 28 of that document ending in Bates Number 028, there's a graphic at the top here and it talks about the Catalyst 9000 Advanced Security Capabilities. Do you see that?

A. I do.

Q. And you recall Dr. Cole relying on this document, correct?

A. Not particularly, no.

Q. Okay. Well, if you look at the very bottom it says, "Detect and stop threats, exclamation point." Do you see that?

A. I do.

Q. And Dr. Cole used it to show that the Catalyst switches and the routers that have the same operating systems can detect and stop threats prospectively right? Or proactively, correct?

A. I don't believe that that's what it says, no.

Q. So you don't think this says it's going to detect and stop threats proactively?

192. *Centripetal Networks, Inc. v. Cisco Sys., Inc.*, 492 F. Supp. 3d 495, 535–38 (E.D. Va. 2020).

A. I don't know what this slide says in this context. I know that Dr. Cole had an analysis that read the claims in a way that was essentially a non-sequitur, a series of non-sequiturs, and accused things as being part of—the read on the claims, the patent claims that had nothing to do with the way in which the products operate.

Q. I'm asking about your opinion now. When it says, "Detect and stop threats," does that mean it's detecting and stopping the threat before they get to the host?

A. It's not clear what it means in this context. I see the words "detect and stop threat." I don't see how it applies to the patent that we're talking about here.

Q. So you don't know what "detect and stop threat" means is what you're telling the Court?

A. No. I'm just saying I don't know whether it means what you're saying it means.

THE COURT: Well, what do you think it means over on the right where it says "Before, During and After"?

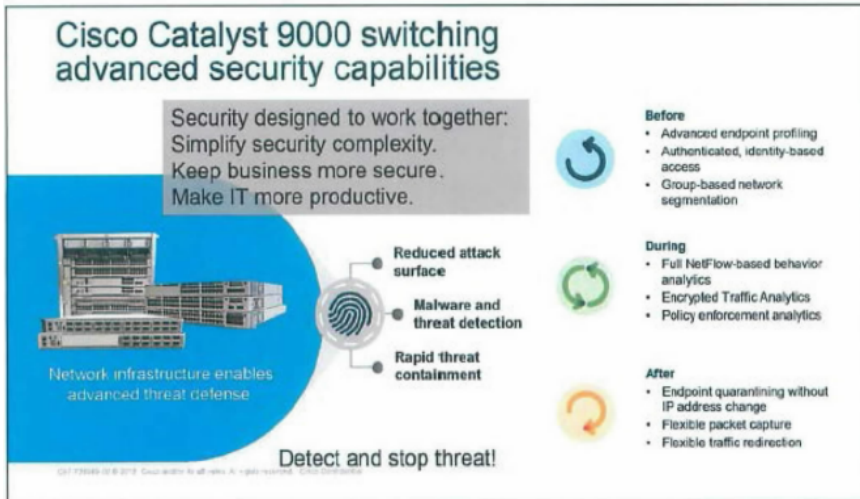
THE WITNESS: It looks like it's saying that—so it looks like it's talking about the fact it's possible to quarantine something, but I don't know how that refers to the—I don't know how that refers to the way in which it reads on the claims and whether what Dr. Cole was alleging has anything to do with what the claims are asserting.

BY MR. ANDRE:

Q. So when it says "During", during the packets coming in, Full Net-Flow-based behavior analytics, Encrypted Traffic Analytics, Policy Enforcement Analytics. You don't have an understanding of what that's referring to?

A. Again, this particular slide is coming out of thin air here, so I would have to spend a little bit of time looking at it to understand the way it's being used in this particular context.

Tr. 1925:16-1927:21; see PTX-1287 at 028 (depicted below).

PTX-1287Cisco Catalyst 9000 Switching Technical Presentation from 2018

It's difficult to comprehend why Dr. Schmidt would state, in his rebuttal of Dr. Cole, that he cannot understand a Cisco post 2017 document because it is "coming out of thin air." In his preparation for his expert testimony, the Court is unaware how or why he overlooked this crucial Cisco document. Dr. Schmidt, when questioned again about this point, stated:

Q. When we talk about Stealthwatch, if we go to the next page, you keep talking about this after-the-fact stuff. On that table on the left there it says, "Real-time detection of attacks by immediately detecting malicious connections from the local environment to the Internet." Do you see that?

A. I do.

Q. So does that make you rethink your opinion that the real-time doesn't mean immediately?

A. No, it does not.

Q. So the word "immediately" doesn't mean immediately in that sentence?

A. Again, immediately is always relative to something. We already know that the packets are always delivered to the destination by the time the work goes up, by the time the NetFlow goes up to Stealthwatch and Cognitive Threat Analytics. And so it will detect it as quickly as it can, but it doesn't say, it doesn't say before the packets are delivered to the destination, does it? It says real-time detection of attacks by immediately detecting malicious connections. But

there's nothing there about it blocking the traffic, it just says it's detecting it.

Tr. 2113:17-2114:12. Dr. Schmidt's testimony is directly refuted by Cisco's own technical documents. For example, Cisco's Catalyst 9000 at-a-glance guide highlights that this line of switches can "detect **and stop** threats, even with encrypted traffic." PTX-199 at 224 (emphasis added). Cisco portrays the benefits of Stealthwatch as "[r]eal time detection of attacks by immediately detecting malicious connections from the local environment to the Internet." PTX-383 at 356. The Stealthwatch Data Sheet confirms that Stealthwatch uses "advanced security analytics to detect **and respond** to threats in **real time**." PTX-482 at 664 (emphasis added). These documents confirm that the accused products are not solely used for detecting, but also for stopping those threats. Furthermore, the Stealthwatch Data Sheet notes that "Stealthwatch can recognize these early signs [of attacks] to **prevent** high impact . . . [o]nce a threat is identified, you can **also** conduct forensic investigations to pinpoint the source of the threat . . ." PTX-482 at 665 (emphasis added). The Court asked Dr. Schmidt about the word "also" in PTX-482:

THE COURT: Why do you think it says "also" there?

THE WITNESS: I think what it's talking about there, Your Honor, if you take a look, it says "You can determine where else it may have propagated." If you look at the —

THE COURT: Do you think maybe it means you can do the things in the first two sentences and also do the thing in the third sentence? Do you think that's what "also" means?

THE WITNESS: I think it's trying to say, sir, that if you look—the forensic investigations they are specifically calling out here are pinpointing where the problem was, so identifying who the bad guy is, and then determining what else might be infected. So that's the problem with network threats; they often spread rapidly like viruses. That's why they're called viruses. So this is saying you can do additional analysis to not just say one person has a problem, but all the other things in the network that that person's connected to somehow, that computer has been connecting to, may also be a problem too. I think that's what "also" means here.

THE COURT: I think "also" means "also" . . .

Tr. 1974:13-1975:6. Notably when Mr. Schmidt previously read the same sentence from PTX-482, he omitted the word "also": "Once a threat is identified, you can ____ conduct forensic investigations." Tr. 1936:16-17. From his own testimony, it is clear to the Court that Dr. Schmidt is solely limiting his

testimony to the forensic after the fact analysis feature in the old pre-2017 Stealthwatch. The Court accepts that Stealthwatch has the features to conduct forensic investigations after the fact. However, Dr. Schmidt, throughout his testimony ignores the presence of the word “also” and “detect and stop” in the technical documents, which denotes that the after the fact investigation is a feature that operates in addition to the ability to stop threats in real time. See Tr. 1974:3-1975:8.”

HIT THE ROAD, JACK: THE AUTO INDUSTRY AS THE NEXT VEHICLE FOR PREDATORY INFRINGEMENT

Kristen Jakobsen Osenga[†]

ABSTRACT

While patents, patent litigation, and patent pools have been part of the automotive industry since the late-1800s, the prevalence of technology covered by standards and accompanying standard essential patents (SEPs) is much more recent. Today's smart cars and the widespread incorporation of telecommunication and Internet of Things standards in vehicles raise concerns about how well the automotive industry will be able to adapt to this new SEP-laden future.

This article predicts that predatory infringement of SEPs for two related reasons. First, although some industries, such as telecommunications, have long dealt with SEPs, the incorporation of standardized technology is more recent in automotives. The automotive industry has experience with patents and will undoubtedly mature into a level of comfort with SEPs, but because they are late to the SEP game, it is likely that automotive SEP policy will be driven by existing precedent from other industries. This is a problem because of the second reason, which is the fact that the history of patent licensing in the automotive industry has been quite different from that in telecommunications. Although patent licenses had usually been taken at the component manufacturer or supplier level, SEPs are often licensed at the end-user or final product level. This licensing shift in the car industry, coupled with its infancy in the SEP space, create an easy road for predatory infringement to occur.

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I. INTRODUCTION

Patents are not new in the car industry. Mercedes-Benz touts its 1886 German patent for a “vehicle powered by a gas engine” as “the birth certificate of the automobile.”¹ George Selden is credited for the first U.S. patent on an automobile for his “improved road engine;” the patent was filed in 1879, but not granted until 1895, after spending some sixteen years in prosecution.² Today, the automotive industry remains innovative, spending over \$116 billion

1. *Company History: The first automobile 1885-1886*, MERCEDES-BENZ GROUP, <https://group.mercedes-benz.com/company/tradition/company-history/1885-1886.html> (last visited Aug. 15, 2023).

2. Amy Norcross, *George Selden Granted 1st US Patent for An Automobile, November 5, 1895*, EDN (Nov. 5, 2019), <https://www.edn.com/george-selden-granted-1st-us-patent-for-an-automobile-november-5-1895/>.

in 2021 on research & development³ and filing hundreds of thousands of patent applications annually.⁴

Patent litigation and patent pools are also not new in the car industry. In 1899, Selden sold his patent to the Electric Vehicle Company (EVC) and EVC sued Winton Motor Carriage Company for patent infringement.⁵ After settling the dispute, a number of car manufacturers, including Winton, Packard, and Cadillac, joined with Selden and EVC to form the Association of Licensed Automobile Manufacturers (ALAM).⁶ In 1903, ALAM sued Ford Motor Company (after Henry Ford was denied membership in ALAM) for infringement.⁷ An eight-year legal battle ensued, with ALAM and Selden prevailing, although Ford ultimately won on appeal in 1911, one year prior to the expiration of Selden's patent.⁸

What is a new—or at least a more recent—development in the automobile industry is the ubiquity of technology covered by standards and the prevalence of standard essential patents (SEPs).⁹ As connected or smart cars become the norm, the industry's incorporation of telecommunication and Internet of Things (IoT) standards has greatly increased. Additionally, these new cars have spurred more standardization in areas of vehicle-specific technology. The industry's lack of familiarity with SEP licensing, as well as the complexities associated with the industry, however, are raising concerns about how well the automotive industry will be able to adapt to this future.¹⁰ While concerns about SEPs in the automotive industry are being raised in trade journals and academic reports, what has not yet been deeply explored is whether more dangerous issues associated with SEPs—such as predatory infringement—are likely to also wreak havoc in the automotive industry. This Article suggests that not only is the automotive industry likely to also experience predatory infringement, but that the history and complexities of the industry may even be more conducive for its occurrence.

3. *Global Automotive Research and Development Spending Between 2020 and 2021, With a Forecast for 2022*, STATISTA, <https://www.statista.com/statistics/1345699/global-automotive-research-and-development-spending/> (last visited Aug. 15, 2023).

4. *Revealed: The Car Brands Driving Automotive Innovation*, BRISTOL STREET MOTORS, <https://www.bristolstreet.co.uk/news/revealed-the-car-brands-driving-automotive-innovation/> (last visited Aug. 15, 2023).

5. See Norcross, *supra* note 2.

6. See *id.*

7. See *id.*

8. See *id.*

9. Manveen Singh & Vishwas H. Devaiah, *SEP Licensing In the Automotive Industry: Shifting Gears Too Quickly?*, 18 J. INTELL. PROP. L. & PRAC. 122, 123 (2023).

10. See *id.*

This Article proceeds as follows: Part II provides background information about the automotive industry, including a discussion of its structure, the growing prevalence of SEPs in the industry, and SEP litigation that is already occurring in this space; Part III provides a brief explanation of predatory infringement and why it is a particular problem for industries where SEPs are prevalent; and Part IV explains how the complex structure and history of the automotive industry create conditions where predatory infringement is likely to flourish.

II. THE AUTOMOTIVE INDUSTRY

The automotive industry, as mentioned above, has always been a field of great innovation. From the invention of the gas-powered engine to today's hybrid and fully-electric vehicles, from seatbelts to anti-lock brakes to backup cameras, and all of the many innovations that have arisen over the last 150 years, the automotive field embodies incredible creativity. One of the more recent transformative areas in this industry is smart or connected cars. Connected cars trace back to the mid-1990s, when General Motors and Motorola developed the OnStar telematics system used first in Cadillacs, allowing drivers to contact emergency services in case of accident.¹¹ Around the same time, BMW introduced BMW Assist telematics, allowing a driver to make emergency calls and obtain traffic information.¹² In 2004, BMW introduced a smart telematics system, allowing a driver to access weather, news, and entertainment services in addition to emergency help and traffic . . . and things went gangbusters from there.¹³ In 2013, there were 23 million connected cars around the world; by 2021, that number grew to 237 million connected cars.¹⁴

Part of why the automotive industry has been able to be so innovative is related to its structure. Another portion of that creativity can be attributed to the automotive industry's ability to leverage existing technology and adapt it for the best purposes in cars. Whether it be innovation within the industry or incorporation of existing non-automotive technology into vehicles, patents play a role in the mix. This Part II first explains in Section II.A the structure of the automotive industry and how it supports innovation, and then in Section

11. Igor Nikolic, *Injunctions Facilitate Patent Licensing Deals: Evidence from the Automotive Sector*, COMPETITION POL'Y INT'L (June 20, 2022), <https://www.competitionpolicyinternational.com/injunctions-facilitate-patent-licensing-deals-evidence-from-the-automotive-sector/>.

12. *See id.*

13. *See id.*

14. *See id.*

II.B describes how SEPs have become ubiquitous in the industry, both as patents brought in from other technology areas as well as patents deriving from innovation within the industry. The presence of patents, and especially SEPs, means that there is a likelihood of patent litigation. The final Section II.C of this Part II looks at some recent SEP cases in the automotive industry.

A. STRUCTURE OF THE AUTOMOTIVE INDUSTRY

Automobiles—when compared to other highly innovative consumer products such as telecommunications—are large, expensive, and generally slow to evolve.¹⁵ Industry leadership shows little turnover, with the same five carmakers holding the top 5 in 1999 as in 2013, and these five firms holding a collective global market share of over 50%.¹⁶ Consumer loyalty, or the percentage of car owners who choose to buy a new car from the same brand, is also fairly high.¹⁷ The central product and essential function of the industry is transporting people and goods in cars, and the dominant design of cars has not changed in decades.¹⁸ Despite that, there is significant technological innovation with respect to secondary aspects, including passenger comfort, safety, fuel efficiency, and environmental impact.¹⁹ Some of this innovation is driven by consumer demand, while other aspects are imposed via governmental regulation, such as the mandate for zero-emission cars issued first by the California Air Resources Board.²⁰ Because the car itself has changed little, industry leaders are entrenched, and consumers are highly brand loyal, automotive manufacturers distinguish themselves and attract consumers through innovation in these secondary features—particularly those that consumers desire.

The manufacturing structure of the industry also supports innovation. The automotive sector is comprised of a long and complicated supply chain, making up multiple tiers.²¹ Original equipment manufacturers (OEMs), or vehicle manufacturers, represent the end product, supported by a pyramid structure consisting of three tiers of suppliers.²² Tier-1 suppliers provide

15. Florian Metzler, *Tracing Competencies and Product Requirements in Technology Space: A New Perspective on Firm & Industry Evolution* 30 (Massachusetts Institute of Technology, Working Paper, 2020), <http://papers.ssrn.com/abstract=3730195>.

16. *See id.*

17. *See, e.g., Brand Loyalty Strong among New-Vehicle Owners, J.D. Power Finds*, Press Release, J.D. POWER (Sept. 26, 2022), <https://www.jdpower.com/business/press-releases/2022-us-automotive-brand-loyalty-study>.

18. *See Metzler, supra* note 15, at 30.

19. *See id.*

20. *See id.* at 31.

21. Singh & Devaiah, *supra* note 9, at 3.

22. *See id.*

systems or parts directly to OEMs and specialize in manufacturing hardware that supports the specifications of the OEMs.²³ Tier-2 comprises numerous component suppliers and manufacturers that Tier-1 companies use to build the hardware.²⁴ Tier-3 companies include suppliers of things like plastics, metals, or aluminum, providing raw materials to Tier-2 and Tier-1 companies.²⁵

This disintegrated model opens up multiple opportunities for innovation. For example, some innovation occurs as a matter of collaboration between the OEM and a skilled supplier.²⁶ Benefits of this type of collaborative innovation include early problem-solving, greater focus on manufacturability, improved product performance, and reduced production costs.²⁷ Other innovation happens as a matter of competition amongst suppliers to win more business from OEMs, either by (1) being able to produce the components more quickly or cheaply and thus offer a lower price, or (2) by producing a component that is of better quality or provides additional features that consumers desire, allowing the OEM to pass these benefits on to the consumer.

B. SEPS IN THE AUTOMOTIVE INDUSTRY

While the automotive industry has always been driving technology forward, the more recent inclusion of autonomous driving and Internet of Things (IoT) technologies in cars has ramped up innovation in this sector. This innovation is occurring not within one particular car company or component supplier, nor is it even contained within only the automotive industry. Instead, much of this new innovation is happening in standards development organizations (SDOs). For example, to support autonomous driving, a car must be equipped with the capability to communicate with systems both within the car and without.²⁸ Some of these functions rely on existing communication standards such as 4G/5G, WiFi, Bluetooth, and near-field communication (NFC).²⁹ In addition to incorporating standards from outside of the automotive industry, these new technologies are creating opportunities for standards development within the industry. For example, vehicle-to-everything communication (V2X) is a specific technology for vehicle

23. *See id.*

24. *See id.*

25. *See id.*

26. Benedikt Langner & Victor P. Seidel, *Collaborative Concept Development Using Supplier Competitions: Insights from the Automotive Industry*, 26 J. ENG. TECH. MGMT. 1, 1 (2009).

27. *See id.* at 1.

28. Shaobin Zhu & Bo Tang, *Road to the Future: SEP Licensing and Litigation In the Automotive Field*, PAT. LAW. 7 (JULY/AUGUST 2022), <https://www.morganlewis.com/-/media/files/publication/outside-publication/article/2022/road-to-the-future-sep-licensing-and-litigation-in-the-automotive-field-the-patent-lawyer-magazine.pdf>.

29. *See id.*

connectivity and has been standardized by IEEE 802.11p and 3GPP for WLAN and cellular V2X, respectively.³⁰

1. SEPs, FRAND, and Licensing

With the increase in standardized technologies being incorporated into cars, SEPs are also now ubiquitous in the automotive industry. Companies that participate in standards development often own patents that cover one or more aspects of the technology incorporated into a standard. To ensure that patented technology incorporated into a standard is going to be available to anyone who wants to practice the standardized technology, SDOs often have intellectual property right (IPR) policies.³¹ One common IPR policy requires SDO participants who own SEPs to agree to license those patents on fair, reasonable, and non-discriminatory (FRAND) terms.³²

The specific obligations related to the FRAND commitment varies by SDO, but generally these IPR policies do not provide formal definitions of what is “fair,” “reasonable,” or “non-discriminatory.”³³ The policies also do not specify provisions of the patent licensing agreements, formulas regarding patent license royalty calculations, price ceilings or floors, or information regarding profit sharing; instead, FRAND obligations have been criticized as incomplete contracts by some.³⁴ However, what the FRAND commitments do facilitate is negotiation between the SEP owner and firms that want to implement the standard; FRAND supports a variety of licensing agreements, with the only exceptions being exclusive licensing or refusing to deal with potential licensees.³⁵

This emphasis on open negotiation, unfortunately, leads to disputes about whether what the SEP owner has offered to a potential implementer is truly FRAND. Of course, there are always disputes about the agreed-to licensing rate; not surprisingly, SEP owners would often like to be paid more and implementers would like to pay less.

However, in fields with products comprised of multiple patented components (like the automotive industry), a common debate is between

30. *See id.*

31. *See e.g.*, Kristen Osenga, “Efficient” Infringement and Other Lies, 52 SETON HALL L. REV. 1085, 1099 (2022).

32. *See id.*

33. Daniel F. Spulber, *Licensing Standard Essential Patents with FRAND Commitments: Preparing for 5G Mobility Telecommunications*, 18 COLO. TECH. L.J. 79, 91 (2020).

34. *See id.* at 92.

35. *See id.*

“license to all” and “access to all.”³⁶ “License to all” means that the SEP owner must agree to license to any party who is willing to pay the license fee, regardless of where in the supply chain that party is situated, whereas “access to all” licensing permits an SEP owner to determine where in the supply chain they will grant licenses, but permit the licensee to provide access to its suppliers. Proponents of a “license to all” approach believe that the value of standardized technology is best reflected at the component level and is generally preferred by implementers who prefer licensing at what is known as the smallest saleable patent practicing unit (SSPPU).³⁷ “Access to all,” instead, stems from the perspective that SEP owners should be able to choose the level of the supply chain at which they prefer to license.³⁸ SEP owners often prefer to license at the OEM or end-user level, as it generally decreases transaction costs in the form of negotiation, monitoring, and compliance.³⁹ The question is whether SEP owners under a FRAND obligation must grant licenses to any and all requesting entities in a supply chain, or whether they have the option to license only to a certain level of a supply chain so long as all other entities in the chain can access the patented technology.⁴⁰

In the telecommunications sector, licenses are usually granted to OEMs and the use of SEPs by component suppliers is often consented to by SEP owners, without identifying individual suppliers.⁴¹ Historically, the automotive industry has not followed the same licensing model.⁴² Patent licensing in the automotive industry has typically been done at the component level, “a practice that has evolved into an implied rule over several decades.”⁴³ This historical practice has also resulted in several licensing provisions unique to the automotive industry.⁴⁴ Some of these provisions include unilateral rights of termination for OEMs, requirements for the component suppliers to continue

36. See generally Anne Layne-Farrar & Richard J. Stark, *License to All or Access to All? A Law & Economics Assessment of Standard Development Organizations' Licensing Rules*, 88 GEO. WASH. L. REV. 1307 (2020) (discussing the legal and economic debates between these licensing models); Zhu & Tang, *supra* note 28 (explaining the “paradigm shift” in moving between the licensing models).

37. See Layne-Farrar & Stark, *supra* note 36, at 1314–15.

38. See *id.* at 1324 (citing Damien Geradin, *Access for All v. License to All: A Response to Richard Vary*, (2020), <https://ssrn.com/abstract=3587319>).

39. Geradin, *supra* note 38, at 5.

40. See *id.*

41. See Singh & Devaiah, *supra* note 9, at 4.

42. See *id.* at 5.

43. See *id.*

44. See, e.g., Daniel A. Crane, Kyle D. Logue & Bruce C. Pilz, *A Survey of Legal Issues Arising from the Deployment of Autonomous and Connected Vehicles*, 23 MICH. TELECOMM. TECH. L. REV. 191, 229–30 (2017).

to supply service parts, favorable IP rights for the OEM in the case of supplier failure, and warranties with significant remedies in favor of the OEM.⁴⁵ Moreover, supply contracts also include indemnification clauses for litigation costs accrued by the OEM in cases of injury claims, as well as assertions of intellectual property infringement.⁴⁶ Unfortunately, this historical practice in the automotive industry is crashing into the present, especially as SEPs from outside the automotive industry, such as those originating in telecommunications, are increasingly incorporated via technology in today's cars.

2. SEPs and Patent Pools

Times are changing in the automotive industry. Not only is the industry adapting and integrating standardized technology from other fields into cars, but automotive companies are also playing active roles in standardizing connected vehicle technology. In doing so, automotive companies are no longer simply consumers of SEPs, but are also SEP owners.⁴⁷ Whether in the role of SEP consumer or SEP owner, the automotive industry is realizing the benefits associated with patent pools.

Patent pools are formed when multiple patent owners combine their patents and allow for group of patents to be licensed to third parties via a single package.⁴⁸ This allows for “one-stop shopping” for implementers while accepting and distributing royalties to SEP owners; on both sides, transaction costs are lowered.⁴⁹ Specifically, patent pools can reduce search costs, negotiation costs, and valuation issues, as well as reducing the risk of patent holdout.⁵⁰ As one study notes, “[patent pools] are mind-blowingly efficient at conducting high volumes of patent licensing.”⁵¹

The most notable patent pool in automotive space is Avanci. Avanci was founded in 2016 by Kasim Alfalahi (former Chief IP Officer at Ericsson, Inc.), who wanted to resolve the “unpredictability and uncertainty” surrounding licensing.⁵² Over fifty SEP owners have signed up and an estimated 80-85

45. *See id.*

46. *See* Omri Ben-Shahar & James J. White, *Boilerplate & Economic Power in Auto Manufacturing Contracts*, 104 MICH. L. REV. 953, 969 (2006).

47. *See* Zhu & Tang, *supra* note 28, at 8.

48. *See, e.g.*, Robert P. Merges & Michael Mattioli, *Measuring the Costs and Benefits of Patent Pools*, 78 OHIO ST. L.J. 281, 285 (2017).

49. *See id.* at 285–86.

50. *See id.* at 296–97.

51. *See id.* at 288.

52. *See, e.g.*, Matthew Bultman, *Avanci is Turning Automaker's Patent Licensing on Its Head*, BLOOMBERG L. (July 5, 2022), <https://news.bloomberglaw.com/ip-law/avanci-is-turning-automakers-patent-licensing-on-its-head>.

percent of implementers in the auto industry have taken an Avanci license, which includes wireless standards relevant to the automotive industry, such as eCall, 3G, and 4G.⁵³ Avanci, which limits its licenses to OEMs, offers a fixed royalty rate, \$15 per connected car, which remains the same regardless of the addition of new licensors and SEPs.⁵⁴ In April 2023, Avanci added Samsung Electronics to its list of patent owners and claims to have licensed to more than eighty brands of automobiles.⁵⁵

As innovation persists, so does the increased role for patent pools in the automotive industry. Avanci requested a Business Review Letter (BRL) from the Antitrust Division of the Department of Justice and, in July 2020, and a positive BRL was issued for Avanci's proposed platform to license 5G technology in automobiles.⁵⁶ Concluding that Avanci's platform was unlikely to harm competition,⁵⁷ Assistant Attorney General (AAG) Delrahim wrote:

In sum, the proposed 5G Platform has the potential to yield efficiencies by reducing transaction costs and streamlining licensing for connected vehicles. . . . Together these efficiencies may allow cellular standards-essential patent owners and vehicle manufacturers to focus resources elsewhere, such as investment in further research and development in emerging 5G technologies and applications.⁵⁸

In addition to highlighting the potential benefits of Avanci's proposed platform, the letter also highlighted: (1) the evaluation system to ensure essentiality; (2) the ability to license patents outside of the patent pool; and (3) the ability for licensees to challenge the validity, enforceability, and essentiality of the patents within the pool as not anticompetitive.⁵⁹

Despite the thorough analysis performed by the DOJ in providing the positive BRL, the Avanci 5G patent pool remains a topic of great controversy. In October 2022, a letter was submitted by a group of former government enforcement officials, professors, and public interest advocates, urging AAG Jonathan Kanter to reconsider the July 2020 BRL.⁶⁰ The letter questioned the

53. See Zhu & Tang, *supra* note 28, at 8.

54. Nikolic, *supra* note 11.

55. *Avanci Welcomes Samsung Electronics*, AVANCI (Apr. 18, 2023), <https://www.avanci.com/2023/04/18/avanci-welcomes-samsung-electronics/>.

56. Letter from Makan Delrahim, U.S. Dep't Just., Antitrust Division, to Mark H. Hamer (July 28, 2020), <https://www.justice.gov/atr/page/file/1298626/download>.

57. See *id.* at 2.

58. See *id.* at 12.

59. See *generally id.*

60. Letter to AAG Jonathan Kanter (Oct. 17, 2022), <https://static1.squarespace.com/static/60e5457fb89be21d705fa914/t/634d9bb669c56b29d6d58e7f/1666030518708/Letter+to+AAG+Kanter+regarding+Avanci+10.17.2022.pdf>.

data supporting the BRL and claimed that the patent pool was an open invitation to bad behavior by patent trolls and was compounding supply chain issues due to patent holdup.⁶¹ A counter letter was filed by a group of former judges and government officials, legal academics and economists, requesting instead that the 2020 BRL be maintained.⁶² The counter letter highlighted a lack of evidence with respect to patent holdup, the importance of injunctive relief for innovation, a variety of mischaracterizations in the October 2022 letter, and the wide-range of global court opinions that support a lack of holdup and the availability of injunctive relief for SEP infringement.⁶³

Some commentators have claimed that, given the wide acceptance of Avanci's patent pool for 2G/3G/4G and the positive BRL regarding the 5G licensing platform, the issues of licensing in the automotive industry are settled and of little interest. However, the recent letter seeking reconsideration of the BRL and the spike of litigation surrounding patent licensing in the automotive industry tell a different story: patents and licensing of those patents in the automotive industry remain a high-octane topic.

C. SEP LITIGATION IN THE AUTOMOTIVE INDUSTRY

While the Avanci patent pool and the increasing prevalence of SEPs in the automotive industry ushered in a new era of technology available in cars, it also creates a clash between the industry's past and future.⁶⁴ Specifically, SEP owners and the Avanci patent pool are providing "access to all" licenses and are opting to license SEPs at the OEM or end-user level, in conflict with the automotive industry's historical practice of licensing to the myriad of component manufacturers who form the supply chains. Not only are car manufacturers not used to paying SEP licensing royalties,⁶⁵ but component suppliers are frustrated that they cannot obtain licenses as they always have. This clash has already resulted in a spate of global litigation.

One case involving SEP licensing in the automotive industry is the patent litigation case between Nokia and Daimler in Germany.⁶⁶ Nokia sued Daimler for patent infringement of SEPs, and Daimler responded by claiming that

61. *See id.*

62. Letter to AAG Jonathan Kanter (Nov. 30, 2022), <https://ipwatchdog.com/wp-content/uploads/2022/11/Letter-to-AAG-Kanter-re-SEPs-and-Patent-Pools-10.30.22-1.pdf>.

63. *See id.*

64. The clashes that appear in the litigations discussed are also highlighted in letter and counter letter to the DOJ from 2022, regarding the Avanci 5G licensing platform BRL.

65. *See* Zhu & Tang, *supra* note 28, at 8.

66. *See id.* at 9; *Nokia v Daimler*, Higher Regional Court (Oberlandesgericht) of Karlsruhe, C4IP (Feb. 12, 2021), <https://caselaw.4ipcouncil.com/german-court-decisions/olg-karlsruhe/nokia-v-daimler> [hereinafter *Nokia v. Daimler*, C4IP].

Nokia's licensing activity was not FRAND-compliant.⁶⁷ Specifically, Daimler argued that it was the suppliers that should be allowed to take licenses from Avanci and it was anticompetitive to refuse to license to suppliers.⁶⁸ Daimler also argued the rates being charged were too high because the rate should be based on the price of component parts—here, telematic control units (TCUs)—and not cars.⁶⁹ In 2020, German courts ruled separately in favor of Nokia, finding infringement of two Nokia SEPs and issuing Germany-wide injunctions on sales of Mercedes cars.⁷⁰ The Mannheim Regional Court held that an SEP owner under patent law is free to choose the level of supply chain at which it seeks to offer licenses and the selection of licensing to OEMs is not anticompetitive, while the Munich Regional Court determined that a FRAND commitment requires the SEP owner to license, but does not commit the SEP owner to license at any particular level of the supply chain.⁷¹ If a license granted at the end-user level of the supply chain includes “have-made rights” then these licenses are not anticompetitive.⁷² These courts also held that the royalty rates sought for use of the SEPs were not inappropriate because connectivity allows the OEMs to generate income from additional services, not reflected in the price of the components themselves.⁷³ In each court, Daimler was found to be an unwilling licensee per *Huawei v. ZTE* and an injunction was issued. In June 2021, Nokia and Daimler announced a settlement, including Daimler's licensing of Nokia's portfolio of SEPs.⁷⁴

Another case occurred in the United States, where Continental, an automotive parts supplier, sued Avanci, arguing that Avanci's refusal to grant a license to Continental was a Sherman Act violation.⁷⁵ This effort was quashed in June 2022, when the U.S. Court of Appeals for the Fifth Circuit affirmed the district court's ruling, dismissing Continental's suit for failure to state a claim.⁷⁶ Continental sought a license from Avanci, but was rejected because Avanci is authorized to only grant licenses to OEMs, not suppliers.⁷⁷

67. See *Nokia v. Daimler*, C4IP, *supra* note 66.

68. *Id.*

69. *Id.*

70. *Id.*

71. *Id.*

72. *Id.*

73. *Id.*

74. *Id.*

75. See *Zhu & Tang*, *supra* note 28, at 9.

76. *Cont'l Auto. Sys. v. Avanci, L.L.C.*, No. 20-11032, 2022 U.S. App. LEXIS 17079 (5th Cir. June 21, 2022) (*affirming* *Cont'l Auto. Sys., Inc. v. Avanci, L.L.C.*, 485 F. Supp. 3d 712 (N.D. Tex. 2020)).

77. *Cont'l Auto. Sys., Inc. v. Avanci, L.L.C.*, 485 F. Supp. 3d 712, 722–23 (N.D. Tex. 2020).

Continental argued that this was a breach and that the refusal to license at the supplier level would result in the possibility of extracting non-FRAND rates from OEMs, allowing the manufacturers to pass the costs on to the suppliers.⁷⁸ The court found that Continental had failed to show that OEMs were being forced to take on non-FRAND licenses or that costs were being passed to Continental and other suppliers.⁷⁹ Continental also argued that Avanci and the SEP owners had breached FRAND for not offering a license at the supplier level.⁸⁰ The court had to consider whether the suppliers, like Continental, were intended third-party beneficiaries of the agreement between the SDO and the SEP owners.⁸¹ Continental, unlike implementers in other cases, was not intended to benefit from the agreement between the SDO and the SEP owner and thus could not argue for a FRAND breach.

Suits against other automotive giants like Tesla and Ford have followed, cementing this time as what some are calling the “automotive patent wars.”⁸² Tesla was sued for patent infringement in Germany, Japan, and the US.⁸³ License negotiations were unsuccessful prior to litigation, but later all cases were withdrawn, implying Tesla likely took a license.⁸⁴ Seven SEP owners sued Ford in the US and Germany, where the Munich Regional Court found Ford to be an unwilling licensee and granted an injunction in 2022.⁸⁵ Following the decision, Ford took a license from Avanci.⁸⁶ These cases and others, where large automotive companies—with significant resources and ample legal savvy—risk the expenses of litigation (and potentially the threat of injunctive relief) rather than taking a license, illustrate that the mindset of big auto has not caught up with the reality of today’s technological ecosystem.

III. PREDATORY INFRINGEMENT

Predatory infringement is a fairly recent phenomenon that has arisen because injunctive relief is not always granted in cases of patent infringement. While some characterize the decision to “infringe first, pay later,” as efficient infringement, the decision to initially infringe, rather than license, patents is

78. *Id.*

79. *Id.* at 729.

80. *Id.*

81. *Id.* at 730–31.

82. *See, e.g.,* Chuck Tannert, *Will the Patent Wars Kill the Self-Driving Cars?*, POPULAR MECHANICS (July 26, 2017), <https://www.popularmechanics.com/cars/hybrid-electric/news/a27480/patent-wars-self-driving-car/>.

83. *See* Nikolic, *supra* note 11.

84. *Id.*

85. *Id.*

86. *Id.*

better characterized as predatory.⁸⁷ Relevant to this Article, injunctive relief is often denied in cases involving SEPs, especially in the United States. This Part III explains in Section III.A the concept of injunctions in patent infringement cases more generally and how the 2006 *eBay* case changed the landscape of injunctive relief, followed by a discussion of predatory infringement in Section III.B.

A. INJUNCTIONS IN PATENT INFRINGEMENT CASES

Patents provide exclusive rights, or the ability to exclude others from using the subject matter covered by the patent.⁸⁸ To attain that exclusive right, the modern Patent Act provides that courts “may grant injunctions in accordance with the principles of equity to prevent the violation of any right secured by patent.”⁸⁹ Courts have affirmed this, with the Supreme Court recognizing “the essence of a patent grant is the right to exclude . . .”⁹⁰ and the Federal Circuit, which hears appeals in patent cases, similarly noting that “the right to exclude recognized in a patent is . . . the essence of the concept of property.”⁹¹

In general, if a patent is found to be infringed, an injunction is issued to prevent continued infringement—and before 2006, this relief was nearly automatic.⁹² By stopping infringement, an injunction restores the exclusive right of the patent. It also serves as a strong deterrent to infringement by others, as it is expensive to begin manufacturing and distributing a product that later is enjoined by the court.⁹³ This deterrent serves to incentivize license negotiation during a number of steps prior to being enjoined by a court.⁹⁴ To avoid claims of infringement in the first instance, an implementer who feared a possible future court order enjoining its behavior would often engage in pre-infringement negotiations in an attempt to license the technology before

87. See Osenga, *supra* note 31, at 1103.

88. 35 U.S.C. § 261 (“[P]atents shall have the attributes of personal property.”); 35 U.S.C. 154(a)(1) (“Every patent shall contain . . . a grant to the patentee, his heirs or assigns, *the right to exclude others* from making, using, offering for sale, or selling the invention throughout the United States or importing the invention into the United States.”) (emphasis added); *In re Etter*, 756 F.2d 852, 859 (Fed. Cir. 1985) (“The essence of all property is the right to exclude, and the patent property right is certainly not inconsequential.”).

89. 35 U.S.C. § 283.

90. *Dawson Chem. Co. v. Rohm & Hass Co.*, 448 U.S. 176, 215 (1980).

91. *Connell v. Sears, Roebuck & Co.*, 722 F.2d 1542, 1548 (Fed. Cir. 1983).

92. See Shyamkrishna Balganes, *Demystifying the Right to Exclude: Of Property, Inviolability, and Automatic Injunctions*, 31 HARV. J.L. & PUB. POL’Y 593, 650–51 (2008) (discussing the Federal Circuit’s rule of nearly automatically granting injunctive relief); Colleen V. Chien & Mark A. Lemley, *Patent Holdup, the ITC, and the Public Interest*, 98 CORNELL L. REV. 1, 16 fig. 3 (2012) (illustrating a grant rate of greater than 90% for the period before the *eBay* decision).

93. See Osenga, *supra* note 31, at 1091–92.

94. See *id.*

embarking on potentially infringing behavior.⁹⁵ Even if the accused infringer did not obtain a license ahead of time, when facing a lawsuit in which injunctive relief is the likely outcome if infringement is found, the accused infringer and the patent owner may be more likely to engage in pre-lawsuit (or at least pre-decision) settlement negotiations.⁹⁶ Finally, even if the lawsuit drew to a conclusion, these regularly-granted injunctions would serve as a place from which post-lawsuit negotiations would begin.

In 2006, the Supreme Court decided the *eBay Inc. v. MercExchange LLC* case,⁹⁷ which ended what had been a nearly-automatic issuance of injunctive relief for patent infringement. In this case, the Court announced a four-factor test that courts should use when deciding whether to grant a permanent injunction.⁹⁸ The four-factor test requires the party seeking a permanent injunction to demonstrate “(1) that it has suffered an irreparable injury; (2) that remedies available at law, such as monetary damages, are inadequate to compensate for that injury; (3) that, considering the balance of hardships between the plaintiff and defendant, a remedy in equity is warranted; and (4) that the public interest would not be disserved by a permanent injunction.”⁹⁹ These factors are balanced and considered on the merits of each particular case.¹⁰⁰ The Supreme Court took issue with categorical grants or denials of injunctive relief, noting that both are inapposite for this equitable doctrine.¹⁰¹

B. PREDATORY INFRINGEMENT IN THE ABSENCE OF INJUNCTIONS

As lower courts began to interpret the Supreme Court’s *eBay* decision as not requiring a grant of permanent injunction upon a finding of patent infringement, the phenomenon of predatory infringement took hold. Predatory infringement is the intentional, and perhaps even rational, choice to infringe a patent rather than take a license to use the patented technology, based on the calculated risk that even if found to be infringing, an injunction will not be issued against the predatory infringer.¹⁰² It makes much more sense for a potential infringer to go ahead and infringe now—and pay later.¹⁰³ At worst, the infringer will simply have to pay damages for past infringement and

95. Cf. Karen E. Sandrik, *Reframing Patent Remedies*, 67 U. MIAMI L. REV. 95, 98 (2012).

96. John M. Golden, *Litigation in the Middle: The Context of Patent Infringement Injunctions*, 92 TEX. L. REV. 2075, 2078–79 (2014) (explaining how injunctive relief affects the expected gains and losses from litigation and may alter settlement decisions).

97. See generally *eBay Inc. v. MercExchange, LLC*, 547 U.S. 388 (2006).

98. *Id.* at 391.

99. *Id.*

100. *Id.*

101. *Id.* at 393–94.

102. See Osenga, *supra* note 31, at 1091.

103. See *id.*

an ongoing royalty for continued, future infringement.¹⁰⁴ Better still, the patent owner may never bring suit, meaning that the infringer pays no royalties, or the patent owner could prevail, but the royalty rate determined by the court for past and ongoing infringement could be substantially lower than the rate that the patent owner was offering at the outset, saving the infringer money.¹⁰⁵

Predatory infringement is only a rational choice where injunctive relief is largely unavailable to a patent owner. One place where courts have been reluctant to enjoin patent infringement is where the infringed patent is an SEP.¹⁰⁶ As described above, SEP owners have often committed to license their patents on FRAND terms where they are unable to decline to provide access to the patented technology.¹⁰⁷ Injunctive relief is denied, under the *eBay* factors, because the SEP owner “is, by definition, willing to license rather than exclude, and benefits from the widespread adoption of its technology resulting from standardization.”¹⁰⁸ Where injunctions are unlikely, predatory infringement is a viable option for implementers.

Not only are courts persuaded into declining injunctive relief due to the *eBay* decision, but they are also reacting to well-worn trope of patent holdout, or the alleged behavior of SEP owners using the threat of exclusion to coerce a potential licensee to accept “excessively large royalties.”¹⁰⁹ Courts, by declining to enjoin infringers have removed the threat of exclusion, and therefore, should eliminate the concern of patent holdup. However, what is actually happening is patent holdout, a phenomenon wherein “an implementer refuses to negotiate in good faith . . . and instead forces the innovator to either undertake significant litigation costs and time delays to extract a licensing payment through a court order[.]”¹¹⁰ In an unpublished study, Gupta & Petrovic looked at cases involving infringement of SEPs where the court determined that an implementer had engaged in patent holdout, was an

104. Joe Nocera, *Opinion, The Patent Troll Smokescreen*, N.Y. TIMES (Oct. 23, 2015), <https://www.nytimes.com/2015/10/24/opinion/the-patent-troll-smokescreen.html> (“Because the courts have largely robbed small inventors of their ability to seek an injunction . . . the worst that can happen is that the infringer will have to pay some money.”).

105. See Adam Mossoff, *Institutional Design in Patent Law: Private Property Rights or Regulatory Entitlements*, 92 S. CAL. L. REV. 921, 938 (2019).

106. See Osenga, *supra* note 31, at 1098–99.

107. See *supra* Section I.B.1.

108. Thomas F. Cotter, *Reflections on Holdup and Royalty Stacking, Part 1*, COMPAR. PAT. REMEDIES (June 11, 2014, 4:20 AM), <http://comparativepatentremedies.blogspot.com/2014/06/reflections-on-holdup-and-royalty.html>.

109. See, e.g., Richard A. Epstein & Kayvan B. Noroozi, *Why Incentives for “Patent Holdout” Threaten to Dismantle FRAND and Why It Matters*, 32 BERKELEY TECH L.J. 1381, 1384 (2017).

110. See *id.* at 1384

unwilling licensee, or acted in bad faith.¹¹¹ Of the 58 unique cases of patent holdout in their study, the automotive company Daimler was a repeat player.¹¹²

Other jurisdictions are not bound by the *eBay* decision and have developed frameworks in which an SEP owner may, under certain circumstances, obtain injunctive relief. One example is the 2015 European Court of Justice (ECJ) case in *Huawei v. ZTE*.¹¹³ The dispute occurred in Germany, where injunctions are automatically granted upon a finding of patent infringement.¹¹⁴ Because Germany's automatic injunction conflicted with previous decisions of the European Commission, clarification was sought from the ECJ.¹¹⁵ The ECJ concluded that an SEP owner bound by a FRAND commitment can, indeed, seek injunctive relief, but that owner's refusal to grant a license may constitute abuse.¹¹⁶ More helpfully, the ECJ provided a set of actions for both SEP owners and implementers to follow to be compliant with European competition law. The SEP owner must alert the alleged infringer and specify how the patent has been infringed and present a written offer to license including how the royalty rates were calculated.¹¹⁷ The implementer, on the other hand, must "diligently respond" to this offer "in good faith" by providing a counter-offer that is also FRAND.¹¹⁸ If the implementer fails to act accordingly or engages in "delaying tactics", the SEP owner may seek and obtain injunctive relief.¹¹⁹ Unfortunately, the United States has not adopted this or any similar framework and injunctive relief is still unlikely in cases of SEP infringement.

IV. THE EASY ROAD FOR PREDATORY INFRINGEMENT IN THE AUTOMOTIVE INDUSTRY

The automotive industry is already a battleground for patent litigation involving SEPs, as described in Section II.C. above, but Part IV of this Article

111. See Kirti Gupta & Urska Petrovcic, *Evidence of Systematic "Patent Holdout"* (unpublished manuscript), at 5 (on file with author).

112. See *id.* at 8.

113. Case C-170/13, *Huawei Technologies Co. v. ZTE Corp.* PP 52-53 (July 16, 2015), <http://curia.europa.eu/juris/document/document.jsf?text=&docid=165911&pageIndex=0&doclang=EN&mode=lst&dir=&occ=first&part=1&cid=603775> [hereinafter *Huawei v. ZTE*].

114. Anne Layne-Farrar & Koren Ervin Wong, *Methodologies for calculating FRAND damages: an economic and comparative analysis of the case law from China, the European Union, India, and the United States*, 8 JINDAL GLOBAL L. REV. 127, 133 (2017).

115. See *id.*

116. See *Huawei v. ZTE*, *supra* note 113, at 52–53.

117. See *id.* at 71.

118. See *id.* at 66–67.

119. See *id.* at 55.

suggests that the field is also ripe for predatory infringement. As discussed above, many automotive manufacturers have been reluctant to take licenses from SEP owners or patent pools like Avanci; in fact, some of this reluctance persisted until European courts issued injunctive relief. But in the United States, where injunctions are still routinely denied for infringement of SEPs, the conditions that make predatory infringement attractive are still present. In addition to the low likelihood of being enjoined, there are at least two additional reasons why the automotive industry is an excellent vehicle for predatory infringement: the automotive industry's relative recent entry into the SEP space and the historical background of licensing in this area.

A. RELATIVE INFANCY IN THE SEP SPACE

One reason why predatory infringement is likely in the automotive industry is its relative infancy in the SEP space. As noted above, while patents and even patent pools are longstanding features of the automotive field, the prevalence of standardized technology from other areas as well as the automotive field itself are of more recent vintage. Most industries when faced with a significant change suffer some growing pains, but the combination of this newness with a flip-flop in how patent licensing occurs in this industry, see below, is inevitably going to create a small amount of chaos initially. In this chaos, it is possible for predatory infringement to occur, and even go unnoticed—at least until the industry sorts itself out.

In some respects, once the automotive industry matures into this new space, it may be better able to address predatory infringement than other industries. Particularly at the OEM or end-user level, the industry is largely composed of longstanding, large companies; there are few upstarts in the automotive world, and thus the factors of reputation and repeat-player dynamics are relevant. Additionally, the automotive industry is perceived with less suspicion than some other industries at this current moment. The same microscopic scrutiny being applied to, for example, big tech companies, seems to have passed big auto by—at least for now. For this reason, as the automotive industry matures in the SEP space, they may have more success in lobbying for legal changes to address the unavailability of injunctive relief and widespread patent holdout in ways that industries that have been facing the same problems have not.

On the other hand, being late to the game may be an obstacle as the automotive industry settles into its SEP-prevalent future. By not being first on the scene, and instead being a relative newcomer behind the telecom industry—where patent wars have already been fought and won—automotive manufacturers and SEP owners in this space are going to be saddled with

precedent that has been developed around a vastly different industry. Moreover, as described below, the automotive industry is facing a transition in its historical licensing practices that other industries where SEPs are common have not had to confront. Dropping existing precedent from other SEP disputes into the automotive industry may not provide the best results.

B. HISTORICAL LICENSING PRACTICES

The other reason predatory infringement is likely to occur in the automotive industry is the industry's historical licensing practices and the changes to those historical practices that the increased prevalence of SEPs is causing. As noted, patent licenses in the automotive industry have traditionally been taken at the supplier level. OEMs or vehicle makers have sufficient buying power to push the responsibility of licensing largely onto their suppliers, and many suppliers include indemnification provisions in their contracts.¹²⁰ In other industries where SEPs are everywhere, such as smartphones, licenses are typically granted on the end-user product, such as the phone.¹²¹ As SEPs become more ubiquitous in the automotive field, there is continued disagreement about whether the SEP licenses should be granted to the OEM or car manufacturer, or if they should be granted to the supplier or component manufacturer. When Avanci came onto the scene and offered licenses at the OEM level, there was dismay from both OEMs (like Daimler) and suppliers (like Continental). Unlike many of the systems in cars that have been licensed at the supplier level, many of the connected car systems are able to be profit centers for the OEMs, which charge for services such as Onstar or BMW Assist. Because of the disagreement over which entities should have to be licensed, it is more likely that (1) unlicensed patent infringement may go unnoticed by the SEP owner and (2) players in the field have become accustomed to being indemnified, and thus have not had the need to be concerned with potential infringement.

In addition to history, there are other differences between the automotive industry and other SEP-dependent fields. Specifically, there is significant value to the car without the inclusion of any SEPs; the greatest value of a car, of course, is simply to provide a means of transportation. Smartphones must have the standardized telecommunication technology to be functional, whereas connectivity in a car has generally been viewed as a feature, or a luxury.¹²² Even were injunctive relief to be reliably granted for infringement of SEPs, given

120. IAM, *Auto industry demands a fresh SEP/FRAND focus in 2023*, IAM (Jan. 25, 2023), <https://www.iam-media.com/article/auto-industry-demands-fresh-sepfrand-focus-in-2023>.

121. *See id.*

122. *See id.*

the perspective of these features as a luxury, rather than a necessity, it still may be a rational choice to engage in predatory infringement because an injunction on the SEPs would not render the entire product unusable, as it would if a smartphone maker were enjoined.

V. CONCLUSION

The automotive industry is incredibly innovative, developing technology within and incorporating technologies from other areas in ways that are making transportation safer, more efficient, and more fun, especially as it delves more deeply into autonomous driving and IoT applications. But these moves may come at a cost due to growing pains. It is important for this industry, which is much newer in the SEP arena, to be aware of the potential for predatory infringement and also to be diligent in helping to shape infringement precedent in a way that will facilitate continued innovation in this space.

THE 2022 IEEE IPR POLICY CHANGES: LEGAL AND POLICY IMPLICATIONS

Manveen Singh[†]

ABSTRACT

Ever since the Institute of Electrical and Electronics Engineers (IEEE) introduced amendments to its Intellectual Property Rights (IPR) Policy in February 2015, the amended policy has attracted constant criticism at the hands of several patent holders, primarily on account of the highly controversial provisions added by the said amendments. The patent holders, however, weren't alone in their criticism of the amended policy and found support in the United States Department of Justice (DOJ) and the European Commission. Both the agencies expressed their concerns regarding the potential negative implications of the 2015 policy change for innovation and competition, amidst calls for the IEEE to consider a review of the said change. An important case in point was the extraordinary step taken by the DOJ to update its 2015 Business Review Letter (BRL) issued to IEEE for the proposed amendments to its IPR Policy. The supplemental BRL, issued in September 2020, replaced the 2015 version while stating that the earlier BRL had been incorrectly cited as an endorsement of the IEEE IPR Policy, and labelling its terms implementer-friendly. The effect of the supplemental BRL, however, was short-lived, with the Biden Administration's DOJ classifying the 2020 BRL as "advocacy," and seemingly reinstating the 2015 BRL in April 2021. The latest turn of events in the long-running saga involve the IEEE's September 2022 decision to update its IPR Policy, with effect from 1st January 2023. The policy update is noteworthy, for it deals with provisions pertaining to the determination of reasonable royalties and injunctive relief, the same set of provisions that were at the heart of the 2015 amendments.

Against the above backdrop, the present paper, while focusing on the legal and policy developments in standard-setting in the US, analyses the possible implications of the IPR Policy change introduced by the IEEE in 2022.

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I. INTRODUCTION

Ever since the Institute of Electrical and Electronics Engineers (IEEE) introduced amendments to its Intellectual Property Rights (IPR) policy in February 2015 (2015 Policy), the amended policy has attracted constant criticism from some of the biggest contributors to wireless technology.¹ The likes of Qualcomm, Nokia, Ericsson, Interdigital, and Huawei have all declined to grant patent licenses under the 2015 Policy² because of its highly controversial provisions.³ However, the patent holders aren't alone in their criticism of the amended policy and have found support from the United States Department of Justice (DOJ) and the European Commission. Both agencies expressed their concerns regarding the potential negative implications

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1. *Will IEEE Finally Admit the Errors of Its 2015 Patent Policy Changes?*, IP EUROPE (Oct. 19, 2021), <https://ipeurope.org/blog/will-ieee-finally-admit-the-errors-of-its-2015-patent-policy-changes/>.

2. *Id.*

3. Ashish Bharadwaj & Manveen Singh, *A Single Spark Can Start a Prairie Fire: Implications of the 2015 Amendments to IEEE-SA's Patent Policy*, 46 CAP. U. L. REV. 583, 602 (2018).

of the 2015 Policy for innovation and competition, amidst calls for the IEEE to consider a review of the said policy.⁴

In the United States, beginning in 2017, the then-Assistant Attorney General (AAG) Makan Delrahim signaled a realignment of the DOJ's policy on standard-essential patents (SEPs) and the development of standards.⁵ In doing so, he firmly advocated for SEP holders' right to seek infringement remedies.⁶ Delrahim further emphasized that "hold-out"—where potential licensees delay or avoid licensing negotiations for favorable terms—posed a greater threat than "hold-up"—wherein patent holders exploit their dominant position to extract supra-competitive royalties.⁷ All this, when considered in light of the IEEE's 2015 Policy, meant that Delrahim did not consider the policy changes innovation-friendly. In fact, between 2017 and 2020, he raised questions about the future of the 2015 Policy on behalf on the DOJ.⁸ What eventually followed was the extraordinary step taken by the DOJ to update its 2015 Business Review Letter (2015 BRL) issued to IEEE for the proposed amendments to the IPR's 2015 Policy.⁹ The September 2020 supplemental BRL (2020 BRL) stated that the 2015 BRL was incorrectly cited as an

4. Richard Llyod, *DOJ Antitrust Chief Takes "Extraordinary" Step Over IEEE's Controversial 2015 SEP Licensing Policy*, IAM (Sept. 14, 2020), <https://www.iam-media.com/article/doj-antitrust-chief-takes-extraordinary-step-in-letter-ieee-over-controversial-2015-licensing-policy>; Brian Pomper, *DOJ Should Not Approve IEEE Patent Policy Weakening WiFi Patents*, IP WATCHDOG (Feb. 2, 2015), <https://ipwatchdog.com/2015/02/02/doj-ieee-policy-wifi-patents/id=54419/>.

5. Lisa Kimmel, Juan A. Arteaga, Mark A. Klapow & Kate M. Watkins, *Antitrust, Standard Development, and Essential Patent Licensing: The Antitrust Division Returns to Sound Enforcement Principles*, CROWELL & MORING (Nov. 22, 2017), <https://www.crowell.com/NewsEvents/AlertsNewsletters/all/Antitrust-Standard-Development-and-Essential-Patent-Licensing-The-Antitrust-Division>Returns-to-Sound-Enforcement-Principles>; Jessica K. Delbaum & Geert Goeteyn, *US Policy Shifts in Intellectual Property Antitrust Enforcement*, LEXOLOGY (Aug. 8, 2019), <https://www.lexology.com/library/detail.aspx?g=99025bb0-2572-47c9-80d2-b20ac93e242a>; Elizabeth A.N. Haas, James T. McKeown, John F. Nagle & Kate E. Gehl, *DOJ and FTC Signal Shifts in Antitrust Enforcement of Essential Patent Disputes*, FOLEY (Oct. 10, 2018), <https://www.foley.com/en/insights/publications/2018/10/doj-and-ftc-signal-shifts-in-antitrust-enforcement>.

6. Makan Delrahim, *Take it to the Limit: Respecting Innovation Incentives in the Application of Antitrust Law*, Remarks as Prepared for Delivery at USC Gould School of Law—Application of Competition Policy to Technology and IP Licensing (Nov. 10, 2017).

7. *Id.*

8. Kimmel et al., *supra* note 5.

9. *Justice Department Updates 2015 Business Review Letter to The Institute of Electrical and Electronics Engineers*, U.S. DEP'T JUST. (Sept. 10, 2020), <https://www.justice.gov/opa/pr/justice-department-updates-2015-business-review-letter-institute-electrical-and-electronics>.

endorsement of the 2015 Policy, and labeled its terms implementer-friendly.¹⁰ However, the effect of the supplemental BRL was short-lived, with the Biden Administration's DOJ classifying the 2020 BRL as "advocacy" and seemingly reinstating the 2015 BRL in April 2021. The latest turn of events in the long-running saga involves the IEEE's October 2022 update to its IPR policy (2022 Policy), effective 1st January 2023.¹¹ The updated 2022 Policy is noteworthy because it deals with provisions pertaining to the determination of reasonable royalties and injunctive relief—the same set of provisions that were at the heart of the 2015 Policy.

The present Article analyzes the possible implications of the IEEE IPR 2022 Policy which revised controversial provisions related to reasonable royalties and injunctive relief that were introduced in the 2015 Policy amendments.

II. THE 2015 IEEE IPR POLICY AMENDMENTS

Over the course of the last decade, one of the most important developments in the domain of standard-setting at Standard Setting Organizations (SSOs), has been the IEEE's IPR 2015 Policy. The IEEE, in redefining patent holders' right to seek returns on their investments and their ability to seek patent remedies,¹² showed a clear intent to step into a territory that had remained largely uncharted as far as SSOs are concerned. Two of the most important and highly talked about reforms introduced by the 2015 Policy were: (1) the definition of "reasonable rate"; and (2) the restriction on the availability of injunctive relief to SEP holders.¹³

Starting with the first of the two, the amended policy defined "reasonable rate" as the appropriate compensation given to the patent holder for the practice of an Essential Patent Claim. This excludes any value, if present, that

10. Letter from Makan Delrahim, Assistant Attorney General, U.S. Department of Justice, to Ms. Sophia A. Muirhead, General Counsel and Chief Compliance Officer, IEEE (Sept. 10, 2020), <https://www.justice.gov/atr/page/file/1315291/download>.

11. Monika Stüchel & Francine Tardo, *IEEE Announces Decision on Its Standard-related Patent Policy*, IEEE SA (Sept. 30, 2022), <https://www.ieee.org/about/news/2022/ieee-announces-decision-on-its-standards-related-patent-policy.html>.

12. Kevin Madigan & Adam Mossoff, *Study Finds IEEE's 2015 Patent Policy Sowing Uncertainty and Slowing Innovation*, C-IP2 (July 17, 2018), <https://cip2.gmu.edu/2018/07/17/study-finds-ieees-2015-patent-policy-sowing-uncertainty-and-slowing-innovation/>.

13. Jorge L. Contreras, *IEEE Amends its Patent (FRAND) Policy*, PATENTLYO (Feb. 9, 2015), <https://patentlyo.com/patent/2015/02/amends-patent-policy.html>; *Will the IEEE Finally Admit the Errors of Its 2015 Patent Policy Changes?*, IP EUROPE (Oct. 19, 2021), <https://ipeurope.org/blog/will-ieee-finally-admit-the-errors-of-its-2015-patent-policy-changes/>.

results from incorporating that Essential Patent Claim’s technology into the IEEE Standards.”¹⁴ It further stated that:

“[D]etermination of such Reasonable Rates should include, but need not be limited to, the consideration of:

- The value that the functionality of the claimed invention or inventive feature within the Essential Patent Claim contributes to the value of the relevant functionality of the smallest saleable Compliant Implementation that practices the Essential Patent Claim.
- The value that the Essential Patent Claim contributes to the smallest saleable Compliant Implementation that practices that claim, in light of the value contributed by all Essential Patent Claims for the same IEEE Standard practiced in that Compliant Implementation.
- Existing licenses covering use of the Essential Patent Claim, where such licenses were not obtained under the explicit or implicit threat of a Prohibitive Order, and where the circumstances and resulting license are otherwise sufficiently comparable to the circumstances of the contemplated license.”¹⁵

With the introduction of the “smallest saleable Compliant Implementation” rule, the IEEE ended up endorsing the calculation of fair, reasonable, and non-discriminatory (FRAND) royalties based on the value of the chipset, as opposed to a more flexible approach allowing for a choice between the smallest saleable patent practicing unit (SSPPU) and the entire market value, as the appropriate royalty base.¹⁶ This occurred despite the possibility of multiple other functions of the device using the said patented technology, or in other words, despite the existence of synergistic value between the patented technology and the device’s functionalities.¹⁷ Therefore, with SSPPU as the prevalent royalty base, patent owners contributing highly valuable patent technologies to IEEE standards were unlikely to command royalties based on a percentage price of the end-user devices.

14. *IEEE-SA Standards Board Bylaws – Clause 6–8*, IEEE SA, <https://standards.ieee.org/about/policies/bylaws/sect6-7/>.

15. David Long, *IEEE’s Controversial Proposed Intellectual Property Rights (“IPR”) Policy amendments*, ESSENTIAL PAT. BLOG (Feb. 3, 2015), <https://www.essentialpatentblog.com/2015/02/ieee/>.

16. Bharadwaj & Singh, *supra* note 3, at 596.

17. David J. Teece, *Are the IEEE Proposed Changes to IPR Policy Innovation Friendly?* 12 (Tusher Ctr. for Mgmt. Intell. Cap., Working Paper No. 2, 2015).

The second major change saw severe limitation of SEP holders' right to seek injunctive relief against unwilling licensees,¹⁸ a right which is integral to patent holders' bouquet of patent remedies. According to the 2015 Policy, patent holders who gave FRAND undertakings shall "neither seek nor seek to enforce a Prohibitive Order ... unless the implementer fails to participate in, or to comply with the outcome of, an adjudication, including an affirming first level appellate review."¹⁹ Under the 2015 Policy, the SEP holders could only seek injunctive relief against the implementer of a standard if the latter failed to abide by the decision of a court or an arbitral tribunal.²⁰ Consequently, the 2015 Policy left minimal room for SEP holders to use injunctive relief as a means to induce unwilling licensees to come to the negotiation table,²¹ thereby encouraging hold-out. Furthermore, the IEEE did not offer any explanation on the limited availability of injunctive relief to patent holders under a FRAND obligation, despite it being a part of the patent enforcement system in the United States.²² In the words of Administrative Law Judge, Theodore Essex, "taking away the right to seek injunctive relief from SEP holders not only 'puts the risk of loss entirely on the side of the patent holder,' but also 'encourages patent hold-out,' which is as unsettling to a fair solution as any patent hold-up might be."²³

The fact that the above changes were, in principle, approved by the DOJ through the issuance of a positive BRL not only gave further impetus to IEEE in its quest to enforce its 2015 Policy, but the approval also shielded the SSO

18. Michael Frohlich, *Report-Work Plan Item 5: Availability of Injunctive Relief for FRAND-Defense in Patent Infringement Proceedings*, AIPPI (Mar. 2014), <http://aippi.org/wp-content/uploads/committees/222/>

Report222AIPPI+report+on+the+availability+of+injunctive+relief+for+FRAND-committed+standard+essential+patentsEnglish.pdf.

19. Ashish Bharadwaj, Manveen Singh & Srajan Jain, *All Good Things Mustn't Come to an End: Reigniting the Debate on Patent Policy and Standard-Setting*, in MULTI-DIMENSIONAL APPROACHES TOWARDS NEW TECHNOLOGY 100 (Ashish Bhardwaj, Indranath Gupta & Vishwas Devaiah eds., 2018).

20. Deepa Sundararaman, *Inside the IEEE's Important Changes to Patent Policy*, LAW 360 (Apr. 3, 2015), <https://advance.lexis.com/api/permalink/3ca3eb00-8a2a-4ebb-b031-53e17586f8be/?context=1000516>.

21. David J. Teece & Edward F. Sherry, *The IEEE's New IPR Policy: Did the IEEE Shoot Itself in the Foot and Harm Innovation?*, BUS. INNOVATION (Aug. 3, 2016), http://businessinnovation.berkeley.edu/wp-content/uploads/2014/07/14-The-IEEES-New-Policy_Teece_Sherry_8-3-16_2_Clean.pdf.

22. *Id.* at 5.

23. *In re Certain Wireless Devices with 3G and/or 4G Capabilities and Components Thereof*, Inv. No. 337-TA-868 113-14, USITC Pub. 4853 (Dec. 2018).

from possible antitrust scrutiny.²⁴ Nevertheless, the positive BRL did not deter SEP holders from questioning the negative impact the 2015 Policy could have on standard-setting in the information and communication technology sectors.²⁵

III. STANDARD-SETTING IN THE AFTERMATH OF THE 2015 IPR POLICY

The IEEE's 2015 Policy not only affected the standard-setting activities at the SSO, but also triggered a few policy changes that involved the DOJ and the Antitrust Division.

A. IMPACT ON IEEE STANDARDS: INCREASE IN NEGATIVE LOAs AND STALLED DEVELOPMENT OF STANDARDS

As soon as the 2015 Policy went into effect, speculations were rife that the policy changes would cast a negative impact on standard-setting activities at IEEE. In the months and years that followed, several academics and industry professionals came out with data supporting the claim that the 2015 Policy stifled innovation at IEEE.²⁶ One of the first and most comprehensive studies in the changes' aftermath was carried out by Ron Katznelson, whose 2016 paper (which was later updated in 2018) highlighted the substantial rise in the number of not just negative letters of assurance (LOAs) but also missing LOAs.²⁷ In the latter case, the IEEE did not receive an accepted LOA from

24. Kirti Gupta & Georgios Effraimidis, *IEEE Patent Policy Revisions: An Empirical Examination of Impact*, at 5, https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3173799.

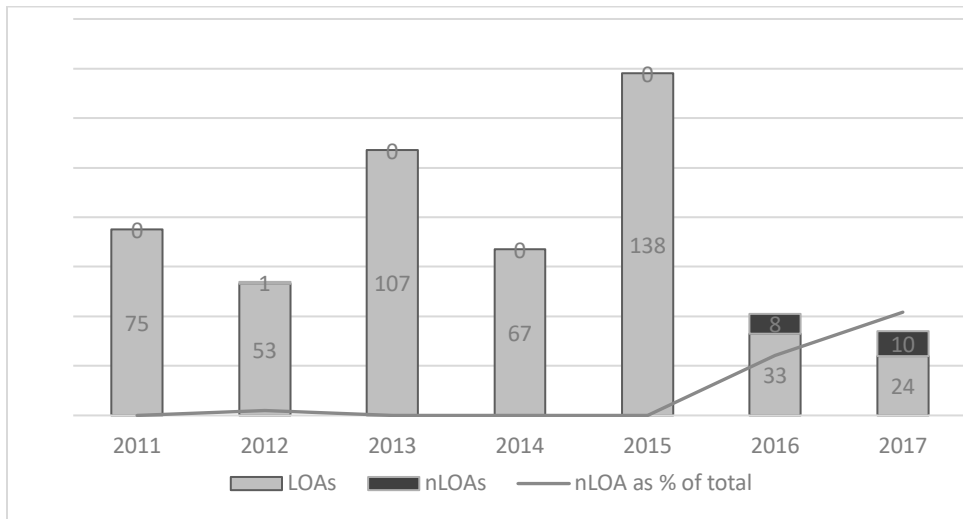
25. Susan Decker & Ian King, *Qualcomm Says It Won't Follow New Wi-Fi Rules on Patents*, BLOOMBERG (Feb. 11, 2015), <https://www.bloomberg.com/news/articles/2015-02-11/qualcomm-says-new-wi-fi-standard-rules-unfair-may-not-take-part?leadSource=verify%20wall>; Richard Lloyd, *InterDigital Reveals That, Like Qualcomm, It Is Reworking Relationship With IEEE After Introduction of New Patent Policy*, IAM (Mar. 24, 2015), <https://www.iam-media.com/article/interdigital-reveals-qualcomm-it-reworking-relationship-ieee-after-introduction-of-new-patent-policy>; *Will IEEE Finally Admit the Errors of Its 2015 Patent Policy Changes?*, IP EUROPE (Oct. 19, 2021), <https://ipeurope.org/blog/will-ieee-finally-admit-the-errors-of-its-2015-patent-policy-changes/>.

26. Keith Mallinson, *Development of Innovative New Standards Jeopardized by IEEE Patent Policy*, 4IP COUNCIL (Sept. 2017), https://www.4ipcouncil.com/application/files/6015/0479/2147/Mallinson_IEEE_LOA_report.pdf; Alden Abbott, *IEEE Patent Policy Change Would Undermine Property Rights and Innovation*, TRUTH ON MKT. (Feb. 4, 2015), <https://truthonthemarket.com/2015/02/04/ieee-patent-policy-change-would-undermine-property-rights-and-innovation/>; Teece & Sherry, *supra* note 21; Ron D. Katznelson, *The 2015 IEEE Policy on Standard Essential Patents – The Empirical Record*, BEPRESS (May 17, 2018), <https://works.bepress.com/rkatznelson/80/>.

27. Katznelson, *supra* note 26, at 12.

patent holders, despite them holding essential patent claims.²⁸ Furthermore, as early as 2016, the net average supply rate of unique LOAs for the IEEE 802.11k and 802.11h standards declined by 83 percent.²⁹ Kirti Gupta and Georgios Effraimidis's study found a drop of 91 percent in the number of positive LOAs, and at the same time, an increase in the number of negative LOAs in the post amendment period.³⁰ Furthermore, according to data from the IEEE PatCom Board meetings, in 2017 there were 10 negative LOAs revived.³¹ This starkly contrasts to the single negative LOA received between 2011 and 2015.³²

Figure 1. Change in the LOAs received by IEEE-SA for 802.11 during 2011-17.³³



One could argue that the IEEE seemed to acknowledge the problems emanating from the 2015 Policy and attempted to remedy the situation with the introduction of a custom LOA form that would allow patent holders to

28. *Id.* at 5.

29. Bharadwaj & Singh, *supra* note 3, at 602.

30. Gupta & Effraimidis, *supra* note 24, at 7.

31. Between December 2017 and March 2018, of the total of twelve LOAs received, three were negative. Bharadwaj, Singh & Jain, *supra* note 19, at 107.

32. *Id.*

33. Source: Author's assessment of the LOAs granted between 2011 and 2017, based on the IEEE PatCom Board's minutes of the meeting.

signal their willingness to grant a license under the pre-2015 IPR policy.³⁴ However, the applicability of these custom LOAs was limited to standardization projects that were taken up prior to the implementation of the changes in the 2015 Policy.³⁵

The impact of the 2015 Policy wasn't limited to the LOAs, as there was a dip even in the number of project authorization requests (PARs)³⁶ for 802 standards. While the average annual count of 802 PARs prior to 2015 was 16.7, the same dropped down to 16 in the period post 2015 (indicating a reduction in the number of PARs by 4.2% after the policy update).³⁷ Any questions about the veracity of the aforementioned claims were put to rest by the supplemental 2020 BRL issued to IEEE by the DOJ.³⁸ The DOJ, in its 2020 BRL, acknowledged that the amended policy “may be discouraging participation in standards development at IEEE and possibly chilling innovation.”³⁹ More specifically, the DOJ noted that there had been a significant increase in the number of negative LOAs since the amended policy went into effect; that negative LOAs were “77% of the total WiFi Letters of Assurance at IEEE between January 2016 and June 2019.”⁴⁰ Consequently, the approval of a couple of proposed iterations of the IEEE 802.11 Wi-Fi standard was declined by the American National Standards Institute (ANSI).⁴¹ The amended policy also appeared to have caused delays in disclosure of licensing intentions by patent holders, resulting in a lack of clarity regarding patents potentially essential to the standard under development.⁴²

B. IMPACT ON ANTTITRUST POLICY: SHIFTING PERSPECTIVES ON SEP LICENSING

While the supplemental BRL might have clarified the DOJ's stance on the amended policy, the Department's opposition to the changes in the 2015

34. Samuel Baird & Craig Thompson, *IEEE IPR Rule Changes Fuel the Wi-Fi 6 Litigation Fire (Part 2)*, IP WATCHDOG (Mar. 21, 2023), <https://ipwatchdog.com/2023/03/21/ieee-ipr-rule-changes-fuel-wi-fi-6-litigation-fire-part-2/id=158050/>.

35. *Id.*

36. A project authorization request (PAR) “is the means by which standards projects are started within the IEEE SA. PARs define the scope, purpose, and contact points for the new project.” See *FAQs: PARS, PAR Forms & Continuous Processing*, IEEE SA, <https://standards.ieee.org/faqs/pars/#:~:text=What%20is%20a%20PAR%3F,points%20for%20the%20new%20project> (last visited May 3, 2023).

37. Gupta & Efraimidis, *supra* note 24, at 26–27.

38. Delrahim, *supra* note 10, at 9.

39. *Id.*

40. *Id.*

41. *Id.*

42. *Id.*

Policy began in 2017 with the appointment of AAG Makan Delrahim. Delrahim kicked off his tenure by signaling a realignment of the DOJ's policy on SEPs and the development of standards.⁴³ He acknowledged the antitrust agencies' narrow focus on the risk of hold-up, and labeled hold-out as a far bigger threat to innovation than hold-up.⁴⁴ More specifically, he cautioned against the transformation of FRAND licensing commitments into a compulsory licensing scheme, and stated the deprivation of the right to seek injunctive relief as synonymous to compulsory licensing.⁴⁵ The inclusion of such a condition in the IPR policy of an SSO would, according to Delrahim, be viewed with suspicion by the antitrust agencies.⁴⁶ However, he did go on to clarify that a patent holder violating an SSO IPR policy provision restricting a patent holder's right to seek injunctive relief should not be treated as an antitrust violation, but may amount to fraud or breach of contract.⁴⁷

Between 2017 and the issuance of the 2020 BRL, Delrahim continued to make public statements, voicing his strong opinion against any kind of policing of SEP holders by SSOs or antitrust agencies.⁴⁸ Of these, his speech at the 2020 LeadersHIP Virtual Series is noteworthy. In it, Delrahim reiterated the significance of the New Madison approach⁴⁹ to the intersection of IP and antitrust law, expressed his unequivocal support for the availability of injunctive relief for SEP holders.⁵⁰ From the perspective of SSOs, and IEEE

43. Kimmel et al., *supra* note 5.

44. Delrahim, *supra* note 6, at 3.

45. *See generally* MANVEEN SINGH, STANDARD-SETTING ORGANISATIONS' IPR POLICIES: INTELLECTUAL PROPERTY AND COMPETITION ISSUES (1st ed. 2022).

46. Delrahim, *supra* note 6, at 12.

47. *Id.*

48. Elizabeth A. N. Haas, James T. McKeown, John F. Nagle & Kate E. Gehl, *DOJ and FTC Signal Shifts in Antitrust Enforcement of Essential Patent Disputes*, FOLEY (Oct. 10, 2018), <https://www.foley.com/en/insights/publications/2018/10/doj-and-ftc-signal-shifts-in-antitrust-enforcement>.

49. In 2018, Makan Delrahim enunciated the New Madison approach, which is comprised of four core premises aimed at incentivizing innovation and implementation. These are—"First: hold-up is fundamentally not an 'antitrust' injury, but rather a contract or fraud injury, when it is proven. Second, SDOs should not become vehicles for concerted action by market participants to favor implementers over patent holders. Third, a fundamental feature of patent rights is the right to exclude, and courts should be hesitant to limit that right by, say, disfavoring injunctive remedies, absent specific congressional direction. Fourth, consistent with the right to exclude, the antitrust laws ought to regard a unilateral decision not to license a patent as *per se* legal." The term SDO stands for a "standards development organization." *See* Makan Delrahim, *Broke ... but Not No More: Opening Remarks – Innovation Policy and the Role of Standards, IP, and Antitrust, Remarks as Prepared for Delivery at LeadersHIP Virtual Series*, U.S. DEP'T JUST. (Sept. 10, 2020), <https://www.justice.gov/opa/speech/assistant-attorney-general-makan-delrahim-delivers-remarks-leadership-virtual-series>.

50. *Id.*

in particular, what is important is that the New Madison approach cautions against the use of SSOs as vehicles of concerted action by market participants, to favor implementers over SEP holders.⁵¹

Yet another dimension on SEP holders' right to seek injunctive relief is added by the constantly changing policy statement of government agencies on the licensing of SEPs. In 2013 when, for the first time, the DOJ and the United States Patent and Trademark Office (USPTO) issued a joint "Policy Statement on Remedies for Standards-Essential Patents Subject to Voluntary F/RAND Commitments"(2013 Policy Statement).⁵² As a part of the 2013 Policy Statement, the two agencies expressed concerns about the remedy of injunctive relief or an exclusion order, and stated the same to be "incompatible with the terms of a patent holder's existing F/RAND licensing commitment to an SDO."⁵³ They further noted that "public interest may preclude the issuance of an exclusion order in cases where the infringer is acting within the scope of the patent holder's F/RAND commitment and is able, and has not refused, to license on F/RAND terms."⁵⁴ While this was the position of the DOJ during the Obama Administration prior to the IPR 2015 Policy, things took a turn in the aftermath of the 2015 Policy change, and more importantly, during Delrahim's tenure as AAG under the Trump Administration.

The 2013 Policy Statement was withdrawn and replaced in 2019 by a revised "Policy Statement on Remedies for Standards-Essential Patents Subject to Voluntary F/RAND Commitments" (2019 Policy Statement) jointly issued by the DOJ, the USPTO, and the National Institute of Standards and Technology (NIST).⁵⁵ In digressing from the approach to injunctive relief as laid down under the 2013 Policy Statement, the 2019 Policy Statement offered the view that "all remedies available under national law, including injunctive relief and adequate damages, should be available for infringement of standards-essential patents subject to a [FRAND] commitment, if the facts of a given case warrant them."⁵⁶ It further stated that there need not be a

51. Makan Delrahim, *The "New Madison" Approach to Antitrust and Intellectual Property Law, Remarks as Prepared for Delivery at the University of Pennsylvania Law School, Philadelphia* (Mar. 16, 2018), <https://www.justice.gov/opa/speech/file/1044316/download>.

52. U.S. DEP'T JUST. & U.S. PAT. & TRADEMARK OFF., POLICY STATEMENT ON REMEDIES FOR STANDARDS-ESSENTIAL PATENTS SUBJECT TO VOLUNTARY F/RAND COMMITMENTS (2013), <https://www.justice.gov/atr/page/file/1118381/download>.

53. *Id.* at 6.

54. *Id.* at 9.

55. U.S. PAT. & TRADEMARK OFF., U.S. DEP'T JUST. & NAT'L INST. STANDARDS & TECH., POLICY STATEMENT ON REMEDIES FOR STANDARDS-ESSENTIAL PATENTS SUBJECT TO VOLUNTARY F/RAND COMMITMENTS (2019), <https://www.justice.gov/atr/page/file/1228016/download>.

56. *Id.* at 4–5.

separate standard for SEPs, and that the *eBay* framework that established a four-factor test for injunctive relief in patent cases was sufficient to arrive at a decision on the question of injunctive relief.⁵⁷ The above position was quite the opposite to the one taken by the Obama Administration and ended up formalizing Delrahim's views on the rights of SEP holders.⁵⁸

The effect of the 2019 Policy Statement was short-lived, as Joe Biden, on becoming the US President, encouraged the reconsideration of the 2019 Statement.⁵⁹ The result was a request for public comments on a new "Draft Policy Statement on Licensing Negotiations and Remedies for Standards-Essential Patents subject to Voluntary F/RAND Commitments," (2021 Draft Statement) jointly issued by NIST, USPTO and the DOJ in December 2021.⁶⁰ Interestingly enough, the 2021 Draft Statement sought to modify the 2019 Statement and revert to a more neutral position as enshrined under the 2013 Statement.⁶¹ On the issue of injunctive relief, the 2021 Draft Statement stated that "[w]here a SEP holder has made a voluntary F/RAND commitment, the *eBay* factors, including the irreparable harm analysis, balance of harms, and the public interest generally militate against an injunction.⁶² Nevertheless, "an injunction may be justified where an implementer is unwilling or unable to enter into a F/RAND license."⁶³ The Draft Statement, at the time it was issued, was quite the expected response from the DOJ under the Biden

57. See generally ASHISH BHARADWAJ, INDRANATH GUPTA & VISHWAS H. DEVALAH, *LOCATING LEGAL CERTAINTY IN PATENT LICENSING* (1st ed. 2022).

58. See generally Peter J. Levitas, Sonia Kuester Pfaffenroth & Matthew Tabas, *Joint Statement with PTO and NIST on FRAND Injunctions Clarifies DOJ's Position on SEP-infringement Relief*, 32 INTEL. PROP. & TECH. L.J. 1 (2020).

59. President Biden issued an Executive Order in July 2021, asking the three agencies to revisit the 2019 Policy Statement. See *Executive Order on Promoting Competition in the American Economy*, WHITE HOUSE (July 9, 2021), <https://www.whitehouse.gov/briefing-room/presidential-actions/2021/07/09/executive-order-on-promoting-competition-in-the-american-economy/>

?utm_campaign=subscriptioncenter&utm_content=&utm_medium=email&utm_name=&utm_source=govdelivery&utm_term=.

60. U.S. PAT. & TRADEMARK OFF., U.S. DEP'T JUST. & NAT'L INST. STANDARDS & TECH., *DRAFT POLICY STATEMENT ON LICENSING NEGOTIATIONS AND REMEDIES FOR STANDARDS-ESSENTIAL PATENTS SUBJECT TO VOLUNTARY F/RAND COMMITMENTS* (2021), <https://www.justice.gov/opa/press-release/file/1453826/download> [hereinafter 2021 Draft Policy Statement].

61. John J. Kavanagh & Michael L. Weiner, *Draft Policy Statement Updates Guidance for Negotiations and Remedies for Standards-essential Patents*, LEXOLOGY (Jan. 21, 2022), <https://www.lexology.com/library/detail.aspx?g=9fc380e6-7fc4-41f4-9f9d-12cc751b1d99>.

62. 2021 Draft Policy Statement, *supra* note 60, at 9.

63. *Id.*

Administration and in stark contrast to that under the Trump Administration.⁶⁴ What came as a surprise, however, was the three agencies' decision to withdraw the 2019 Policy Statement in 2022, in the aftermath of the inputs received from the public on possible revisions.⁶⁵ In doing so, the agencies stated that "withdrawal best serves the interests of innovation and competition," and that going forward, the DOJ, in exercise of its law enforcement will review the conduct of SEP holders and implementers on a "case-by-case basis"⁶⁶ without any active policy statement on licensing of SEPs.

It's evident from the policy statements that over the last decade, each change in administration in the United States has witnessed a change in the antitrust policy. The only exception seems to be the Biden Administration's decision to maintain a position of neutrality in terms of antitrust policies, especially because the administration was expected to adopt an implementer-centric approach.⁶⁷ That said, it remains to be seen for how long the said position is likely to exist. Furthermore, the said change isn't just limited to the issuance of policy statements, but also influenced the BRLs issued by the DOJ. The decision to issue the supplemental 2020 BRL, as discussed earlier, was an extraordinary one. However, the decision to reclassify the supplemental BRL

64. The antitrust policies of the Biden Administration have largely mirrored those under the Obama Administration, as a result of which the 2021 Draft Policy Statement ended up aligning with the 2013 Policy Statement.

65. Oblon, McClelland, Maier & Neustadt, L.L.P., *The Department of Justice, U.S. Patent and Trademark Office and National Institute of Standards and Technology Withdraw 2019 Standards-Essential Patents (SEP) Policy Statement*, MONDAQ (June 13, 2022), <https://www.mondaq.com/unitedstates/patent/1200892/uspto-nist-and-doj-withdraw-joint-2019-policy-statement-on-remedies-for-standards-essential-patents-subject-to-voluntary-frand-commitments>; Jonathan H. Ashtor, Andrew C. Finch, William B. Michael, Catherine Nyarady, Joshua H. Soven & Aidan Synnott, *DOJ Withdraws Standards-Essential Patent Policy and Will Evaluate Competition Issues "Case-by-Case,"* PAUL WEISS (June 14, 2022), <https://www.paulweiss.com/practices/litigation/antitrust/publications/doj-withdraws-standards-essential-patent-policy-and-will-evaluate-competition-issues-case-by-case?id=43287>; Ryan C. Richardson, *DOJ, USPTO, and NIST Withdraw 2019 Standards-Essential Patents (SEP) Policy Statement*, STERNE KESSLER (June 10, 2022), <https://www.sterneesslerer.com/news-insights/client-alerts/doj-uspto-and-nist-withdraw-2019-standards-essential-patents-sep-policy>.

66. U.S. PAT. & TRADEMARK OFF., U.S. DEP'T JUST. & NAT'L INST. STANDARDS & TECH., *WITHDRAWAL OF 2019 POLICY STATEMENT ON REMEDIES FOR STANDARDS-ESSENTIAL PATENTS SUBJECT TO VOLUNTARY F/RAND COMMITMENTS (2022)*, <https://www.uspto.gov/sites/default/files/documents/SEP2019-Withdrawal.pdf>.

67. Gene Quinn, *IEEE Approves Pro-Patent Holder Policy Updates*, IP WATCHDOG (Sept. 30, 2022), <https://ipwatchdog.com/2022/09/30/ieee-approves-pro-patent-holder-policy-updates/id=151824/>.

just months after Joe Biden came to power was also quite unusual.⁶⁸ The DOJ, in signaling the return to an implementer-centric antitrust policy, “reclassified” the 2020 BRL as mere “advocacy” as opposed to “formal guidance.” The reclassification meant that the 2015 BRL would yet again be considered the prevailing authority on the availability of remedies for SEP holders.⁶⁹

IV. THE 2022 IEEE IPR POLICY UPDATE

While the DOJ under the Biden Administration might have reclassified the IEEE’s supplemental 2020 BRL, it nonetheless triggered a change in the IPR policy of the SSO. In fact, prior to the reclassification in 2021, the IEEE announced its decision to review the IPR 2015 Policy.⁷⁰ Eventually, in September 2022, the Board of Governors of IEEE announced changes to its 2015 Policy, with it taking effect from 1 January 2023.⁷¹ As was predicted, the two major changes brought about by the 2022 Policy concerned the definition of “Reasonable Rate” and the availability of injunctive relief,⁷² with the former having further implications on the choice of royalty base and the overall determination of FRAND.⁷³

Beginning with the definitions under Clause 6.1, “Reasonable Rate” under the new Policy is defined as the “appropriate compensation to the patent holder for the practice of an Essential Patent Claim excluding the value, if any, resulting from the inclusion of that Essential Patent Claim’s technology in the

68. John Pierce, *DOJ’s 2015 Business Review Letter for IEEE and 2020 Supplemental Response*, UNIFIED PATS. (July 22, 2021), <https://www.unifiedpatents.com/insights/2021/7/22/dojs-2015-business-review-letter-for-ieee-and-2020-supplemental-response>.

69. Kathryn Jordan Mims, Jaelyn Phillips & Abdul M. Hafiz, *DOJ Antitrust Division Quietly Walks Back Prior Administration-Era Support of Standard Essential Patent Holders*, WHITE & CASE (May 26, 2021), <https://www.whitecase.com/insight-alert/doj-antitrust-division-quietly-walks-back-prior-administration-era-support-standard>.

70. Emily Luken & James Tierney, *IEEE’s Efforts to Placate its Adversaries by Making Minor Changes to Its Patent Policy Will Create Unnecessary Risk and Uncertainty for Its Core Constituents*, COMPETITION POL’Y INT’L (Feb. 28, 2023), <https://www.competitionpolicyinternational.com/ieees-efforts-to-placate-its-adversaries-by-making-minor-changes-to-its-patent-policy-will-create-unnecessary-risk-and-uncertainty-for-its-core-constituents/>.

71. *IEEE Announces Decision on Its Standards-related Patent Policy*, IEEE SA (Sept. 30, 2022), <https://standards.ieee.org/news/ieee-announces-decision-on-its-standards-related-patent-policy/>.

72. David Cohen, *Recent Edits to the IEEE IPR Policy are Steps in the Right Direction*, JD SUPRA (Apr. 25, 2023), <https://www.jdsupra.com/legalnews/recent-edits-to-the-ieee-ipr-policy-are-2877643/>.

73. OxFirst, *Implications of the Updated IEEE IPR Policy for FRAND Rate Determination*, IP FINANCE (Oct. 7, 2022), <http://www.ip.finance/2022/10/implications-of-updated-ieee-ipr-policy.html>.

IEEE Standard,” with some optional considerations for the determination of “Reasonable Rate” now including:

- “The value that the functionality of the claimed invention or inventive feature within the Essential Patent Claim contributes to the value of the relevant functionality of the smallest saleable Compliant Implementation that practices the Essential Patent Claim *or to another appropriate value level of the Compliant Implementation.*
- The value that the Essential Patent Claim contributes to the smallest saleable Compliant Implementation *or to another appropriate value level of the Compliant Implementation* that practices that *Essential Patent Claim*, in light of the value contributed by all Essential Patent Claims for the same IEEE Standard practiced in that Compliant Implementation.
- Existing licenses covering use of the Essential Patent Claim, where the circumstances and resulting licenses are sufficiently comparable to the circumstances of the contemplated license. . . .”⁷⁴

The above changes to the definition of “Reasonable Rate” imply that the SSPPU is no longer the preferred royalty base, and apportionment no longer the preferred principle, for the determination of a RAND rate. Rather, the definition now allows for other appropriate levels of Compliant Implementation, such as the entire market value of the product, to also be factored in for such analysis.⁷⁵ Additionally, the new definition, in removing the existing limitation of comparable licenses obtained under the implicit or explicit threat of a prohibitive order, allows for all licenses to be treated as comparable licenses so long as the circumstances under which they were obtained are sufficiently comparable to those of the contemplated license.⁷⁶ These changes are significant because most of the changed language was introduced by the 2015 Policy.

The second of the changes affects the availability of injunctive relief for SEP holders under Clause 6.2, and aligns the IEEE’s IPR policy with those of other major SSOs operating around the world.⁷⁷ The 2022 Policy encourages both the SEP holders and the implementers to negotiate in good faith without

74. Thomas Cotter, *IEEE Amends Its Patent Policy, Effective January 1*, COMPAR. PAT. REMEDIES (Oct. 3, 2022), <http://comparativepatentremedies.blogspot.com/2022/10/ieee-amends-its-patent-policy-effective.html>.

75. Cohen, *supra* note 72.

76. Luken & Tierney, *supra* note 70, at 3.

77. Cohen, *supra* note 72.

causing unreasonable delay.⁷⁸ However, an SEP holder is allowed to seek a prohibitive order against an implementer not willing to negotiate a license in good faith.⁷⁹ In defining the scope of good faith negotiations, the 2022 Policy clarifies that a party seeking additional information post the initial notice of infringement, choosing to file a case, or arbitrating over the FRAND rate does not imply that the party is not willing to negotiate in good faith.⁸⁰

These changes, according to the IEEE, are intended to bring clarity to the “IEEE’s standards processes related to patented technologies,” while at the same time offer “more options for stakeholders.”⁸¹

V. POSSIBLE IMPLICATIONS OF THE 2022 IPR POLICY UPDATE

At the very outset, it is important to recognize that the IEEE’s decision to update its existing 2015 Policy was taken after much deliberation over the years in the lead up to September 2022.⁸² And while the latest policy update may not have drastically changed the SEP licensing landscape, it does make for a positive reading from the patent holders’ perspective.⁸³ The biggest reason is the dilution of some of the controversial provisions introduced by the 2015 Policy, including the preference of SSPPU as royalty base and the limitations on the patent holders’ right to seek injunctive relief.⁸⁴ The addition of the words “another appropriate value level of the Compliant Implementation” implies that the 2015 Policy now offers much more flexibility in terms of the choice of royalty base, bringing entire market value of the standard compliant product back into the fold. As a result, patent holders are no longer restricted in terms of their demand for royalties based on a single methodology or royalty base and can rather proceed on a case-by-case basis. Furthermore, the updated

78. *IEEE SA Standards Board Bylaws*, IEEE SA (Sept. 30, 2022), <https://standards.ieee.org/wp-content/uploads/import/governance/bog/resolutions/september2022-updates-sasb-bylaws.pdf>.

79. Cotter, *supra* note 74.

80. *IEEE SA Standards Board Bylaws*, *supra* note 78.

81. *IEEE Announces Decision on Its Standards-related Patent Policy*, IEEE SA (Sept. 30, 2022), <https://standards.ieee.org/news/ieee-announces-decision-on-its-standards-related-patent-policy/>.

82. The 2022 Policy Update was announced by the IEEE on September 30.

83. Quinn, *supra* note 67.

84. Florian Mueller, *IEEE Rejoins Mainstream of Standard-setting World as It Undoes Key Elements of 2015 Patent Policy That Encouraged Hold-out By Unwilling Licensees: Major Defeat for Apple and Its Allies*, FOSS PATS. (Sept. 30, 2023), <http://www.fosspateints.com/2022/09/ieee-rejoins-mainstream-of-standard.html>.

Policy broadens the scope of comparable licenses regardless of whether a threat of injunctive relief played a part in their acquisition.

The other much talked about provision from the 2015 Policy concerning the limitation on the right to seek a prohibitive order or injunctive relief also caused a lot of discontentment amongst patent holders, especially in terms of encouraging hold-out by implementers. Those concerns, to a great extent, are quelled by the 2022 Policy because the patent holders are now at liberty to seek a prohibitive order against any party not willing to negotiate in good faith. What it has also done is send a clear message to the implementers that they can no longer indulge in any kind of delaying tactics while engaging in licensing negotiations, and if they do, there is a major risk of being subject to injunction. Moreover, with the availability of injunctive relief on the table, there is a major likelihood that the number of negative LOAs goes down.⁸⁵ This would in turn benefit the standard-setting activities carried out at IEEE and, more importantly, help regain ANSI accreditation for IEEE standards.⁸⁶ It is also worth noting that with the DOJ's withdrawal of the 2019 Policy Statement and the updates to the IEEE's 2015 Policy, for all questions pertaining to the grant of injunctions, courts in the US are likely to continue relying on the *eBay* framework. Whether that would attract more litigation is a question that will be answered over time.

Nonetheless, questions have already been asked of the need to update the policy, given the fact that the 2020 BRL that arguably acted as a catalyst for the 2022 updates was rescinded by the DOJ Antitrust Division in 2021.⁸⁷ Amongst the biggest critics was the Fair Standards Alliance, who called out the IEEE for what it described as giving into “pressure from a minority of stakeholders with specific business interests, which were seemingly given precedence over the interests of the vast majority of industry participants supporting the 2015 policy.”⁸⁸ It further stated that the changes were likely to “create more uncertainty for licensing of patents essential to IEEE standards.”⁸⁹

Despite of all that has been said about the IEEE's IPR 2022 Policy, it cannot be denied that its present position on the definition of “reasonable rate” and the grant of injunctive relief is on the same wavelength as that of

85. *Id.*

86. *Id.*

87. Luken & Tierney, *supra* note 70, at 3.

88. *Changes to IEEE Licensing Policy Undermine Its Own Mission to Benefit Privileged Few*, FAIR STANDARDS ALL. (Oct. 5, 2022), <https://fair-standards.org/2022/10/05/changes-to-ieee-ipr-policy-undermine-its-own-mission/>.

89. *Id.*

other major SSOs operating in the information and communication technology sector.

VI. CONCLUSION

At the ITU-T Roundtable of 2012, when Renata Hesse, the then-Deputy Assistant Attorney General of the Antitrust Division at the DOJ, urged SSOs to bring clarity and transparency to their IPR policies,⁹⁰ the IEEE was one of the first SSOs to start updating its policy. The 2015 Policy and the 2022 Policy proved to be two major flashpoints over the course of the next decade, shaping much of the discussion about SSO IPR policies. Yet, after all these years, there continues to remain a lack of consensus on the effect the latest update is likely to have on standard-setting at IEEE, despite the IEEE having brought changes to some of the most fundamental aspects of SEP licensing twice over. What it also points to is the fact that there cannot be a perfect IPR policy, and there are bound to be certain provisions that might favor the patent holders and other provisions that might favor the implementers. The important thing, however, is to maintain a balance between the interests of the two, and the SSO IPR policies must also be reflective of the same.

The updated 2022 Policy by the IEEE board is a step in the right direction. It is only fair that an SSO, through the medium of its IPR policy, should not fix the royalty base or the royalty determination methodology in a manner that favors one set of stakeholders over the other. Rather, the same should entail flexibility and must be considered on a case-by case basis. Similarly, for a remedy such as injunctive relief, it is important to not deprive patent holders of their rights. This, especially when as a middle path, injunctive relief can be limited to exceptional situations involving lack of good faith from the opposite party. It is in furtherance of the aforementioned aspects of royalty determination and injunctive relief that the IEEE looks to have brought about the latest set of changes to its IPR policy. The 2022 Policy changes gain additional significance because the Biden Administration opted against issuing any policy statement on the licensing of SEPs. Having said that, whether the said changes kickstart a new era at IEEE or continue to be a stumbling block for IEEE standards remains to be seen.

90. Renata Hesse, *Six "Small Proposals for SSOs Before Lunch"*, ITU-T PAT. ROUNDTABLE (Oct. 10, 2012), <https://www.justice.gov/atr/file/518951/download>.

“PAY NO ATTENTION TO THE COMPARABLE BEHIND THE CURTAIN!”

THE HARMS OF OPACITY IN STANDARD ESSENTIAL PATENT LICENSING

Barbara Lauriat[†]

ABSTRACT

Despite calls for greater transparency in standard essential patent (SEP) licensing from many quarters, there is a systemic lack of transparency at multiple levels of the global SEP licensing market, including questions of validity and essentiality in large portfolios, access to information from comparable licensing agreements, and sometimes the existence of past SEP disputes and the bases for their resolution. The current landscape incentivizes secretive, adversarial disputes instead of informed, arms-length negotiations, which creates inefficiencies and adds to the complexity of determining Fair, Reasonable, and Non-Discriminatory (FRAND) terms for SEP licenses. While this lack of transparency and the strategic use of information imbalances to game the system can create problems for the parties involved in a particular dispute, the inaccuracies and inefficiencies also harm the public interest. Market participants have legitimate business reasons to maintain confidentiality of sensitive commercial information alongside less legitimate reasons for withholding relevant data, and judges and arbitrators struggle to differentiate between genuine claims of confidentiality or trade secrecy and strategic obfuscation. These difficulties are more pronounced as SEP-licensing moves into the Internet of Things (IoT), where potential licensees have more limited access to information and less experience navigating the FRAND terrain. Competition to disclose as little as possible reduces transparency and incentivizes information gamesmanship, the cumulative effects of which are harmful to the global market for SEPs and the resolution of FRAND disputes. This Article outlines the systemic lack of transparency in SEP-licensing, the problems created by information disparities, and the resilience of—and harm created by—the opaque status quo. Mechanisms to increase transparency should be built into the global SEP system in order to increase efficiency, decrease transaction and litigation costs, maintain the balance of private and public interests in supporting innovation and standardization, and allow for adequate oversight.

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I. INTRODUCTION

Digital interoperability is a quietly inescapable feature of everyday life. Advances in smart technologies and 5G connectivity have allowed for the proliferation of the Internet of Things (IoT) that incorporates networked devices into a wide range of everyday items and creates novel efficiencies and functionalities. The telecommunications industry has achieved the current high level of interoperability through the mechanism of industry-wide standard setting. Whether we are individually aware of it or not, the increasing presence of telecommunications technologies in our daily lives is also indicative of the increasing importance of industry standard setting on a global scale. The major telecommunications companies are positioned to develop valuable inventions and contribute to key standards that will benefit the global public. At the same time, disturbing the competitive balance of standard essential patent (SEP) licensing has the potential to harm billions.¹

Patent regimes strongly implicate both public and private interests; national patent laws already struggle to strike a balance between incentivizing innovation and harming marketplace competition. The increased market power arising from patented technologies in worldwide standards creates another level of complexity for legal regimes trying to maintain this crucial balancing act. Antitrust/competition authorities have sometimes viewed intellectual property with slight skepticism, given its monopolistic

1. See e.g., Alexandra Bruer & Doug Brake, *Mapping the International 5G Standards Landscape and How it Impacts U.S. Strategy and Policy*, INFO. TECH. & INNOVATION FOUND. (Nov. 8, 2021), <https://itif.org/publications/2021/11/08/mapping-international-5g-standards-landscape-and-how-it-impacts-us-strategy/> (“U.S. policymakers appear wary of the potential for unfair strategic gamesmanship in standards-setting organizations by Chinese actors, and with good reason.”).

characteristics.² They have also traditionally approached standard setting with some caution due to the opportunities for collusion and other negative market effects.³ While the value of patent protection and standard setting in rapidly-moving, high-technology environments is generally thought to outweigh the risks of harm to the market, the potential for harm nevertheless remains. Although standard essential patents themselves are the product of public privileges (patents) and collective action (standards), the negotiations and disputes dealing with them are most often private and bilateral rather than public and cooperative.⁴

The same system of collective private ordering that created SEPs also developed a widely adopted solution to the problems that can arise in standard setting in patent-heavy areas of technology: a requirement for SEP owners to declare their SEPs and license them on Fair, Reasonable, and Non-Discriminatory (FRAND) terms. The FRAND commitment is meant to prevent SEP owners from abusing the robust monopoly theoretically conferred by standard essentiality by refusing to license or licensing only at over-inflated rates (patent “hold-up”) ameliorating the risk of anticompetitive market harm.⁵

While making an assertion of essentiality restricts an SEP owner by requiring them to license at FRAND terms and placing limits on the available remedies when faced with infringement, the assertion itself can also have the effect of increasing market power, which leads to habitual over-declaration of SEPs. Unlike the rigorous patent examination procedures conducted by many national patent offices, standard setting organizations (SSOs)⁶ usually do not examine declared SEPs to determine whether they are essential to the standard or even valid patents.⁷ Market participants, experts, and courts may disagree on which methods should be used for valuing portfolios and calculating

2. See Olav Kolstad, *Competition Law and Intellectual Property Rights: Outline of an Economics-Based Approach*, in RESEARCH HANDBOOK ON INTELLECTUAL PROPERTY AND COMPETITION LAW 3 (Josef Drexler ed., 2008).

3. See Alden F. Abbott, *US Government Antitrust Intervention in Standard-Setting Activities and the Competitive Process*, 18 VAND. J. OF ENT. & TECH. L. 225, 232–33 (2020).

4. Jorge L. Contreras, *Global Rate Setting: A Solution for Standards-Essential Patents?*, 94 WASH. L. REV. 701, 709 (2019) (“In reality, despite the inherently bilateral, adversarial nature of litigation, the determination of a FRAND royalty is not strictly a bilateral matter.”)

5. See Joseph Farrell, John Hayes, Carl Shapiro & Theresa Sullivan, *Standard Setting, Patents, and Hold-Up*, 74 ANTITRUST L.J. 603, 648 (2007).

6. In this Article, SSOs and Standard Development Organizations (“SDO”) are referred to collectively as SSOs for the sake of simplicity.

7. See MANVEEN SINGH, STANDARD-SETTING ORGANISATIONS’ IPR POLICIES 51, 69–71; Mark A. Lemley & Timothy Simcoe, *How Essential are Standard-Essential Patents?* 104 CORNELL L. REV. 607, 620–628 (2019).

FRAND rates, and much of the data usually required to make these calculations is not readily available.

Partly because of the unique character of the global SEP market, the lack of information, and uncertainties about best practices, the FRAND landscape has left open opportunities for abusive and anticompetitive behaviors by both SEP owners and SEP implementers—and many players in the telecommunications industry have been both at the same time. SEP owners can make the most of their FRAND-encumbered patents through strategies such as over-declaration and excessive bundling of patents in their licensing portfolios, unreasonably requiring global licenses, or using confidentiality and non-disclosure agreements to hide data that might lower portfolio valuations.⁸ Implementers can take advantage of the FRAND commitment’s restrictive effects on the SEP owner’s ability to seek injunctive relief by simply manufacturing products incorporating standardized technology without a license; if caught, they can artificially prolong negotiations with the SEP owner by rejecting all licensing offers as not FRAND while continuing to manufacture: a practice known as “hold-out.”⁹

The patent system is built on an expectation of openness and disclosure of valuable technology to the public. Lack of information has created innumerable challenges to the efficient operation of the market for SEP licenses, and private industry players, government authorities, judges, and academics alike have proposed means of improving access to relevant information and data.¹⁰ The European Union’s recent draft proposal for a Regulation on Standard Essential Patents recommends measures explicitly aimed at achieving greater transparency in licensing and rigor in monitoring standard essentiality,¹¹ but it has received intense criticism from a variety of stakeholders.¹²

8. Where injunctions are available, problems such as “constructive refusal to deal” can arise if a dominant SEP holder uses equitable relief to attempt seek royalties higher than FRAND “(excessive pricing theory of harm)” or to exclude downstream competitors “(exclusionary theory of harm).” A. Nicita & G. Corda, *The “New Madison” v. the “Old Europe” Doctrine: On Re-balancing Competition Policy Towards SEPs*, in *THE INTERPLAY BETWEEN COMPETITION LAW AND INTELLECTUAL PROPERTY: AN INTERNATIONAL PERSPECTIVE* 53, 54 (Gabriella Muscolo, Marina Tavassi eds., Kluwer Law 2019).

9. See Brian J. Helmers & Christian Love, *An Empirical Test of Patent Hold-Out Theory: Evidence from Litigation of Standard Essential Patents*, 3 INT’L J. OF INDUS. ORG. (forthcoming 2023), <https://ssrn.com/abstract=3950060>.

10. See SINGH, *supra* note 7, at 185–87.

11. Proposal for a regulation of the European Parliament and of the Council on standard essential patents and amending Regulation (EU) 2017/1001, COM (2023) 232 (Apr. 23, 2023), https://single-market-economy.ec.europa.eu/publications/com2023232-proposal-regulation-standard-essential-patents_en [hereinafter EU Proposal 2023].

12. See e.g., *European Commission’s Formal SEP Regulation Proposal Addressed Certain Issues and is Now Criticized by Both Net Licensors and Net Licensees of Standard-essential Patents*, FOSS PATENT BLOG (Apr. 28, 2023), <http://www.fosspatents.com/2023/04/european-commissions-formal-sep.html>.

In negotiation, mediation, litigation, and arbitration, parties and decisionmakers all struggle to differentiate between legitimate claims of confidentiality and strategic obfuscation. Sometimes both sides in a dispute are keen on minimizing transparency; even in the absence of an active dispute over access to information, the situation can still be to the detriment of the global markets for technology. Rather than providing a comprehensive solution to complicated jurisdictional problems in global SEP licensing disputes, the recent enthusiasm for arbitration is likely to increase the privacy and confidentiality of proceedings, which in turn will likely compound transparency problems and further obscure the licensing landscape for new entrants to the market.¹³ Resolving FRAND disputes—which implicate collective and public actions and rights—through straightforward bilateral proceedings means that the wider interest in having a functional global SEP licensing framework may not always be taken into account, particularly when those proceedings are private.

While some commentators assert that technology markets appear to function effectively and no genuine problem actually exists,¹⁴ others claim the problem may be getting worse as new markets open because these markets attract implementers who lack the information and experience with the SEP licensing landscape to know what they do not know. SEP licensing is rapidly moving into the IoT space where potential licensees, particularly small and medium-sized enterprises (SMEs), struggle to know who owns the SEPs in a given standard and cannot determine whether the cumulative rates for licensing SEPs might pose a barrier to their entry into the market.¹⁵

Looking at the system holistically, the current levels of opacity in the global SEP marketplace harm both the wider public and the individual private parties involved in bilateral transactions. In the former case, transparency levels are too low to allow for objective assessment, oversight, and procedural development of the SEP licensing system on behalf of the public interest. In the latter case, the lack of information pertaining to the validity and essentiality of declared SEPs and the lack of access to comparable licensing terms

13. Barbara Lauriat, *FRAND Arbitration Will Destroy FRAND*, MICH. TECH. L. REV. (forthcoming 2023), <https://ssrn.com/abstract=4451576>.

14. Pierre Larouche, Jorge Padilla & Richard S. Taffet, *Settling FRAND Disputes: Is Mandatory Arbitration a Reasonable, Fair, and Nondiscriminatory Alternative*, 10(3) J. OF COMP. L. & ECON. 581, 590 (2014) (“There is, in short, no evidence that opportunism by SEP owners is an overarching or systemic problem requiring an overhaul of the existing voluntary-consensus standards process.”).

15. See Brian J. Love & Christian Helmers, *Are Market Prices for Patent Licenses Observable? Evidence from 4G and 5G Licensing*, 24 COLUM. SCI. & TECH. L. REV. 55, 61, 83 (2022).

disincentivizes negotiation and incentivizes information gamesmanship, hold-out, and contentious legal proceedings.

This Article sets out some of the present risks of information asymmetry and lack of transparency in SEP licensing, and then examines a variety of vested interests that militate to maintain the opaque status quo. While calls for greater transparency in SEP licensing are far from radical, it is important to analyze the legal and economic forces that militate to stand in the way of transparency and disincentivize adequate information exchanges. Transparency is unusually important in the SEP framework because of the special character of SEPs, the exceptional nature of their existence, their role in creating new markets, and their ability to facilitate or impede innovation. A broad view of the potential harm to the public interest at a structural level—combined with an appreciation of the strong vested interests that militate against transparency—is important to make an objective assessment of FRAND policy recommendations.

II. THE LACK OF TRANSPARENCY IN SEP MARKETS HARMS THE PUBLIC INTEREST

While the lack of transparency creates problems for individual market participants, the parties in any given transaction or dispute are not the only ones who have an interest. Their competitors and—importantly—the global public all have an interest in the wider system of standard setting, SEP licensing, and FRAND royalty rate calculations. While transparency regarding pricing information and agreements might seem to be an aberration—or even an anathema—in the commercial world, one must remember that patent protection and standard setting are both aberrations in the context of normal market behavior. Moreover, the concept of industry standard setting involving patented technology further defies the usual norms of the marketplace because it requires levels of transparency and oversight that would be inappropriate and potentially harmful in other markets.¹⁶ The fundamental bargain of the patent system is the disclosure of innovation in exchange for patent protection. Unlike other areas of commercial activity, when dealing with public patent systems the default position should be openness, with secrecy tolerated only in limited circumstances.

Granting patent rights is already an exceptional practice in traditional competitive markets, and it is an accepted fact that the public has its own stake

16. See AM. BAR ASS'N, COMM. ON TECHNICAL STANDARDIZATION, SECTION OF SCI. & TECH. L., STANDARDS DEV. PATENT POLICY MANUAL x–xi (Jorge L. Contreras, ed., 2007)

in the patent bargain.¹⁷ The word “patent” has Latin roots from the verb *pateo*, *patere* meaning “to be open, stand open, lie open.”¹⁸ Openness and transparency are foundational principles of the patent system; inventors receive a limited term of “protection from competitive exploitation” in exchange for bringing “new designs and technologies into the public domain through disclosure” for the benefit of all.¹⁹ The rights offered through the patent bargain incentivize innovation, but they also require disclosure to the public. In the recent case of *Amgen v. Sanofi*, the U.S. Supreme Court emphasized the role of enablement in ensuring adequate disclosure; patent specifications are meant to be sufficiently detailed and specific to allow the public access to the invention after the expiration of the patent term.²⁰

The role of antitrust/competition legislation is to safeguard the competitive process within markets, enabling the market participants to assess prices so that they reach an appropriate level without undue interference from individual firms or the government. Both standard setting and patent protection are public in nature and are exceptions to normal market functioning, and consequently they call for heightened public scrutiny because of the potential for abuse.²¹ Accuracy in calculating FRAND rates is important—not just to the immediate parties involved in a bilateral negotiation or dispute, but also to their competitors and the public.²² Both overvaluation and undervaluation of FRAND royalty rates have the potential to disrupt the market and harm innovation.²³ It is unsurprising that the highly unusual marketplace for SEPs struggles to operate smoothly. Oversight is crucial in the context of FRAND because of the delicate balance to be maintained between apparently opposing forces: collaboration and competition; the sharing of

17. “It is as important to the public that competition should not be repressed by worthless patents, as that the patentee of a really valuable invention should be protected in his monopoly.” *Lear, Inc. v. Adkins*, 395 U.S. 653, 663–64 (1969) (quoting *Pope Manufacturing Co. v. Gormully*, 144 U.S. 224, 234 (1892)).

18. CASSELL’S LATIN DICTIONARY 426 (1959).

19. *Bonito Boats, Inc. v. Thunder Craft Boats, Inc.*, 489 U.S. 141, 151 (1989).

20. *See Amgen v. Sanofi*, 598 U.S. 594 (2023).

21. Yoonhee Kim, *Lifting Confidentiality of FRAND Royalties in SEP Arbitration*, 16 COLUM. SCI. & TECH. L. REV 1, 32 (2014) (arguing that not all patent licensing terms need to be made public, but “a FRAND licensing rate calls for scrutiny in light of its public nature”).

22. Alexandra Bruer & Doug Brake, *Mapping the International 5G Standards Landscape and How it Impacts U.S. Strategy and Policy*, INFO. TECH. & INNOVATION FOUND. (Nov. 8, 2021) <https://itif.org/publications/2021/11/08/mapping-international-5g-standards-landscape-and-how-it-impacts-us-strategy/>.

23. Tim W. Dornis, *Standard-Essential Patents and FRAND Licensing—At the Crossroads of Economic Theory and Legal Practice*, 11(10) J. E.U. COMP. L. & PRAC. 575, 582–83 (2020).

knowledge and exclusivity; and a commitment to standards and radical innovation.²⁴

The primary aim of the FRAND obligation is to maintain a balance of competition in the market for SEPs without unfair distortion from the collective standardization process. Pricing at FRAND rates should allow prospective implementers to predict future costs, adopt effective standards, and access technology markets efficiently, *and* their doing so should not inhibit further innovation in the industry.²⁵ In recent years, private ordering has predominated in the standard setting world, but antitrust and intellectual property authorities should not be complacent about future risks to technology markets and to the patent system. Indeed, gaming disclosure of licensing terms has already been cited as a cause of competition problems.²⁶ While SEP owners may eventually be compelled by courts to reveal the terms of past licenses because of their relevance in FRAND disputes, this raises the question of why confidentiality should be permitted at all.²⁷ Effectively requiring litigation before other implementers can access information relevant to the FRAND determination is costly for the courts, inefficient for the parties, and promotes harmful hold-out.

Given the collective nature of standard setting and the public interests at stake, there is an argument that antitrust principles should be the predominant organizing framework of SEP licensing.²⁸ While scrutinizing each and every license would be unnecessarily burdensome, and potentially harmful, government interference,²⁹ incentivizing and/or compelling SSOs to incorporate greater transparency—starting in the earliest stages of the standard-setting and SEP-declaration process—could provide a more balanced strategy.³⁰

How can antitrust/competition authorities provide limited but adequate oversight when they lack enough data about the overall market to assess whether market distortion is occurring even when individual claims come to

24. See Herbert Hovenkamp, *FRAND and Antitrust*, 105 CORNELL L. REV., 1683, 1743 (2020) (cautioning that oversight is necessary to prevent the “collaborative innovation that FRAND contemplates” from falling apart).

25. See Nicita & Corda, *supra* note 8, at 54.

26. Mark R. Patterson, *Confidentiality in Patent Dispute Resolution*, 93 WASH. L. REV. 827, 841 (2018).

27. Vikas Kathuria & Jessica C. Lai, *Royalty Rates and Non-Disclosure Agreements in SEP Licensing: Implications for Competition Law*, 40(6) E.I.P.R. 357, 362 (2018).

28. HARI TSILAKAS, *ANTITRUST ENFORCEMENT AND STANDARD ESSENTIAL PATENTS* 66 (Munich IP L. Center Studies 2017).

29. See Maureen K. Ohlhausen, *The Elusive Role of Competition in the Standard-Setting Antitrust Debate*, 20 STAN. TECH. L. REV. 93, 121–22, 141–42 (2017).

30. EU Proposal 2023, *supra* note 11.

their attention? The current lack of transparency means that there are limited opportunities for objective scrutiny by government authorities, public institutions, the press, and academics who want to analyze and criticize the impact of the system from a public interest perspective.³¹ As Patterson observes, identifying and proving violations of antitrust/competition laws in a FRAND dispute, particularly in arbitration, can be very challenging for the authorities “because it is difficult to show collusion towards an unlawful objective when both sides of the dispute tend to have their own, different incentives for confidentiality.”³²

The foundational principles behind both the patent system and standard setting suggest that the opacity prevalent at many levels of the standard setting and SEP licensing frameworks is symptomatic of an illness to be cured in the marketplace. Yet this symptom also hampers the development of a cure; the lack of transparency stifles the development of accepted procedures, methods, practices, and applicable laws when calculating FRAND rates and resolving disputes, which harms the market participants and the SEP licensing system. For example, there is still no clear consensus on the best method for setting FRAND rates because there are competing methods of calculation and variation even within jurisdictions.³³ Without transparency, the FRAND ecosystem struggles to develop consensus and effective procedures; confidential arbitration can cause further harm, preventing procedural precedents from emerging out of collective experience in resolving such disputes.³⁴ Experienced players in the SEP licensing space have an increasingly significant advantage over new entrants to the market, who not only lack

31. Kung-Chung Liu, *As a Matter of Standard for Asia and Beyond?, in* SEPs, SSOs AND FRAND: ASIAN AND GLOBAL PERSPECTIVES ON FOSTERING INNOVATION IN INTERCONNECTIVITY 1 [4.3.3] (2019) (“With FRAND royalties hidden in the dark, no creditable academic research or oversight from the Fourth Estate is possible, which will encourage patent abuse and trolls”).

32. See Patterson, *supra* note 26, at 879–80.

33. “Several methods of calculation have been developed in the case law around the world. Often combined, these methods are essentially the following: (1) the hypothetical negotiations approach; (2) the comparable approach; (3) the top-down approach; (4) the incremental value approach; and (5) the bottom-up approach” Matthew Dhenne, *Calculation of FRAND Royalties: An Overview of Practices Around the World*, 41(12) E.I.P.R. 755, 755 (2019).

34. Avinash Poorooye & Ronan Feehily, *Confidentiality and Transparency in International Commercial Arbitration: Finding the Right Balance*, 22 HARV. NEGOTIATION L. REV. 275, 301 (2017) (noting that one of the harms of commercial arbitration is that the “impossibility of or difficulty in obtaining these jurisprudential deliberations means that commercial law is effectively going underground”); Avantika Chowdhury, *Alternative Dispute Resolution in FRAND Licensing: Economic Considerations for an Effective Framework, in* THE INTERPLAY BETWEEN COMPETITION LAW AND INTELLECTUAL PROPERTY: AN INTERNATIONAL PERSPECTIVE 39, 46 (Gabiella Muscolo & Marina Tavassi, eds., 2019).

information gleaned from past transactions but are also unaware of the information-gathering techniques and calculation expertise of market veterans.³⁵

III. THE LACK OF TRANSPARENCY IN SEP MARKETS HARMS THE MARKET PARTICIPANTS

Both industry participants and voluntary consensus standards bodies are equipped with the appropriate knowledge and experience to best facilitate the SEP licensing process. This is achieved, among other ways, by facilitating good-faith negotiations and the transparent exchange of information, as well as setting forth, and adhering to, clear intellectual property rights policies.³⁶

While the quote above from a former United States Patent and Trademark Office (USPTO) Director acknowledges that good-faith negotiations and the transparent exchange of information are indeed required to facilitate the SEP licensing process, an increasingly severe problem is that not all industry participants *do* have adequate levels of knowledge and experience for them to participate meaningfully in the SEP licensing process or clear IP rights policies to follow. As IoT markets emerge, businesses are implementing standards that include SEPs for the first time, meaning they have little accumulated information about SEP licensing from the past or experience with the SEP landscape. Even when offered a genuinely FRAND license, implementers may be suspicious of whether it is indeed FRAND given the complexity and their lack of information—particularly if any disclosures they *do* receive are accompanied by robust non-disclosure agreements.³⁷ Knowing the limitations the FRAND commitment places on relief, implementers may resort to infringement instead of seeking a license, which harms SEP owners and the

35. Christian Helmers & Brian J. Love, *Submission to European Commission Call for Evidence for an Impact Assessment re: Intellectual Property – New Framework for Standard-Essential Patents*, EUR. COMM'N (May 9, 2022), https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/13109-Intellectual-property-new-framework-for-standard-essential-patents/F3257444_en.

36. Andrei Iancu, Director, USPTO, Remarks delivered at the Standard-Essential Patents Strategy Conference (Sept. 10, 2019), <https://www.uspto.gov/about-us/news-updates/remarks-director-iancu-standard-essential-patents-strategy-conference>.

37. For example, a non-disclosure agreement at issue in *Vringo v. ZTE Corporation* provided that the information provided in licensing negotiations would “not be used or referenced in any way by any Party in any existing or future judicial or arbitration proceedings or made the subject of any public comment or press release.” NO 14-cv-498 (S.D.N.Y. June 3, 2015).

system as a whole..³⁸ Swiftly reaching a licensing agreement with implementers is in the best interest of SEP owners, but an insistence on secrecy can make it more challenging for them to demonstrate to implementers—particularly those with less experience—that their offers are genuinely FRAND. Thus, the lack of transparency in the worldwide SEP licensing system contributes to an inefficient and unpredictable market situation that harms the would-be licensors and licensees alike.

Complaints about a lack of transparency in SEP licensing from prospective implementers usually fall into two broad categories: 1) lack of scrutiny as to the invalidity and/or inessentiality of patents in the portfolio; and 2) lack of information about comparable licensing agreements. There is an established basis for concerns regarding validity and essentiality. Over-declaration means many declared SEPs may not be practiced by a standard; one study found that 80% of patents declared essential were unlikely to be essential under the SSO's own criteria.³⁹ Implementers may have reasonable challenges to the validity of SEPs,⁴⁰ and implementation may not, in fact, even infringe.⁴¹

Negotiations commonly proceed thus: prospective implementers claim their refusals to pay proposed rates for SEP licenses are not anticompetitive hold-out, but rather the natural result of their lack of access to the information necessary to know whether the proposed rate is FRAND.⁴² Without accurate and objective assessment of the validity and essentiality of the patent portfolio or access to comparable licensing terms for similarly situated parties, assessing whether the rate offered is FRAND can be a guessing game. SEP owners respond that expense and impracticality are insurmountable barriers to any scrutiny of the validity and essentiality of their portfolio, and that genuine issues of confidentiality—including contractual non-disclosure and trade secrecy—prevent them from sharing relevant information. Requiring an NDA before sharing royalty rates can lead prospective licensees to assume that

38. See generally Adam Mossoff & Jonathan Barnett, *Comment of 25 Law Professors, Economists, and Former U.S. Government Officials in Response to EU Commission Call for Evidence on Standard-Essential Patents*, SSRN (June 22, 2022), <https://ssrn.com/abstract=4107938>.

39. David J. Goodman & Robert A. Myers, *3G Cellular Standards and Patents*, IEEE (2005) <https://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=1549445> (assessing the essentiality of declared 3G standard essential patents).

40. See Arindam Som, *How We Use 3G and GSM Concepts to Invalidate 4G LTE Patents?*, GREYB, <https://www.greyb.com/blog/invalidate-4g-lte-patents/> (last visited Sep. 15, 2023).

41. Mark A. Lemley & Timothy Simcoe, *How Essential are Standard-Essential Patents?* 104 CORNELL L. REV. 607, 608 (2019) (finding the SEPs in their study more likely to be valid than most litigated patents but “significantly less likely to be infringed”).

42. The EU survey found that three quarters of the respondents identified lack of transparency and conflicting decisions as “key problems” in the FRAND landscape. EU Proposal 2023, *supra* note 11, at 6.

secrecy is imposed in order to allow for them to impose discriminatory rates in violation of the FRAND commitment.⁴³ Implementers may be unaware of the number and identity of SEP owners who may require licenses following the implementation of a standard. This leads to fears about overpayment for the implementation of the standard, known as “royalty stacking.” The lack of transparency in the system as a whole, combined with SEP owners enforcing excessive confidentiality requirements—requiring NDAs and withholding relevant information—encourages implementer hold-out. Even if wholly unjustified, secrecy in this context can be viewed as a red flag that encourages prospective licensees to wait for litigation and court-ordered disclosure of information.⁴⁴

In theory, a competitive market for SEP licensing would need to be fully transparent to allow access to all the relevant data necessary to calculate FRAND rates with accuracy:

Ideally, complete information both *ex ante* and *ex post* on the existence, validity, essentiality, ownership, scope, enforceability of the relevant patents would improve decision-making, prevent opportunistic behavior and reduce transaction costs in the licensing process.⁴⁵

This ideal situation is far from the reality; negotiating parties are “at a great disadvantage if its opponent knows the terms of its licence agreements” while they remain unaware of the terms of their opponents’ agreements.⁴⁶ Naturally, parties in FRAND negotiations or disputes want everyone else to show their hands without showing their own, and no one wants to bear the cost of essentiality or invalidity inquiries.⁴⁷ If one market participant can get away with

43. Kathuria & Lai, *supra* note 27, at 357–58.

44. FAIR STANDARDS ALLIANCE, *TRANSPARENTLY FRAND: THE USE (AND MISUSE) OF CONFIDENTIALITY OBLIGATIONS IN FRAND LICENSING NEGOTIATIONS* (2017), <https://fair-standards.org/wp-content/uploads/2017/02/170213-FSA-Position-PaperTransparency-FRAND-1.pdf> (“Indeed, imposing excessive secrecy requirements, or failing to provide relevant materials, may in some cases encourage licensees to pursue court resolution over private negotiation, so as to obtain the benefit of the procedures for information exchange available in court matters.”).

45. *Standardisation and SEP Licensing: A EU Policy Perspective*, in *THE INTERPLAY BETWEEN COMPETITION LAW AND INTELLECTUAL PROPERTY*, 14 (discussing European Commission, *Setting out the EU approach to Standard Essential Patents*, COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, AND THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE 712 (Brussels 2017)).

46. *Id.*

47. In its 2022 submissions to the EU Qualcomm agreed on principle that “that perfect knowledge of which patents are essential to a standard and infringed by a product would be beneficial for both patent holders and implementers” but objected to the cost, time, expertise

gaming the system by withholding information, others will naturally try to do the same thing to remain competitive.⁴⁸

Once negotiations have failed between an SEP owner and a potential licensee, the decisionmaker usually determines the FRAND rate for the SEP portfolio—attempting to predict the result of a hypothetical bilateral negotiation between the licensor and licensee, absent any unfair advantage that can arise from the implementers already committed to using the standardized technology.⁴⁹ The non-discrimination element prevents price discrimination between similarly situated licensees.⁵⁰ The bottom line in FRAND calculation is identifying a rate that will not allow an SEP owner to abuse its position or result in an implementer paying SEP owners collectively more than their technology is actually worth.⁵¹

While there are some arguments for greater disclosure of patent licensing generally, SEPs are different. Non-disclosure of information related to SEPs and comparable licensing terms makes it difficult for market entrants to ascertain their future licensing costs and to determine whether a license they are being offered is FRAND. This is nearly impossible to do before a dispute arises and can even be challenging during the dispute.⁵² Moreover, because non-discrimination is based on comparison with similarly situated licensees, both the context and the rate are important when assessing comparable licenses.⁵³

and complexity of such assessments as being broadly prohibitive. Qualcomm Inc., *Response to European Union Request for Evidence on “Intellectual Property – New Framework for Standards Essential Patents,”* EUR. COMM’N (May 9, 2022), https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/13109-Intellectual-property-new-framework-for-standard-essential-patents/F3257473_en (referencing Feedback Number F3257473).

48. Hovenkamp, *supra* note 24, at 1743; FAIR STANDARDS ALLIANCE, *TRANSPARENTLY FRAND: THE USE (AND MISUSE) OF CONFIDENTIALITY OBLIGATIONS IN FRAND LICENSING NEGOTIATIONS* (2017), http://fair-standards.org/wp-content/uploads/2020/07/170213_FSA-Position-PaperTransparency-FRAND-1.pdf.

49. *Interim Report of the UMTS IPR Working Group*, EUR. TELECOMM. STANDARDS INS., http://www.qtc.jp/3GPP/GSM/SMG_27/tdocs/P-98-0608.pdf [<https://perma.cc/C799-M5RZ>] (“The value of the ETSI IPR Policy as the sole vehicle for the handling of IPR issues relating to standards lies in . . . the fact that the complex commercial issues of the details of licenses, and of compensation therefore, are placed where they belong, at the center of bilateral negotiations between licensor and licensee.”); CARL SHAPIRO & HAL R. VARIAN, *INFORMATION RULES: A STRATEGIC GUIDE TO THE NETWORK ECONOMY* 241 (1999).

50. *See* Patterson, *supra* note 26, at 831–32 (acknowledging that while views on non-discrimination differ, “different license terms are at least problematic”).

51. *See* Dhenne, *supra* note 33, at 760 (“Not all of these methodologies of calculation are mutually exclusive and may even be complementary but at the end of the day they should all be able to exclude abuses like patent hold-up and royalty stacking.”).

52. Kathuria & Lai, *supra* note 27, at 357.

53. *Unwired Planet v. Huawei*, [2017] EWHC 711 ¶146 [202] (Pat.) (2017).

While access to some commercial information—from the SEP owner, SSO, and potentially third parties—is crucial in making judgments and calculations of FRAND rates, it is possible that some of this information does give rise to a genuine need for protective secrecy. Unfortunately, one of the difficulties faced by a decisionmaker in a FRAND case—even in jurisdictions like the United States where extensive discovery is common—involves making decisions that balance the need for transparency with legitimate confidentiality concerns.⁵⁴ Parties often claim that they must keep information about third-party comparable licenses confidential for purposes of litigation strategy, concern for commercial interests, binding non-disclosure or confidentiality agreements, or some combination of the above. Trade secrecy is also asserted to help maintain confidentiality, and it can be particularly difficult for an opposing party to challenge assertions of trade secrecy in some courts or arbitration proceedings, particularly where extensive discovery is not part of the legal culture.⁵⁵

When an SEP owner approaches an implementer asking them to pay for a license on FRAND terms, a lack of transparency surrounding an offer can cause suspicion even when an offer is genuinely FRAND. When a potential licensee, particularly one new to SEP licensing, lacks the means to assess the validity or essentiality of an SEP owner's portfolio and has limited access to information about the SEP owner's prior licenses, it may be impossible for the prospective licensee to determine to its satisfaction whether the offer is FRAND. Consequently, the lack of transparency increases suspicion and incentivizes implementer hold-out and escalation of disputes to the courts. By pursuing judicial resolution instead of setting a rate through private negotiation, prospective licensees can benefit from the increased access to information that comes with court-mandated disclosure. Ultimately, the low levels of transparency in SEP licensing encourage greater complexity and higher costs in transactions, harming the parties and the public.

Even where SEP owners are prevented from licensing at rates higher than FRAND, they may attempt to use their position of power to impose excessive secrecy through non-disclosure agreements as a prerequisite for entering into licensing negotiations.⁵⁶ While secrecy regarding sensitive business information may be standard commercial practice in many markets, confidentiality in SEP

54. See generally Haris Tsilikas & Spyros Makris, *Confidentiality and Transparency in FRAND Litigation in the EU*, 15 J.I.P.L. & PRAC. 173, 173–84 (2020).

55. See Dhenne, *supra* note 33, at 759 (“Nothing will prevent the holder from invoking a trade secret in order to maintain the confidentiality of agreements concluded with third parties.”).

56. FAIR STANDARDS ALLIANCE, *supra* note 48.

licensing comes with a higher risk of harm to third parties.⁵⁷ In litigation, parties often seek broader confidentiality protection than is desirable for third parties' interests.⁵⁸ In proceedings brought by InterDigital to enforce an arbitral award against Huawei arising from a FRAND dispute, *both* parties jointly moved for an order sealing the courtroom on the basis that “the written submissions and the record to date reference a significant amount of confidential business information.” The judge denied the request, stating it was “incredible to think that the parties could not make intelligent legal arguments without referring to highly confidential information.”⁵⁹

Unlike major players in the telecommunication industry equipped with sophisticated legal teams with decades of experience in FRAND negotiations and disputes, new implementers—even those with substantial resources—lack knowledge about SEP licensing that could deter them from entering the market.⁶⁰ They may not know enough about the information they lack to even be able to ask about it. They also may not be aware of techniques using publicly available information from past disputes between parties to fill in some of the information gaps, as more experienced parties in the SEP licensing territory might attempt.⁶¹ This point regarding channels for information gathering was highlighted by Love and Helmers as a particular topic of concern in their submission to the EU Call for Evidence:

Our results may also suggest that confidentiality and price dispersion can be contributing factors to opportunistic behaviors like “holdup” and “holdout,” both of which leverage (at least to some extent)

57. *E.g.*, TQ Delta L.L.C. v Zyxel Comm'ns UK Ltd. & Anor (Rev 1) [2018] EWHC 1515 ¶ 22 (Ch) (2018).

58. *See* InterDigital Techn. Corp. v. OnePlus Tech. Co., [2023] EWCA (Civ) 166 ¶¶ 23, 25 (2023).

59. *InterDigital v. Huawei*, 15 Civ. 4485 (JGK), 2 (S.D.N.Y. Feb. 11, 2016).

60. *Apple Inc., Response to European Commission Call for Evidence on Intellectual Property – New Framework for Standard-Essential Patents*, EUR. COMM'N, at 4 (May 9, 2022), https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/13109-Intellectual-property-new-framework-for-standard-essential-patents/F3257505_en (referencing Feedback F3257505) (“An SME abandoned plans to develop a novel drone that monitors dangerous conditions for firefighting agencies due to uncertainty about product costs related to SEP royalties.”).

61. *Christian Helmers & Brian J. Love, Submission to European Commission Call for Evidence for an Impact Assessment re: Intellectual Property – New Framework for Standard-Essential Patents*, EUR. COMM'N, at 60 (May 9, 2022), https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/13109-Intellectual-property-new-framework-for-standard-essential-patents/F3257444_en (explaining that their results “suggest experienced incumbents are advantaged in patent licensing markets to the extent that they possess private information gleaned from prior transactions and thus need not rely exclusively on the sparse public record.”).

information asymmetries about what royalty rates actually (or should) prevail in the market.⁶²

While it may be true that larger SEP owners have little interest in taking action against SMEs and rarely do so, some patent assertion entities (possibly SMEs themselves) do choose to go after IoT SMEs.⁶³

Moreover, implementers who are not also SEP owners are less likely to be members of SSOs or involved in the standard setting process, and many manufacturers in the IoT field are pure implementers. Information imbalances may benefit or harm parties on either side of an individual licensing negotiation, but it is true that SEP owners and SEP owner-implementers *collectively* have incentives to keep information about licensing as opaque as possible in their dealings with pure implementers. Since pure implementers are seldom involved in process, there is no impetus to incorporate their interests into SSO policy. Implementers from new markets may not know about the existence of a standard until after it has been finalized.⁶⁴ Newcomers may also have more difficulty ascertaining the identities of all the SEP owners when implementing a standard, which may create a perception of high risk and uncertainty even when neither may exist. While it is important to offer predictable and reliable IP protection to encourage both innovation and standard development,⁶⁵ it is also important to offer a degree of predictability and reliability to innovative implementers coming to patent licensing from diverse commercial backgrounds.

Supporters of device-level licensing make a strong case for the efficiencies of licensing at only one level of the supply chain, but the inefficiencies created by a lack of transparency may be compounded by downstream licensing due to the larger numbers and nature of the potential licensees in this area, many of whom will not have access to methods of obtaining information that would aid them in the negotiation process.⁶⁶ Greater transparency built into earlier

62. *Id.* at 60–61.

63. *See* Press Release, Fair Standards Alliance, Fair Standards Alliance Reacts to European Commission Proposal for a Regulation on Standard Essential Patents (Apr. 27, 2023), <https://fair-standards.org/2023/04/27/fair-standards-alliance-reacts-to-european-commission-proposal-for-a-regulation-on-standard-essential-patents/>.

64. Gil Ohana & C. Bradford Biddle, *The Disclosure of Patents and Licensing Terms*, in STANDARDS DEVELOPMENT IN PATENTS 254, 256 (ed. Jorge L. Contreras, 2018).

65. Iancu, *supra* note 36 (cautioning that “without predictable and reliable IP rights, fewer may be willing to invest the resources needed to develop robust standard-based technology; or, if they do develop such technology, to disclose it so that it can become a standard that others can use.”).

66. In its submission to the EU Call for Evidence, Apple Inc. raised concerns about the increase in transaction costs that would result from requiring numerous device level licenses

stages of the standard setting process would make it easier and more efficient for patent owners to demonstrate later that the license they are offering is indeed FRAND, whether in negotiations or in proceedings to obtain injunctive relief.

IV. ARBITRATION OF SEP LICENSING DISPUTES WOULD DECREASE TRANSPARENCY⁶⁷

These appeals illustrate yet again the dysfunctional state of the current system for determining SEP/FRAND disputes. . . . Each side has adopted its position in an attempt to game the system in its favour. The only way to put a stop to such behaviour is for SDOs like ETSI to make legally-enforceable arbitration of such disputes part of their IPR policies.⁶⁸

As Lord Justice Arnold forcefully stated in *Optis v. Apple*, international commercial arbitration is seen as an attractive solution to the controversial question of FRAND rate setting on a global scale.⁶⁹ Without the same constraints of territoriality and legal jurisdiction, global FRAND terms could be decided by a single tribunal. If effective, parallel proceedings would be avoided, disincentivizing aggressive forum shopping or racing to national courts.⁷⁰ The USPTO and WIPO have already made joint efforts to facilitate the resolution of SEP disputes.⁷¹

Parties in a FRAND dispute may welcome the efficiency, neutrality, and global reach of international commercial arbitration, but some may also appreciate both the privacy and opportunity for heightened confidentiality that it offers. Contractual requirements of confidentiality are already pervasive in

as well as the burden that such licensing practices could create for SMEs in the field of IoT. Apple Inc. Response to European Commission Call at Annex B, 23.

67. For a more extensive discussion of the arbitration of FRAND disputes, see Lauriat, *supra* note 13 at 59–78.

68. *Optis Cellular Tech. v. Apple Retail UK Ltd.*, [2022] EWCA (Civ) 1411 ¶115 (2022)(CA) (Arnold, L.J.). See also Richard Arnold, *SEPs, FRAND, and Mandatory Global Arbitration*, G.R.U.R. 123 (2021) (arguing that FRAND disputes should be decided through mandatory, global arbitration and that such mandatory arbitration of FRAND disputes could be made legally enforceable).

69. See, e.g., Joff Wild, *Despite the difficulties, It Is Time to Embrace Arbitration As The Best Way to Resolve Licensing Disputes*, IAM MEDIA (Aug. 31, 2019), <https://www.iam-media.com/embrace-arbitration>.

70. Jing He, Annie Xue & Melissa Feng, *Could (China-Based) Arbitration Save the FRAND Rate Setting Game?*, CIP ANTITRUST CHRON. 1, 3 (2021).

71. Press Release, USPTO, USPTO And WIPO Agree To Partner On Dispute Resolution Efforts Related To Standard Essential Patents (July 20, 2022), <https://www.uspto.gov/subscription-center/2022/uspto-and-wipo-agree-partner-dispute-resolution-efforts-related-standard>.

the SEP licensing territory; for example, concerns have been raised that overly broad non-disclosure agreements can result in license fees paid at multiple levels of the supply chain.⁷² Given the incentives for SEP owners to maintain secrecy of their commercial information, the opportunity to maintain high levels of confidentiality in the arbitration process would be likely to increase the existing transparency problems⁷³ and lead to progressively less accurate calculations of FRAND rates.⁷⁴

Arbitration is voluntary and parties would be unlikely to agree on a dispute settlement procedure requiring full transparency;⁷⁵ the limited discovery available in arbitration proceedings would provide even further opportunities for them to avoid disclosure of useful data. Common sense should lead us to assume that parties will contractually limit transparency for self-interested reasons;⁷⁶ known disadvantageous comparable licenses could contribute to decision-making by a court or tribunal, which could then have further undesirable effects on future decisions and negotiations.⁷⁷ With decreasing transparency and increasing information asymmetry, progressively less accurate FRAND rates would result from future arbitration proceedings.⁷⁸ While commercial arbitration awards usually have no precedential value, the outsized relevance of previous awards in FRAND valuations means that they might be used in future proceedings and therefore lead to increasingly less accurate calculations.

Parties could agree to build transparency into their bilateral arbitration proceedings, but they would have no reason to do so without legal

72. Agreement on Core Principles and Approaches for Licensing of Standard Essential Patents, June 2019, CWA 95000, ICS 03.140.

73. See, Patterson, *supra* note 26, at 832–33, 845–46; Jorge L. Contreras & David L. Newman, *Developing a Framework for Arbitrating Standards-Essential Patent Disputes*, J. DISP. RES. 1, 39–40 (2014).

74. See Lauriat, *supra* note 13, at 74–78.

75. *Union Oil Co. of California v. Leavell*, 220 F.3d 562, 568 (7th Cir. 2000) (“People who want secrecy should opt for arbitration. When they call on the courts, they must accept the openness that goes with subsidized dispute resolution by public (and publicly accountable) officials.”).

76. Mark Lemley & Carl Shapiro, *A Simple Approach to Setting Reasonable Royalties for Standard-Essential Patents*, 28 BERKELEY L. & TECH. J. 1135, 1145 (2013).

77. See James H. Carter, *FRAND Royalty Disputes: A New Challenge for International Arbitration?*, in CONTEMPORARY ISSUES IN INTERNATIONAL ARBITRATION AND MEDIATION 78 (2015) (“Parties naturally wish to maintain the privacy of their royalty arrangements to the greatest extent possible; but it will be difficult for arbitrators to make rulings on what is non-discriminatory without some access to information about related decisions and license.”).

78. Eli Greenbaum, *Forgetting Frand: The WIPO Model Submission Agreements*, LES NOUVELLES 81, 83 (June 2015), https://www.wipo.int/amc/en/docs/frand_2015.pdf.

compulsion.⁷⁹ Respect for party autonomy, secrecy of proceedings, and allowing the option of confidentiality are widely accepted norms of international commercial arbitration practice. Both parties may be happy to keep a FRAND arbitration award confidential for reasons of competitive advantage.⁸⁰ For example, consider a case where an arbitral tribunal finds a high likelihood of invalidity and/or non-essentiality in a portfolio. The SEP licensor would not want to disclose the award for fear it would encourage others to infringe or bring a judicial or administrative challenge to the validity of its patent. The licensee would not want to lose the competitive advantage it has obtained by not having to pay royalties when its competitors must. Furthermore, even under the standard WIPO FRAND submission agreement, the disputants and the arbitrators will be required to keep the existence of a FRAND arbitration as well as the details of any award confidential, unless required to disclose them by law.⁸¹ While § 294 of the US Patent Act requires any arbitral awards addressing the validity and infringement of US patents to be filed with the USPTO, parties rarely comply.⁸²

Opportunities for parties to seek disclosure of relevant third-party agreements may also be more limited in arbitration, but decision makers in FRAND cases must be aware of the need to question claims of trade secrecy and confidentiality, even where third parties are involved or the parties in a dispute agree to maintain secrecy. More troubling is the fact that future decision makers in FRAND cases, whether national courts or arbitral tribunals, may not know that there was a dispute resulting in a relevant award.⁸³ Incomplete FRAND rate setting data may lead to compounded flaws in future FRAND rate setting. Arbitrating FRAND disputes without requiring transparency could compromise the global SEP licensing framework in ways that would be hidden from public scrutiny.

79. See Robert W. Wachter, Grace Yoon & Minjae Yoo, *Confidentiality in International IP Arbitration*, in THE GUIDE TO IP ARBITRATION—SECOND EDITION (GAR, Dec. 21, 2022)

80. Patterson, *supra* note 26, at 839.

81. See Lauriat, *supra* note 13, at 68–69.

82. 35 U.S.C. § 294 (c)-(e). See Letter from Traci Alexander, USPTO FOIA Specialist, to Barbara Lauriat (June 6, 2023) (on file with author) (identifying no records in response to a request for arbitration award notices filed since Jan. 1, 2017); Patterson, *supra* note 26, at 82.

83. The 2023 EU Proposal noted that national courts already struggle with FRAND determinations, “due to the lack of transparency and complexity of the issues that are central to such determinations, such as the essentiality of patents, comparable licenses and compliance with FRAND requirements.” EU Proposal 2023, *supra* note 11, at 5.

V. CONCLUSION: IMPROVING TRANSPARENCY IN FRAND LICENSING⁸⁴

When focusing on the specific private interests of a bilateral FRAND dispute, the public interest in the operation of the standard essential patent licensing system as a whole is easily overlooked. Standard essential licensing disputes are indicative of a larger global problem, which calls for a more holistic and systemic solution beyond simply resolving each individual dispute.

The much-maligned EU Proposal aims to improve negotiations and lower transaction costs for SEP holders and implementers by creating a central database⁸⁵ with information about SEP ownership and essentiality and offering greater transparency about FRAND royalty rates.⁸⁶ There are flaws in its prospective implementation, but it represents an attempt to address a general consensus that greater transparency would benefit the SEP licensing system overall. However, there needs to be a collective commitment to transparency. The disadvantages of being the first to show one's cards in a negotiation are acutely felt and understandably avoided, particularly in the case of SEP owners. At the same time, the challenge of obtaining highly relevant commercial information in FRAND negotiations or calculations presents one of the strange paradoxes of the SEP universe. Under normal circumstances, it would be entirely inappropriate—and possibly in violation of antitrust and competition laws—for competitors to be sharing information about their various commercial licensing arrangements with each other. In the case of setting FRAND rates, however, where the standard-setting process is necessarily a cooperative enterprise, it becomes necessary to achieve efficiency in an already-unnatural market.⁸⁷

84. “A SEP owner should be prepared to provide a base level of information needed to assess whether the accused products infringe valid patent rights. This will typically include a list of the asserted patents, a detailed specification (e.g., claim charts) describing how the patents are allegedly infringed by the products implementing the standard, as well as other relevant information needed by the potential licensee to evaluate claims of infringement, validity, and essentiality, and to assess the proposed valuation.” Innovators Network Foundation Response to the European Commission’s Call for evidence for an impact assessment for a new framework for standard-essential patents, F3257385 (May 2022), https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/13109-Intellectual-property-new-framework-for-standard-essential-patents/F3257385_en.

85. EU Proposal 2023, *supra* note 11, at 19.

86. *Id.* at 8.

87. “In order to ascertain whether the royalties that the SEP owners are charging are fair and free of discrimination, comparison must be made between the royalties they have charged for the same SEPs, even between royalties they have charged for different SEPs.” Liu, *supra* note 31, at ¶ 4.3.3.

This paradox has been debated at length—legal and regulatory authorities have repeatedly called for SSOs to require greater transparency from their members to no avail.⁸⁸ More attention, along with more resources, should be focused at the SSO level; collective standard setting in private industry has always required careful scrutiny. Competition authorities should be insisting upon greater participation and representation from those representing the interests of potential implementers, whose interest in greater transparency is more immediate, at the SSO level.

Standards development has emerged as the responsibility of private industry and governments are understandably—perhaps admirably—wary of involvement. Placing the full responsibility of the system on SSOs, however, has demonstrably failed so far. Although some SSOs have considered increasing transparency through validity and essentiality checks and disclosure of ex ante licensing terms, there has been little action.⁸⁹ Because standard setting is an exception to normal competitive market activity, there should be more involvement of implementers, neutral third parties, and national patent offices when it comes to shaping SSOs’ intellectual property rights (IPR) policies.⁹⁰ The 5G Transparency Project’s pragmatic approach to qualitative review of SEPs, focusing strategically on patents where minimal effort and straightforward review would yield useful results,⁹¹ may represent the kind of realistic strategies that could help shift the balance in the right direction. Restrictions on the use of NDAs and general presumptions against claims of confidentiality by decisionmakers in FRAND cases would also aid in improving the general atmosphere. Incorporating greater transparency into the system at an earlier stage in a way that applies equally to all SEP owners will also make it easier for them to demonstrate later—whether in negotiations or

88. IGOR NIKOLIC, LICENSING STANDARD ESSENTIAL PATENTS 232 (2021). *See also* Mark A. Lemley, *Intellectual Property Rights and Standard-Setting Organizations* 90 CALIF L. REV. 1889, 1965 (2002); Dornis, *supra* note 23, at 591 (“Transparency and information are thus of utmost importance. This will not be achieved through court proceedings alone—it must occur in the sphere of SSOs as well.”).

89. Ohana & Biddle, *supra* note 64, at 254 (noting that while there has been much discussion in SDOs about ways to encourage disclosure of licensing terms, “the number of SDOs that have developed ex ANTE disclosure rules is small”).

90. Ohana & Biddle, *supra* note 64, at 256 (“The relative prominence of patent holders compared to implementers in standards development processes may explain why efforts to encourage disclosure of future licensing terms (in groups that permit FRAND licensing) have been less broadly adopted than the development of rules to encourage the disclosure of patents.”).

91. Submission to European Commission Call for Evidence for an Impact Assessment from 5G Transparency Project, F3257441 (May 2022), https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/13109-Intellectual-property-new-framework-for-standard-essential-patents/F3257441_en.

in proceedings to obtain injunctive relief—that the license they are offering is indeed FRAND.

Competition authorities shifting their focus away from FRAND litigation and towards the standards development process could help force SSOs to address potential anticompetitive exclusions in the initial standard development process that lead to a lack of transparency in the system. While the public law aspects of SEP licensing certainly exist, the first point of concern for antitrust authorities should be at the SSO level, where the unusual market interactions begin, rather than focusing only on the fallout from disputes.

With disclosure identified as a fundamental organizing principle of contemporary patent regimes, the fact that such a level of transparency in SEP licensing is seen as an absurd utopian dream should worry more people. SSOs and their industry participants claim that the reality must rest “far below the full information benchmark” because “the provision of reliable information entails costs and requires time.”⁹² Of course, the patent examination process, upon which national patent systems rely, also takes time and resources. Reaching greater transparency for SEPs should not be considered an impossibility when the global importance of telecommunications standards and patented technology are acknowledged. In addition to the dedication of public resources, other kinds of private collective licensing might provide better predictability and efficiency,⁹³ though they would not necessarily increase transparency and could increase the risk of antitrust violations.⁹⁴ With appropriate oversight, however, patent pools could allow entrants from the IoT market greater access to SEP licensing while creating reliable profits for SEP owners.⁹⁵

In the current climate, parties in FRAND disputes are understandably going to try to obscure information that might be contrary to their interests in a present or future dispute if they are allowed to do so. Mechanisms to increase transparency should be built into the global SEP system to increase efficiency, decrease transaction and litigation costs, maintain the balance of private and public interests in supporting innovation and standardization, and allow for oversight. While SEP licensing should be recognized as both a private law and public law concern, this Article suggests that antitrust authorities focusing on

92. *Standardisation and SEP Licensing: A EU Policy Perspective*, *supra* note 45, at 14.

93. NIKOLIC, *supra* note 88, at 242.

94. John Jurata & Emily Lukens, *Glory Days: Do the Anticompetitive Risks of Standards-Essential Patent Pools Outweigh Their Procompetitive Benefits?* 58 SAN DIEGO L. REV. 417 (2021).

95. *Communication From the Commission to The European Parliament, The Council and the European Economic and Social Committee, Setting out the EU approach to Standard Essential Patents*, EU COMM’N (Nov. 29, 2017), <https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:52017DC0712&rid=2>.

the SSO level—insisting on greater involvement in SSO policymaking for potential implementers and neutral parties with relevant expertise—would be a solid beginning in improving transparency.

The FRAND commitment is meant to be the solution to a problem. The less transparent the SEP licensing system is and the longer the opacity continues, the greater the advantages that will come from being one of the players who possesses useful information and knows how to obtain more. This situation presents a barrier to new entrants to technology markets. Furthermore, decision-makers—whether national courts or arbitral tribunals—will not necessarily know about or have access to important information about past licenses and how their terms were set.

The complex public-private nature of FRAND cases should mean strong resistance against restricting the issues and parties in the immediate dispute without concern for the system as a whole. There are compelling interests—public and private, economic and non-economic—that may extend to consumers, third party competitors, and nations. Patent hold-out is clearly a problem but, at the same time, neither side of a business negotiation should be forced to take the other side's claims at face value in the absence of adequate evidence to support an asserted valuation. Simply shifting the balance of power away from the implementer by expanding access to injunctive relief is a solution to many of the inefficiencies of the system, but it would also create new and different undesirable consequences.

Just as with standard setting itself, any solution to the problem of transparency must involve collective action. The private actors involved should be compelled towards greater transparency when facing their competition. The transparency problems of SEP licensing—and the incentives to maintain the opaque status quo—are problems for us all.

PATENT INJUNCTIONS AND THE FRAND COMMITMENT: A CASE STUDY IN THE ETSI INTELLECTUAL PROPERTY RIGHTS POLICY

Adam Mossoff[†]

ABSTRACT

Many academics and government officials claim that owners of patents on standardized technologies, such as 5G or Wi-Fi, cannot obtain injunctions as a remedy for infringement of their patents. They believe this is mandated in the contractual commitment by an owner of a standard essential patent (SEP) to license on fair, reasonable, and non-discriminatory (FRAND) terms. This conventional wisdom is profoundly mistaken. FRAND agreements do not prohibit SEP owners from receiving injunctions for continuing infringement of their patents. One of the oldest, exemplary FRAND agreements evinces this basic legal truth: the FRAND commitment set forth by the European Telecommunications Standards Institute (ETSI). According to the plain text, contractual context, and historical provenance of the ETSI FRAND commitment, it is clear that it does not prohibit injunctions as remedies for infringement of SEPs. In recent years, this has been confirmed by courts in jurisdictions throughout the world repeatedly issuing injunctions to SEP owners under the ETSI FRAND commitment. Unfortunately, the mistaken belief that FRAND prohibits injunctions persists among American academics and courts. It is important to clarify the legal requirements of FRAND and the availability of injunctive relief for SEP owners because normative theories or economic models about SEP licensing and litigation should be based in legal facts. Otherwise, incorrect claims about FRAND allegedly prohibiting injunctive remedies will continue to proliferate among academics and officials, provoking unnecessary litigation and unjustified agency actions by antitrust officials. These legal errors impose costs on innovators and implementers alike, which undermine the efficient growth in the global innovation economy.

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I. INTRODUCTION

The vast array of technological devices and services produced in the global innovation economy rely on standardized technologies. It does not matter whether someone uses an Apple iPhone, a Samsung Galaxy, or a laptop computer produced by Apple, Microsoft, or a myriad of other manufacturers. They can send and receive emails, watch videos, listen to music, send text messages, and engage in innumerable other activities on all these products and services created by different companies throughout the world. This feat of interoperability is achieved by private organizations that develop standardized technologies, such as telecommunications technologies like 4G or 5G.¹ They are known as standard development organizations (SDOs).²

1. See Kirti Gupta, *How SSOs Work: Unpacking the Mobile Industry's 3GPP Standards*, in THE CAMBRIDGE HANDBOOK OF TECHNICAL STANDARDIZATION LAW 29 (Jorge L. Contreras ed. 2018).

2. SDOs are sometimes referred to as standard setting organizations (SSOs). In this Article, I use the term SDO, as SDOs refer to themselves as engaging in “standards development,” not standard setting. See, e.g., *About ETSI*, ETSI, <https://www.etsi.org/about>

Creators of these standardized technologies like 5G secure the fruits of their inventive labors with patents to facilitate licensing business models that recoup their research and development costs and fund additional innovation.³ When these “standard-essential patents” (SEPs) are contributed to the standard-development process at an SDO, many SDOs require these patent owners to contractually commit to license their SEPs on fair, reasonable, and non-discriminatory (FRAND) terms with implementers (device manufacturers) of these standardized technologies.⁴

To turn a phrase from the Bard: there’s the rub. What is the function of an SEP owner’s commitment to offer a license on FRAND terms? Does this contractual commitment with the SDO limit the remedies an SEP owner may request and receive for infringement of its patents?

Some courts state that the function of the FRAND commitment by an SEP owner with an SDO is to prevent “patent holdup,”⁵ which, in this context, occurs when an SEP owner uses the threat of an injunction as leverage to compel a license with an implementer at supra-optimal royalty rates.⁶ Academics similarly assert that the FRAND commitment requires an SEP owner to forego injunctive relief for patent infringement.⁷ These courts and

(“[T]he many benefits of membership include . . . direct participation in *standards development*”) (emphasis added) (last visited June 12, 2022); *About Us*, IEEE-SA STANDARDS ASS’N, <https://standards.ieee.org/about/> (“The IEEE SA *standards development* process is open to members and non-members, alike.”) (emphasis added) (last visited June 12, 2022).

3. See, e.g., Fed. Trade Comm’n v. Qualcomm Inc., 969 F.3d 974, 982 (9th Cir. 2020) (“Qualcomm protects and profits from its technological innovations through its patents, which it licenses to original equipment manufacturers (‘OEMs’) Qualcomm’s patents include cellular standard essential patents (‘SEPs’), non-cellular SEPs, and non-SEPs.”).

4. See *infra* Part III.A–B.

5. See *Apple Inc. v. Qualcomm Inc.*, No. 317CV00108GPCMDD, 2017 WL 3966944, at *2 (S.D. Cal. Sept. 7, 2017) (“The FRAND commitment . . . is designed to prevent patent holdup.”); *Apple, Inc. v. Motorola, Inc.*, 869 F. Supp. 2d 901, 914 (N.D. Ill. 2012), *aff’d in part, rev’d in part and remanded*, 757 F.3d 1286 (Fed. Cir. 2014) (“By committing to license its patents on FRAND terms, Motorola committed to license . . . to anyone willing to pay a FRAND royalty and thus implicitly acknowledged that a royalty is adequate compensation for a license to use that patent.”); *Microsoft Corp. v. Motorola, Inc.*, 696 F.3d 872, 876 (9th Cir. 2012) (“Many SSOs try to mitigate the threat of patent holdup by requiring members who hold IP rights in standard-essential patents to agree to license those patents to all comers on terms that are ‘reasonable and nondiscriminatory,’ or ‘RAND.’” (citing Lemley, *infra* note 7, at 1902, 1906)).

6. See Alexander Galetovic, Stephen H. Haber & Ross Levine, *An Empirical Examination of Patent Holdup*, 11 J. COMPETITION L. & ECON. 549, 556–57 (2015); see also Alexander Galetovic & Stephen H. Haber, *The Fallacies of Patent Holdup Theory*, 13 J. COMPETITION L. & ECON. 1 (2017) (describing conceptual concerns with shifting senses of “patent holdup” as this theory is used by legal scholars and economists throughout the literature).

7. See, e.g., Doug Lichtman, *Understanding the RAND Commitment*, 47 HOUS. L. REV. 1023, 1043 (2010) (“Courts could interpret RAND as a public commitment . . . the patent

commentators do not quote any SDO intellectual property (IP) policy that expressly states that the function of a FRAND commitment is to preclude injunctive relief for infringement of SEPs.

Despite these claims by courts and scholars, no SDO states that the primary function of the FRAND commitment in its IP policy is to prevent SEP owners from obtaining injunctive relief for the infringement of their patents. For a brief period, one SDO did alter its IP policy to state that an SEP owner is effectively prohibited from obtaining an injunction against an infringing implementer. In 2015, the Institute for Electronics and Electrical Engineers (IEEE) revised its patent policy to adopt this position.⁸ It was extremely controversial.⁹ Commentators recognized that the 2015 IEEE patent policy diverged from SDO practices,¹⁰ but supporters of its new patent policy “hoped that other SSOs will soon follow.”¹¹ The exact opposite occurred. In September 2022, the IEEE revised its patent policy and

holder would be deemed to have permanently waived his right to seek triple damages or to ask for injunctive relief, but would otherwise be allowed to invoke patent law’s damages regime.”); Joseph Farrell, John Hayes, Carl Shapiro & Theresa Sullivan, *Standard Setting, Patents, and Hold-Up*, 74 ANTITRUST L. J. 603, 609 (2007) (“Many standard-setting organizations have rules relevant to the patent hold-up problem. . . . requiring participants to license essential patents on ‘Fair, Reasonable and Non-Discriminatory’ (FRAND) or ‘Reasonable and Non-Discriminatory’ (RAND) terms.”); Mark A. Lemley, *Intellectual Property Rights and Standard-Setting Organizations*, 90 CALIF. L. REV. 1889, 1967 (2002) (“IP owners who join an SSO are committing themselves to important contractual obligations. In some cases they may have to give up their IP rights altogether, and, in any event, they generally are agreeing to give up their right to injunctive relief and extraordinary damages.”).

8. See IEEE SA Standards Board Bylaws, 6 Patents (Feb. 8, 2015), https://www.bipc.com/assets/PDFs/Insights/Article-Antitrust_Intellectual_Property_Litigation-IEEE_Approves_Updated_Patent_Policy_for_Standard_Essential_Patents-IEEE_Patent_Policy-20150209.pdf; Jorge L. Contreras, *IEEE Amends its Patent (FRAND) Policy*, PATENTLYO (Feb. 9, 2015), <https://patentlyo.com/patent/2015/02/amends-patent-policy.html> (describing the changes and some of the process).

9. See, e.g., Nicolas Petit, *The IEEE-SA Revised Patent Policy and Its Definition of “Reasonable” Rates: A Transatlantic Antitrust Divide?*, 27 FORDHAM INTELL. PROP. MEDIA & ENT. L.J. 211 (2017), <https://ir.lawnet.fordham.edu/iplj/vol27/iss2/1>. On the overall controversy, which addressed everything from the internal process at the IEEE that produced the new patent policy to whether the change was justified or not, see J. Gregory Sidak, *Testing for Bias to Suppress Royalties for Standard-Essential Patents*, 1 CRITERION J. INNOVATION 301 (2016), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3176693; J. Gregory Sidak, *The Antitrust Division’s Devaluation of Standard-Essential Patents*, 104 GEO L. J. ONLINE 48 (2015), <https://www.criterioneconomics.com/docs/antitrust-divisions-devaluation-of-standard-essential-patents.pdf>.

10. See, e.g., Ron D. Katznelson, *Perilous Deviations from FRAND Harmony - Operational Pitfalls of the 2015 IEEE Patent Policy*, IEEE 9TH INTERNATIONAL CONFERENCE ON STANDARDIZATION AND INNOVATION IN INFORMATION TECHNOLOGY (2015), <https://ieeexplore.ieee.org/document/7535599>.

11. Contreras, *supra* note 8.

effectively abrogated its earlier prohibition of injunctive relief that it adopted in 2015.¹² Thus, it is possible to say again that no SDO explicitly states that injunctions are prohibited by the FRAND commitment in its patent or IP policy.

Whence did the narrative arise that a FRAND commitment necessarily precludes injunctive relief? It apparently begins with a 2002 article by Mark Lemley in which he asserted that “many private SSOs” require SEP owners to “forgo injunctive relief altogether.”¹³ Yet, he did not quote a single SDO IP policy or FRAND commitment that expressly stated this. He could not. The U.S. National Academies surveyed the IP policies and FRAND commitments of twelve leading SDOs and concluded that “[n]one of the policies of the surveyed SSOs imposes any restrictions on what legal remedies a member or third-party beneficiary of a licensing commitment may pursue in court.”¹⁴ Except for the seven-year period when the IEEE deviated from this institutional norm among SDOs in their FRAND commitments, this remains true today.

Still, the narrative remains, and it has proven difficult to dislodge from the minds of courts and commentators. Professor Lemley’s article continues to be cited for his (incorrect) claim that SDOs prohibit SEP owners from receiving injunctive relief through IP policies and FRAND commitments.¹⁵ Many U.S.

12. IEEE SA Standards Board Bylaws, 6 Patents (Sept. 30, 2022), <https://standards.ieee.org/wp-content/uploads/import/governance/bog/resolutions/september2022-updates-sasb-bylaws.pdf>.

13. Lemley, *supra* note 7, at 1902.

14. COMMITTEE ON INTELLECTUAL PROPERTY MANAGEMENT IN STANDARD-SETTING PROCESSES ET AL., PATENT CHALLENGES FOR STANDARD-SETTING IN THE GLOBAL ECONOMY: LESSONS FROM INFORMATION AND COMMUNICATIONS TECHNOLOGY 47 (Keith Maskus & Stephen A. Merrill eds., 2012), <https://nap.nationalacademies.org/read/18510/chapter/4>.

15. *See, e.g.*, Fed. Trade Comm’n v. Qualcomm Inc., No. 17-CV-00220-LHK, 2018 WL 5848999, at *10 (N.D. Cal. Nov. 6, 2018), *vacated*, 969 F.3d 974 (9th Cir. 2020) (“To avoid giving SEP holders the power to prevent other companies from practicing the standard, SSOs maintain IPR policies that impose on SEP holders ‘an obligation to license IP rights on reasonable and nondiscriminatory terms.’” (quoting Lemley, *supra* note 7, at 1913)); *Microsoft Corp. v. Motorola, Inc.*, 696 F.3d 872, 876 (9th Cir. 2012) (“Many SSOs try to mitigate the threat of patent holdup by requiring members who hold IP rights in standard-essential patents to agree to license those patents to all comers on terms that are ‘reasonable and nondiscriminatory,’ or ‘RAND.’” (citing Lemley, *supra* note 7, at 1902, 1906)); FED. TRADE COMM’N, THE EVOLVING IP MARKETPLACE: ALIGNING PATENT NOTICE AND REMEDIES WITH COMPETITION 235 n.93 (2011), <https://www.ftc.gov/reports/evolving-ip-marketplace-aligning-patent-notice-remedies-competition> (“Some have argued that the RAND commitment should bar the patentee from seeking an injunction” (citing, among others, Lemley, *supra* note 7, at 1902, 1925)); Joseph Scott Miller, *Standard Setting, Patents, and Access Lock-in: Rand Licensing and the Theory of the Firm*, 40 IND. L. REV. 351, 376 (2007) (“Professor

scholars and judges seem to be unaware of the actual FRAND commitment in SDO policies and how these policies have been consistently interpreted by courts throughout the world in granting injunctions to SEP owners.¹⁶

This Article fills a gap in this literature by describing and analyzing the European Telecommunications Standards Institute (ETSI) IP rights policy, demonstrating how its FRAND commitment does not preclude the award of injunctive relief to an SEP owner. The academic literature largely focuses on normative debates about whether a FRAND commitment should prohibit injunctions for ongoing patent infringement. Yet, as the legal realists recognized, policy arguments are “empty without *objective description* of the causes and consequences of legal decisions.”¹⁷ If normative arguments lack a proper descriptive foundation in the text and legal meaning of an SDO’s IP policy, then incorrect claims about FRAND will continue to proliferate in the literature, in court decisions, and in agency actions.

The ETSI IP rights policy is an ideal candidate for this study because it is a leading SDO. More than 70% of all declared SEPs worldwide have been declared in ETSI.¹⁸ The U.S. Court of Appeals for the Fifth Circuit referred to ETSI as “a preeminent standard setting organization in the mobile telecommunications field.”¹⁹ For this reason, ETSI’s IP rights policy is often the focal point of SEP disputes in courts throughout the world.²⁰ ETSI is arguably the SDO with the most important IP policy and FRAND commitment today.

This Article proceeds in three Parts. First, it briefly describes the history of SDOs and ETSI. Second, it details the ETSI IP rights policy and its FRAND commitment, engaging in classic legal interpretation in reviewing the plain meaning of the text, the related provisions in the ETSI Directives in which the IP rights policy is embedded, and external sources of meaning, including the equivalent of its legislative history and subsequent failed attempts at its amendment. Significantly, the FRAND commitment in the ETSI IP

Lemley, who offers the most extended and penetrating legal analysis of the RAND promise, repeatedly casts its role in conferring long-term access on adopters as a patentee’s waiver of the injunction right.” (citing Lemley, *supra* note 7, at 1902).

16. See *infra* Part IV.

17. Felix S. Cohen, *Transcendental Nonsense and the Functional Approach*, 35 COLUM. L. REV. 809, 849 (1935) (emphasis added).

18. See Tim Pohlmann & Knut Blind, *Landscaping Study on Standard Essential Patents (SEPs)*, 11 (2016), <https://ec.europa.eu/docsroom/documents/20741/attachments/1/translations/en/renditions/native> (“Most SEPs were declared at ETSI representing over 70% of all worldwide SEP declarations.”).

19. *HTC Corp. v. Telefonaktiebolaget LM Ericsson*, 12 F.4th 476, 481 (5th Cir. 2021).

20. See *infra* Part IV (discussing a selection of European cases); see also *HTC Corp.*, 12 F.4th at 483–88 (interpreting and applying the ETSI IP policy).

rights policy was born of a “protracted controversy” precipitated by ETSI’s first proposed IP rights policy in 1993 that would have prohibited injunctions and imposed other restrictive commercial mandates on SEP owners.²¹ The current IP rights policy was adopted in 1994, replacing the 1993 IP rights policy, and removed the prohibition on injunction relief and other restrictive mandates. This is highly dispositive of the legal meaning of this FRAND commitment. Lastly, it reviews some illustrative examples of tens of court decisions in various jurisdictions in Europe that have construed the ETSI IP rights policy and its FRAND commitment; contrary to the conventional wisdom among U.S. commentators and courts, these courts have granted injunctions to SEP owners as a remedy for the ongoing infringement of their patents. In sum, the FRAND commitment in the ETSI IP rights policy, an exemplar of most SDO IP policies, does not preclude injunctive relief for SEP owners faced with ongoing infringement of their patents.

II. A BRIEF HISTORY OF SDOs AND ETSI

SDOs are private organizations that have existed for over a century. The IEEE, for example, first arose from private organizational efforts in the 1880s by innovators, technicians, and businesspersons to share information and promote faster dissemination of the new technologies being invented and patented at that time by Thomas Edison and Guglielmo Marconi, among many others.²² Starting in the early twentieth century, these information-sharing and information-distribution efforts developed into more explicit efforts at creating efficiencies in the marketplace by establishing standardized nomenclature both for the new art of electrical engineering and for the many new electrical products and services sold to consumers.²³

21. Eric J. Iversen, *ETSI’s controversial search for new IPR-procedures*, STANDARDIZATION AND INTELLECTUAL PROPERTY RIGHTS, at 3 (K. Jacobs & R. Williams, eds., 1999), https://eprints.utas.edu.au/1297/1/Iversen_ETSI_2002.pdf; see also Roger G. Brooks & Damien Geradin, *Interpreting and Enforcing the Voluntary FRAND Commitment*, 9 INT’L J. OF IT STANDARDS & STANDARDIZATION RSCH. 1, 8 (2011), <https://www.igi-global.com/article/interpreting-enforcing-voluntary-frand-commitment/50572> (describing the “heated opposition” to the proposed IP policy and the even “louder opposition” once the 1993 IPR policy was adopted). A draft version of this article is available at <https://papers.ssrn.com/abstract=1645878>.

22. See *History of IEEE*, IEEE, <https://www.ieee.org/about/ieee-history.html> (last visited July 2, 2022).

23. Standards are developed by many SDOs for innumerable products and services in the modern era; it is not a market practice only in the modern telecommunications sector. See U.S. DEP’T OF JUSTICE & FED. TRADE COMM’N, ANTI-TRUST ENFORCEMENT AND INTELLECTUAL PROPERTY RIGHTS: PROMOTING INNOVATION AND COMPETITION 33 n.5 (2007), http://www.usdoj.gov/atr/public/hearings/ip/chapter_2.pdf (“Hundreds of

There are innumerable SDOs with significant variances in structures, rules, and functions for a myriad of products and services, especially in the high-tech sector of the modern global innovation economy.²⁴ SDOs arose from a simple market need for interoperability between different products sold by different commercial firms; for example, an Android smartphone, such as a Samsung Galaxy, communicates with an Apple iPhone. The IEEE and ETSI, among many other SDOs, arose to increase efficiency in the adoption of interoperability standards in the marketplace.

SDOs thus benefit commercial firms and consumers alike because they preempt wasteful conflicts between different manufacturers selling incompatible products or equally inefficient “standards wars” in which private firms vie in the marketplace for dominance in becoming the industry standard with their own products.²⁵ Even with the prevalence of SDOs, standards wars still do occur. The marketplace battle between VHS and Betamax in the 1980s and the similar battle between HD DVD and Blu-ray in the 1990s are two well-known examples of such standards wars.²⁶ Manufacturers and consumers both benefit by avoiding standards wars and promoting interoperability, especially in the modern global telecommunications sector based on global standards for innumerable products and services used by billions of people worldwide.²⁷ The rapid growth in technological innovations—and in new consumer products and services in the modern telecommunications sector in the past four

collaborative standard-setting groups operate worldwide, with diverse organizational structures and rules.”). For example, the shipping container that was invented (and patented) in the mid-twentieth century, and which was the launching pad for the modern global innovation economy, was the subject of a standardization process. *See* MARC LEVINSON, *THE BOX: HOW THE SHIPPING CONTAINER MADE THE WORLD SMALLER AND THE WORLD ECONOMY BIGGER* 127–49 (2008) (describing the setting of a standard for shipping container specifications in extensive negotiations among cargo ship owners, railway companies, trucking companies, port operators, and longshoremen unions, among other stakeholders).

24. *See* C. Bradford Biddle, *No Standard for Standards: Understanding the ICT Standards-Development Ecosystem*, in *THE CAMBRIDGE HANDBOOK OF TECHNICAL STANDARDIZATION LAW* 17 (Jorge L. Contreras ed. 2018) (“There is no standard for standards. Technology standards are created, maintained, and propagated in a bewildering variety of ways, by a diverse set of actors.”).

25. *See* Kristen Osenga, *Ignorance over Innovation: Why Misunderstanding Standard Setting Organizations Will Hinder Technological Progress*, 56 *U. LOUISVILLE L. REV.* 159, 169 (2018).

26. *See* Knut Blind & Brian Kahin, *Standards and the Global Economy*, in *THE CAMBRIDGE HANDBOOK OF TECHNICAL STANDARDIZATION LAW* 11 (Jorge L. Contreras ed. 2018).

27. *See, e.g.*, Manveen Singh, *Tracing the Evolution of Standards and Standard-Setting Organizations in the ICT Era*, 24 *MARQ. INTELL. PROP. L. REV.* 217, 224–25 (2020) (describing benefits of SDOs to firms and consumers, including interoperability, efficiencies in market interactions, and avoidance of standards wars); Osenga, *supra* note 25, at 166–70 (same).

decades—exemplifies the value and benefits of SDOs for innovators, commercial enterprises, and consumers alike.

ETSI is one of many SDOs operating in today’s global innovation economy that has successfully developed technological standards that propelled the mobile revolution, such as digital transmission technologies like 4G and today’s 5G. ETSI was created in 1988 by “the European Conference of Postal and Telecommunications Administrations (CEPT) in response to proposals from the European Commission.”²⁸ It was a byproduct of a 1987 European Commission Green Paper that proposed “the rapid development of standards and specifications at national and European level . . . supported by the creation of a European Telecommunications Standards Institute.”²⁹ The Green Paper recognized that “standardization is a necessary requirement for a truly open competitive market” and that “substantial . . . resources” should be applied to achieving this goal.³⁰ ETSI has been incredibly successful in its purpose to “draw flexibly on experts . . . in order [to] substantially . . . accelerate the elaboration of standards and technical specifications, [which are] indispensable for an open competitive market environment.”³¹

III. THE FRAND COMMITMENT IN THE ETSI IP RIGHTS POLICY

Like most SDOs, ETSI adopted an IP rights policy to balance the interests of the relevant stakeholders who participate in the development of the standards that it adopts, including the interests of both innovators and implementers.³² This incentivizes both innovators and implementers to participate in the development of technological standards. Such participation is necessary for several reasons. It ensures the best technological standard is developed by an SDO. It also ensures a standard in which the stakeholders in the relevant sector have “buy in” and thus they will adopt and promote the standard in their commercial activities. These in turn contribute to the chances

28. *See History of ETSI*, ETSI, <https://www.etsi.org/about> (last visited July 17, 2022).

29. COMMISSION OF THE EUROPEAN COMMUNITIES, TOWARDS A DYNAMIC EUROPEAN ECONOMY: GREEN PAPER ON THE DEVELOPMENT OF THE COMMON MARKET FOR TELECOMMUNICATIONS SERVICES AND EQUIPMENT, COM(87) 290, at 5 (June 30, 1987).

30. *Id.* at 22.

31. *Id.*

32. *See* EUROPEAN TELECOMMUNICATIONS STANDARDS INSTITUTE, ETSI DIRECTIVES Version 45, at 43 (June 22, 2022), https://portal.etsi.org/directives/45_directives_jun_2022.pdf (“ETSI IPR POLICY seeks a balance between the needs of standardization for public use in the field of telecommunications and the rights of the owners of IPRs.”).

of successful adoption of the standard in the marketplace to the benefit of firms and consumers alike.

The ETSI IP rights policy sets forth a contractual commitment by SEP owners to make available licenses that are FRAND compliant. This is a contractual commitment between the SEP owners and ETSI. The construction of legal instruments—whether contracts, patents, statutes, or regulations—is governed by a long-settled two-step process. First, a court starts with the express text of the relevant clause or provision in the legal instrument.³³ Second, if these terms are deemed ambiguous in resolving the question presented to a court, then a court may look to other sources of meaning (such as other provisions in the overall statute or legal instrument),³⁴ external evidence concerning the circumstances of the adoption of the legal instrument (such as legislative history or industry norms), and other accepted sources of meaning.³⁵ These interpretative rules make clear that the FRAND commitment in the ETSI IP rights policy does not prohibit any specific remedies already available to an SEP owner under the patent laws, such as an injunction. This Part applies these two interpretative steps for construing a legal instrument—text and surrounding circumstances—to the FRAND commitment in the ETSI IP rights policy.

A. THE TEXT OF THE FRAND COMMITMENT IN CLAUSE 6.1

First, we start with the actual text of the legal commitment by SEP owners with ETSI concerning the FRAND licensing of their patents covering an ETSI

33. *See, e.g.*, *Connecticut Nat. Bank v. Germain*, 503 U.S. 249, 253–54 (1992) (“We have stated time and again that courts must presume that a legislature says in a statute what it means and means in a statute what it says there. When the words of a statute are unambiguous, then, this first canon is also the last: ‘judicial inquiry is complete.’” (quoting *Rubin v. United States*, 449 U.S. 424 (1981)) (some citations omitted); *Louisville & N.R. Co. v. Gaines*, 3 F. 266, 276 (C.C.M.D. Tenn. 1880) (“Where the language is clear and explicit the court is bound.”).

34. *See, e.g.*, *Graham Cty. Soil & Water Conservation Dist. v. U.S. ex rel. Wilson*, 559 U.S. 280, 290 (2010) (“Courts have a ‘duty to construe statutes, not isolated provisions.’”) (quoting *Gustafson v. Alloyd Co.*, 513 U.S. 561, 568 (1995)); *Food & Drug Admin. v. Brown & Williamson Tobacco Corp.*, 529 U.S. 120, 133 (2000) (“It is a ‘fundamental canon of statutory construction that the words of a statute must be read in their context and with a view to their place in the overall statutory scheme.’”) (quoting *Davis v. Michigan Dept. of Treasury*, 489 U.S. 803, 809 (1989)); *Louisville & N.R. Co.*, 3 F. at 276 (discussing that a legal text “must be construed as a whole. The office of a good expositor, says My Lord Coke, ‘is to make construction on all its parts together.’”).

35. *See, e.g.*, *Frigalimint Importing Co. v. B.N.S. Int’l Sales Corp.*, 190 F. Supp. 116, 118 (S.D.N.Y. 1960) (reviewing trade usages and the actions by the parties under a contract in construing the meaning of the term “chicken” in a purchase contract given that “the word ‘chicken’ standing alone is ambiguous”).

standard. The specific commitment is in Clause 6.1 in Annex 6 of the ETSI Directives, which contains the ETSI IP rights policy.³⁶ Clause 6.1 states:

6.1 When an ESSENTIAL IPR³⁷ relating to a particular STANDARD or TECHNICAL SPECIFICATION is brought to the attention of ETSI, the Director-General of ETSI shall immediately request the owner to give within three months an irrevocable undertaking in writing that it is prepared to grant irrevocable licences on fair, reasonable and non-discriminatory (“FRAND”) terms and conditions under such IPR to at least the following extent:

- MANUFACTURE, including the right to make or have made customized components and sub-systems to the licensee’s own design for use in MANUFACTURE;
- sell, lease, or otherwise dispose of EQUIPMENT so MANUFACTURED;
- repair, use, or operate EQUIPMENT; and
- use METHODS.

The above undertaking may be made subject to the condition that those who seek licences agree to reciprocate.³⁸

With respect to legal remedies, the plain text in Clause 6.1 is clear. The FRAND commitment in Clause 6.1 is devoid of mandates concerning the remedies available to an SEP owner that sues an implementer for patent infringement.³⁹ The only express obligation of the FRAND commitment is that an SEP owner must provide “in writing that it is *prepared to grant* an irrevocable license” on FRAND terms and then Clause 6.1 specifies the scope of this license to methods and products necessary to implement the SEP.⁴⁰ In sum, SEP owners are expressly committing in the ETSI IP rights policy to

36. See ETSI, *supra* note 32, at 43–54.

37. This is a standard acronym for an intellectual property right (IPR) in Europe and in other jurisdictions, and thus ETSI uses it in its written documents. It is not a standard acronym in the U.S. Since I am writing primarily for a U.S. audience in this article, I have been using the standard nomenclature of “IP right,” but I have retained the usage of IPR in quoted material from the ETSI Directives and other documents to remain true to the primary source documents that I am relying on in this article.

38. *Id.* at 43–44.

39. *Cf.* *Ericsson, Inc. v. D-Link Sys., Inc.*, 773 F.3d 1201, 1231 (Fed. Cir. 2014) (“Rather than instruct the jury to consider ‘Ericsson’s obligation to license its technology on RAND terms,’ J.A. 226, the trial court should have instructed the jury about Ericsson’s *actual* RAND promises.”).

40. ESTI, *supra* note 32, at 43–44 (emphasis added).

make available FRAND licenses to implementers; this is confirmed by the title of Clause 6.1: “Availability of Licenses.”⁴¹

An SEP owner must ultimately make an offer in good faith—or through negotiations make a final offer in good faith—of a license that is FRAND compliant in its terms. This is the totality of the FRAND commitment in the express terms of Clause 6.1 in the ETSI IP rights policy. It is a flexible contractual obligation that does not mandate any specific remedies or other terms in a FRAND-compliant license offered by an SEP owner. Clause 6.1 explicitly leaves the parties free to negotiate the specific royalty rates and other contractual terms for the licensed use of SEPs.

In *Unwired Planet v. Huawei*, the United Kingdom Supreme Court recognized the plain meaning of the FRAND commitment in the ETSI IP rights policy that it is devoid of specific mandates or per se rules governing the nature of the royalties paid in SEP licenses. The *Unwired Planet* Court stated:

[I]t would have required far clearer language in the ETSI FRAND undertaking to indicate an intention to impose the more strict, ‘hard-edged’ non-discrimination obligation Any reasonable person who seeks to engage with the ETSI regime, whether as a SEP owner or as an implementer who is a potential licensee, would understand this. Those engaging with the ETSI regime are highly sophisticated and well-informed about economics, practice in the market and competition laws across the world.⁴²

Although the *Unwired Planet* Court was addressing whether the “non-discrimination” element in the FRAND commitment mandates equal treatment of all licensees in terms of specific royalty rates, the general interpretative point equally applies to the availability of injunctive remedies under this same IP rights policy. The FRAND commitment in the ETSI IP rights policy imposes no “hard-edged” or per se mandates prohibiting injunctions, just as it does not mandate anything about the specific nature of FRAND royalty rates. The sophisticated parties—the large firms creating and licensing standardized technologies and those manufacturing and selling the devices that implement these technological standards—would have included these express licensing requirements or prohibitions on remedies in Clause 6.1 if this was the function of its FRAND commitment.

As Justice Antonin Scalia famously said in the context of statutory interpretation, “Congress . . . does not alter fundamental details of a regulatory scheme in vague terms [in a statute] . . . [I]t does not, one might say, hide

41. *Id.* at 43.

42. *Unwired Planet Int’l Ltd. v. Huawei Technologies Co. Ltd.* [2020] UKSC 37, 124].

elephants in mouseholes.”⁴³ Similarly, it would be significant for SEP owners to forego a fundamental, longstanding remedy for patent infringement—such as an injunction for ongoing or willful infringement⁴⁴—in a contract with an SDO, especially given the legal and commercial sophistication of all parties to the contract. The expressly stated obligation set forth in Clause 6.1 is that an SEP owner must be “prepared to grant irrevocable licenses[.]”⁴⁵ It is the equivalent of hiding an elephant in a mousehole to infer from this plain text that it contains a per se prohibition against injunctive relief for any or all infringements of an SEP.

B. THE ETSI IP RIGHTS POLICY CONFIRMS THE FLEXIBLE FRAND COMMITMENT IN CLAUSE 6.1

Even if a court deemed the text of Clause 6.1 to be unclear or ambiguous concerning the scope of injunctive remedies, the ETSI IP rights policy within which Clause 6.1 is situated confirms the absence of any “hard-nosed” mandates or per se rules concerning royalties or remedies. As noted above, Annex 6 of the ETSI Directives contains its IP rights policy. There is no mention of legal remedies in the other provisions of the ETSI IP rights policy, but it does repeatedly address the nature of the contractual commitment its IP rights policy represents in terms of the scope and nature of the obligations for SEP owners. In this respect, ETSI consistently and repeatedly avoids any mandates or per se rules, and instead leaves SEP owners and implementers generally free to negotiate within their appropriate technological and commercial context a FRAND-compliant license. If the ETSI IP rights policy generally foregoes mandates on licensing terms, then, all things being equal, it similarly foregoes mandates prohibiting injunctive remedies.

As a preliminary matter, the flexibility and generalized obligation imposed on SEP owners by the FRAND commitment Clause 6.1 is consistent with the express policy of the ETSI IP rights policy. ETSI states that the policy objective is to achieve “a balance between the needs of standardization for public use in the field of telecommunications and the rights of the owners of IPRs.”⁴⁶ An IP policy that balances the respective rights and needs of both SEP owners and implementers using SEPs in telecommunications services

43. *Whitman v. American Trucking Ass’n, Inc.*, 531 U.S. 457, 468 (2001).

44. See Adam Mossoff, *The Injunction Function: How and Why Courts Secure Property Rights in Patents*, 96 NOTRE DAME L. REV. 1581, 1587 (2021) (“In the context of patent litigation . . . following a patent owner establishing . . . ongoing or willful infringement of this valid property right, an injunction issued presumptively.”); see *id.*, at 1597-1601 (detailing historical cases).

45. ETSI, *supra* note 32, at 43.

46. *Id.* at 43.

would not impose unilateral prohibitions or restrictions on only one side of this equation.

This is not a mere inference, as ETSI explains what it means by the balance it seeks to achieve with its IP rights policy. On the one hand, “ETSI . . . seeks to reduce the risk . . . that investment in the preparation, adoption and application of STANDARDS could be wasted as a result of an ESSENTIAL IPR for a STANDARD or TECHNICAL SPECIFICATION being unavailable.”⁴⁷ On the other hand, ETSI recognizes that “IPR holders, whether members of ETSI and their AFFILIATES or third parties, should be adequately and fairly rewarded for the use of their IPRs in the implementation of STANDARDS and TECHNICAL SPECIFICATIONS.”⁴⁸ In sum, as the *Unwired Planet* Court recognized in construing the FRAND commitment in the ETSI IP rights policy, its purpose is “to achieve a fair balance between the interests of SEP owners and implementers, by giving implementers access to the technology protected by SEPs and by giving the SEP owners fair rewards through the licence[s]” that provide them royalties.⁴⁹

Other provisions in the ETSI IP rights policy further confirm that the FRAND commitment in Clause 6.1 contains no per se rules or prohibitive mandates on SEP owners, such as a prohibition on the availability of injunctive relief. The commitment is generalized and open-ended to conform to the specific context of a license in balancing the respective interests of both SEP owners and implementers. Two other provisions in the ETSI IP rights policy support this conclusion.

First, Clause 4.1 of the ETSI IP rights policy states that “[s]pecific licensing terms and negotiations are commercial issues between the companies and shall not be addressed within ETSI.”⁵⁰ In other words, ETSI does not dictate any specific licensing terms in FRAND-compliant licenses, such as royalty rates, royalty structures, or even a contractual term that an SEP owner agrees to forego injunctive relief (a term that can be negotiated and included in any license). ETSI further states in Clause 4.1 that it will neither create nor mandate a database of FRAND-compliant licenses under its IP rights policy, because this will create a “misleading impression” that the terms of these licenses are either prescribed by ETSI or at least endorsed by ETSI.⁵¹ SEP owners and implementers are free from any mandates or per se rules under the ETSI IP

47. *Id.*

48. *Id.*

49. *Unwired Planet Int'l Ltd. v. Huawei Technologies Co. Ltd.* [2020] UKSC 37, ¶ 14.

50. ETSI, *supra* note 32, at 70.

51. *Id.* (“No detailed licensing terms should be available from ETSI to avoid a misleading impression.”).

rights policy generally and Clause 6.1 specifically to negotiate the terms of the licenses for SEPs covering ETSI technology standards.

Second, in the Guide on Intellectual Property Rights, ETSI states that “[t]he basic principle of the ETSI IPR regime remains FRAND with no specific preference for any licensing model.”⁵² Accordingly, a range of FRAND-compliant licenses are appropriate in the licensing of SEPs covering an ETSI technology standard, such as 5G. For example, the FRAND commitment in the ETSI IP rights policy does not mandate any specific licensing model, such as national-level licenses of single patents or global portfolio licenses. The Guide on Intellectual Property Rights further states that

Members do NOT have a duty to: . . . disclose within the Technical Body the commercial terms for licenses for which they have undertaken to grant licenses under FRAND terms and conditions. Any such commercial terms are a matter for discussion between the IPR holder and the potential licensee, outside of ETSI.⁵³

This is consistent with and reconfirms the policy in Clause 4.1, as well as the plain text of the FRAND commitment in Clause 6.1 that the FRAND commitment does not prohibit or mandate any specific contract or patent rights, whether specific royalty rates or the availability of injunctive relief for an SEP.

Courts have consistently and repeatedly recognized the contextual, flexible nature of the FRAND commitment for SEP owners. For example, courts have acknowledged that there is no specific, single royalty rate mandated by the FRAND commitment; instead, there is a *range* of royalty rates and other contractual terms that are acceptable for FRAND-compliant licenses.⁵⁴ In *HTC v. Ericsson*, the Court of Appeals for the Fifth Circuit acknowledged that “ETSI . . . has chosen to give patent holders some flexibility in coming to reasonable agreements with different potential licensees.”⁵⁵ In this case, the Fifth Circuit affirmed the trial court’s decision that a multi-tiered royalty rate complies with the FRAND commitment in the ETSI IP rights policy, i.e.,

52. *Id.* at 57.

53. *Id.* at 62.

54. *See, e.g., In re Certain Wireless Devices*, Inv. No. 337-TA-868, at 113 (June 13, 2014) (Initial Determination) (noting that “a FRAND rate is a range of possible values”); *Microsoft Corp. v. Motorola, Inc.*, No. C10-1823JLR, 2013 WL 2111217, at *101 (W.D. Wash. Apr. 25, 2013) (approving a FRAND royalty rate for Motorola’s H.264 SEP portfolio with a *range of thirty times* from the lowest to the highest rates and a FRAND royalty rate for the 802.11 SEP portfolio with a *range of twenty-four times* from the lowest to the highest rates).

55. *HTC Corp. v. Telefonaktiebolaget LM Ericsson*, 12 F.4th 476, 486 (5th Cir. 2021).

Clause 6.1 does not mandate any specific licensing terms or a specific royalty rate in the licenses negotiated between SEP owners and implementers.⁵⁶

Given the text of Clause 6.1 and the provisions that confirm the meaning of this text throughout the ETSI IP rights policy and its Directives, the conclusion seems inescapable: there are no specific mandates or prohibitions in the ETSI IP rights policy for SEP owners other than the express obligation that they be “prepared to grant” a FRAND-compliant license. All license terms from the amount and structure of the royalty rate to other commercial and patent rights are left to the parties to negotiate in their licenses for the use of SEPs covering ETSI technological standards. This includes whether an SEP owner retains or chooses to sell its preexisting patent right to obtain an injunction for continuing or willful infringement of its patents by the implementer.

C. PROPOSALS BEFORE AND AFTER THE ADOPTION OF THE ETSI IP RIGHTS POLICY CONFIRM THAT ITS FRAND COMMITMENT DOES NOT PRECLUDE INJUNCTIVE REMEDIES

The provenance of Clause 6.1 further supports the construction of this contractual provision that it sets forth a flexible, balanced commitment by SEP owners to offer FRAND-compliant licenses without any prohibition on injunctive remedies. As detailed in this Section, Clause 6.1 was adopted by ETSI in 1994 to replace a previously proposed IP rights policy, identified as the “1993 Undertaking,” that did impose per se rules on FRAND-compliant licenses, including restrictions on the availability of injunctions for infringement of SEPs. ETSI eliminated these per se rules and licensing mandates in the 1993 Undertaking when it adopted Clause 6.1 in its IP rights policy in 1994. Moreover, some ETSI members attempted to revise Clause 6.1 in subsequent years to impose various mandates, but ETSI rejected these proposals. This “legislative history” of the FRAND commitment in Clause 6.1 confirms the interpretation of its text and of the broader IP policy in which it is embedded: the FRAND commitment in the ETSI IP policy does not impose per se rules or mandates concerning the terms of FRAND-compliant licenses or what legal remedies are available to SEP owners for infringement of their patents by implementers.

56. See *HTC Corp. v. Telefonaktiebolaget LM Ericsson*, 407 F. Supp. 3d 631, 637 (E.D. Tex. 2019), *aff'd*, 12 F.4th 476 (5th Cir. 2021) (“The market-based evidence of the value of cellular . . . demonstrates the reasonableness of Ericsson’s proposed royalty rates of \$2.50 or 1% with a \$1 floor and a \$4 cap per 4G device.”).

1. *Clause 6.1 Replaced a Proposed 1993 FRAND Policy that Prohibited Injunctions and Imposed Other Contractual Restrictions on SEP Owners*

The FRAND commitment contained in Clause 6.1 of the ETSI IP rights policy is essentially unchanged since ETSI adopted it in 1994, but this was not the first IP rights policy or FRAND commitment considered for adoption by ETSI. ETSI adopted Clause 6.1 in 1994 in lieu of an IP rights policy and FRAND commitment it first proposed to its members in 1993, eventually identified as the 1993 Undertaking.⁵⁷ The 1993 Undertaking mandated, among other restrictions, that SEP owners must commit *ex ante* to a “maximum royalty rate” for any future licenses with implementers before the adoption of a standard, that SEP owners can license only on a most-favored licensee condition in which any implementer can “require replacement of the terms and conditions of its license” with any “terms and conditions that are clearly more favourable” granted to any another implementer, and, of most relevance to this Article, that SEP owners “undertake[] not to seek an injunction against a PARTY in respect of any essential IPR.”⁵⁸

The 1993 Undertaking immediately precipitated a “protracted controversy” within ETSI and among stakeholders in the telecommunications sector, leading to its abrogation the following year in the adoption of Clause 6.1 of the ETSI IP rights policy.⁵⁹ The reasons why ETSI proposed the 1993 Undertaking is of interest to economists and political scientists who study institutional economics and interest-based policies that drive competitive actors, and that is beyond the scope of this Article. This Article instead focuses on the statements and other materials that are relevant to courts and other officials as evidence in applying the legal rules for interpreting and applying a legal instrument, such as a statute, a patent, or a contract. In this context, the express abrogation and replacement of a prior rule by a subsequent enactment of a contrary rule is dispositive in construing the meaning of the subsequent rule.⁶⁰ This is the *legal significance* of the 1993 Undertaking for the purpose of understanding whether the FRAND commitment in Clause 6.1 in the ETSI

57. See European Telecommunications Standards Institute, Intellectual Property Policy and Undertaking (March 16-18, 1993).

58. *Id.* at U2, U6, U8–9.

59. Iversen, *supra* note 21, at 3; see also Brooks & Geradin, *supra* note 21, at 18 (describing the “heated opposition” to the 1993 Undertaking and the “louder opposition” once the 1993 Undertaking was initially adopted).

60. *Cf.* *Graham v. John Deere Co. of Kansas City*, 383 U.S. 1, 15 (1966) (“Congress intended by the last sentence of § 103 to abolish the test it believed this Court announced in the controversial phrase ‘flash of creative genius’ used in *Cuno Engineering Corp. v. Automatic Devices Corp.*, 314 U.S. 84 (1941).”).

IP rights policy prohibits injunctions as remedy for infringement of an SEP that covers an ETSI technology standard.

The crux of the controversy over ETSI's 1993 Undertaking that imposed numerous *per se*, restrictive mandates on SEP owners in a FRAND commitment—a prohibition on injunctions, a most-favored licensee requirement, an *ex ante* commitment to a maximum royalty rates—was that ETSI was “depart[ing] from normal practices” in SDOs in the telecommunications sector.⁶¹ The 1993 Undertaking was viewed as unbalanced and discriminatory against SEP owners, which was contrary to the commitment by ETSI to an IP rights policy that properly balanced the interests of all stakeholders in the development and use of technology standards.⁶²

Numerous ETSI members who were leading innovators in the high-tech sector at the time threatened to quit if ETSI implemented the 1993 Undertaking.⁶³ Apple, IBM, AT&T, and Motorola, among others, expressed strong opposition to the 1993 Undertaking.⁶⁴ Apple, for example, wrote to ETSI that it “operates under a number of basic principles in the worldwide development of standards and protection of intellectual property,” and that it believed that the 1993 Undertaking “compromises these principles and departs significantly from accepted international standards practices.”⁶⁵ IBM expressed similar opposition to the 1993 Undertaking, stating in strident language that it represented “a severe departure from accepted international standards practices.”⁶⁶ In a lengthy letter detailing numerous concerns about and criticisms of the 1993 Undertaking, Philips stated bluntly that the 1993 Undertaking represented a “failure to strike a reasonable balance between the interests of those having substantial IPR portfolios based on their R&D investments and users of ETSI standards.”⁶⁷ In expressing these complaints,

61. Iversen, *supra* note 21, at 3.

62. *See* Comments by Mr. Peters, Koninklijke Philips N.V. (Philips), DRAFT MINUTES OF THE 15TH GENERAL ASSEMBLY OF ETSI, ETSI/GA 15(93)34, at 4.

63. Brooks & Geradin, *supra* note 21, at 9.

64. *See* LETTERS FROM ETSI MEMBERS REGARDING THE SIGNATURE OF THE ETSI IPR UNDERTAKING, ETSI/GA 17(93)3 (June 4, 1993).

65. Letter from H.W.F. Borgerhoff Mulder, Associate General Counsel, Apple Computer Europe, to K.H. Rosenbrock, Director, ETSI, May 19, 1993, *in* LETTERS FROM ETSI MEMBERS REGARDING THE SIGNATURE OF THE ETSI IPR UNDERTAKING, ETSI/GA 17(93)3 (June 4, 1993).

66. Letter from R.H. Dunkel to K.H. Rosenbrock, ETSI, April 28, 1993, *in* LETTERS FROM ETSI MEMBERS REGARDING THE SIGNATURE OF THE ETSI IPR UNDERTAKING, ETSI/GA 17(93)3, at 4 (June 4, 1993).

67. Letter from R.J. Peters, Philips International B.V., to K.H. Rosenbrock, ETSI, February 10, 1993, *in* ETSI IPR POLICY AND UNDERTAKING, ETSI/GA 15(93)29, at 3 (March 16-18, 1993).

all of these companies threatened to withdraw from ETSI if it required them to commit to the terms of the 1993 Undertaking. Ultimately, ETSI received approximately 12–14 letters from ETSI members “who threatened to pull out of ETSI if it implemented the 1993 policy.”⁶⁸

In addition to ETSI members’ expressing opposition to the 1993 Undertaking and threatening to withdraw if adopted, several ETSI members filed a complaint with the European Commission. IBM, AT&T, Philips, and others filed a complaint alleging “that ETSI’s approach to IPRs [in the 1993 Undertaking] contravened European competition law.”⁶⁹ This complaint was significant because it essentially alleged that the 1993 Undertaking contradicted the European Commission’s original justification for creating ETSI, as expressed in the 1987 European Commission Green Paper that ETSI should “accelerate the elaboration of standards and technical specifications, indispensable for an open and competitive market environment.”⁷⁰

Beyond the internal controversy within ETSI and the legal complaint filed with the European Commission, political actors were engaged in the debate as well, which reveals the full extent of this significant controversy at the birth of the mobile revolution. The United States engaged in what one commentator has identified as a “phenomenal” effort in urging ETSI to reject the 1993 Undertaking.⁷¹ In addition to external political efforts, such as President Bill Clinton and other U.S. officials speaking with European governmental officials to express opposition to the 1993 Undertaking,⁷² representatives from the U.S. government voiced opposition within ETSI. At an ETSI General Assembly meeting in the late fall 1993, Earl Barbely, an official with the U.S. Department of State, stated that the 1993 Undertaking represented “a major departure from accepted international standard-setting practices.”⁷³ Among many concerns, he noted that the 1993 Undertaking “inappropriately specifies a mechanism for setting maximum royalty rates and demonstrates a strong bias toward monetary remuneration” as a remedy for infringement of SEPs.⁷⁴ Mr. Barbely further stated that the United States “believe[s] that the basis for determining reasonable compensation should be fair and reasonable commercial terms that

68. Iversen, *supra* note 21, at 6.

69. *Id.* (describing the complaint). These companies argued in part that “ETSI intended to flush the dissenters out of the institute” in adopting the 1993 Undertaking and thus this exposed “ETSI’s IPR Approach was at heart competition distorting.” *Id.*

70. See COMMISSION OF THE EUROPEAN COMMUNITIES, *supra* note 29, at 22.

71. Iversen, *supra* note 21, at 6.

72. *Id.*

73. Comments by Mr. Barbely, U.S. Dep’t of State, DRAFT MINUTES OF THE 15TH GENERAL ASSEMBLY OF ETSI, ETSI/GA 15 (93)34, at 3.

74. *Id.*

are demonstrably free of any unfair discrimination and without specific reference to monetary remuneration.”⁷⁵ Ultimately, the U.S. government viewed the 1993 Undertaking as a fundamentally unbalanced policy that did not serve the goal of ETSI to “have access to the best technology available in the field of telecommunications” because it “ignore[d] the rights of innovative companies whose ideas are driving this industry.”⁷⁶

The broad array of criticisms and the broader political and legal efforts prompted ETSI to start a process in late 1993 to reconsider and revise the 1993 Undertaking that it had adopted earlier that year. ETSI explicitly framed the 1993 IP rights policy as only an “Undertaking,” and less than a year later it adopted a new “interim” IP rights policy.⁷⁷ The interim IP rights policy became the official IP rights policy in 1994 with the FRAND commitment in Clause 6.1, which is essentially the same to this day.

This historical provenance of Clause 6.1 informs its meaning. In the adoption of a legal instrument, if a proposed provision is considered and then expressly rejected in favor of a different provision, then this is strong evidence that the earlier, now-rejected provision is abrogated by the provision adopted into law or agreed upon by parties to a contract. Patent lawyers know this interpretative rule in applying prosecution history estoppel in an equivalents infringement lawsuit; in this context, a change in claim scope during patent prosecution in which the original claim would have covered the now-alleged equivalent is deemed to preclude equivalents liability.⁷⁸ In applying this general interpretative rule to the FRAND commitment in the ETSI IP rights policy, it is clear that the *per se* rules in the 1993 Undertaking, including the prohibition on injunctive relief, were abrogated by the adoption of Clause 6.1 in 1994.

75. *Id.*

76. *Id.* at 4. This broader involvement by political actors is fodder for additional research by economists and political scientists in exploring a competitive geopolitical dimension to this dispute in the early 1990s between the U.S. and Europe. U.S. companies, such as Motorola and Bell Labs, were leading innovators who launched the mobile telecommunications revolution in the 1970s. Motorola was the largest licensor of telecommunications technologies at the time. European telecommunications companies were primarily implementers. A representative from a U.S. company to ETSI who participated in the debate at the time commented to me orally that the 1993 Undertaking was characterized at the time as “the anti-Motorola policy.”

77. See Brooks & Geradin, *supra* note 21, at 9.

78. See *Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co.*, 535 U.S. 722, 733–34 (2002) (“When, however, the patentee originally claimed the subject matter alleged to infringe but then narrowed the claim in response to a rejection, he may not argue that the surrendered territory comprised unforeseen subject matter that should be deemed equivalent to the literal claims of the issued patent.”). The preclusive function of prosecution history estoppel works only if the change was done to meet the patentability requirements. *Id.* at 735–37.

2. *ETSI Has Rejected Attempts to Amend Clause 6.1 to Adopt Per Se Rules*

In the years following the adoption of Clause 6.1 in 1994, ETSI has rebuffed efforts to amend Clause 6.1 that sought to impose express, restrictive mandates as FRAND requirements for SEP owners.⁷⁹ In addition to the legislative history of ETSI's express rejection of prohibitive mandates, as detailed above, these subsequent developments further support the conclusion that the FRAND commitment does not prohibit injunctive relief for SEP owners. Two specific events are relevant in this interpretative analysis.

Approximately two decades after the adoption of Clause 6.1 in the ETSI IP rights policy, some members proposed in 2012 that ETSI amend Clause 6.1 to mandate a new "royalty base" for SEP licenses.⁸⁰ They proposed that ETSI reject the "communication device" as the royalty base given that the allegedly "more apt [royalty] base is the baseband chip (i.e. 'smallest saleable patent-practicing unit' or 'smallest priceable component,' respectively)."⁸¹ ETSI chose not to amend Clause 6.1, which has remained largely unchanged to this date.⁸²

A few years later when the IEEE changed its patent policy to mandate the smallest salable patent practicing unit standard for royalties and effectively prohibited injunctions for SEPs,⁸³ Christian Loyau, ETSI Director of Legal Affairs, commented on the IEEE's new patent policy. Mr. Loyau stated that the 2015 IEEE patent policy "would not be compatible with the ETSI IPR policy as commercial discussions between members . . . take place outside ETSI and [there is] no provision in the [ETSI] IPR policy rules [on the] use of injunction[s]."⁸⁴ In sum, ETSI has chosen not to adopt any per se rules or restrictive mandates in its FRAND commitment in its IP rights policy, both in

79. See Brooks & Geradin, *supra* note 21, at 9–10 (describing multiple efforts by some ETSI members to revise Clause 6.1).

80. Dirk Weiler, IPR SC Chairman, *Status of discussions: overview of the possible scenarios, associated historical information and wording proposals where appropriate*, ETSI IPR (12)12_002r2, at 2 (Sept. 26, 2012).

81. *Id.* at 2–3.

82. See Brooks & Geradin, *supra* note 21, at 9.

83. See *supra* notes 8–12 and accompanying text (discussing the 2015 IEEE patent policy, the controversy over it that was similar to the controversy over the 1993 Undertaking, the change in the IEEE patent policy in 2022).

84. Bertram Huber, *Why the ETSI IPR Policy Does Not and Has Never Required Compulsory "License to All": A Rebuttal to Karl Heinz Rosenbrock* 6 (2017), <https://papers.ssrn.com/abstract=3038447> (quoting statement by Christian Loyau, ETSI Director of Legal Affairs, in the Draft Minutes from the meeting of the ETSI General Assembly, ETSI/GA(15)65_030r2, at 11 (March 17-18, 2015)); see also *supra* notes 53–**Error! Bookmark not defined.** and accompany text (quoting the ETSI Guide on Intellectual Property Rights that commercial terms in SEP licenses are "outside of ETSI" and thus are not matters governed by the ETSI IP policy).

response to efforts to amend its FRAND commitment and in response to the “peer pressure” created by the IEEE’s change in its patent policy.

IV. EUROPEAN COURTS ARE GRANTING INJUNCTIONS TO SEP OWNERS UNDER THE ETSI IP RIGHTS POLICY

The official interpretation and application of a legal instrument is another source for ascertaining the meaning of this legal instrument. In common law jurisdictions, as opposed to the civil law jurisdictions in the European Union, court decisions interpreting legal instruments have the weight of *stare decisis*.⁸⁵ In this regard, European courts in multiple jurisdictions have been issuing injunctions to SEP owners requesting this remedy and who have committed to FRAND licensing under the ETSI IP rights policy. The purpose of this Part is to describe some of these court decisions, and a small sample will have to suffice given the limitations of the scope of this Article. This admittedly brief survey of the case law interpreting and applying the ETSI IP rights policy in issuing injunctions for ongoing infringement of SEPs is important. First, it confirms the textual analysis in the prior Parts that the FRAND commitment in Clause 6.1 of the ETSI IP rights policy does not preclude injunctive relief for infringement of SEPs. Second, U.S. courts and academics seem to be unaware of these court decisions, and thus the following review may disabuse them of their mistaken belief that a FRAND commitment necessarily precludes injunctive relief for SEP owners.

The legal and evidentiary framework applied by European courts in issuing injunctions for the ongoing infringement of SEPs is derived from the seminal 2015 decision by the Court of Justice of the European Union (CJEU) in *Huawei v. ZTE*.⁸⁶ In *Huawei*, the CJEU affirmed the right of SEP owners to request and receive injunctive remedies for infringement of their patents when the SEP owner is negotiating a FRAND-compliant license in “good faith,” and the implementer is engaging in strategic “delaying tactics,”⁸⁷ commonly

85. See *Payne v. Tennessee*, 501 U.S. 808, 827–28 (1991) (“*Stare decisis* is the preferred course because it promotes the evenhanded, predictable, and consistent development of legal principles, fosters reliance on judicial decisions, and contributes to the actual and perceived integrity of the judicial process”).

86. Case C-170/13, *Huawei Technologies Co. Ltd. V. ZTE Corp. and ZTE Deutschland GmbH*, ECLI:EU:C:2015:477 (July 16, 2015). I have read only English translations of the continental European court decisions, or the relevant portions of the court decisions and relevant case summaries. See *Case Law post CJEU ruling Huawei v ZTE*, 4IPCOUNCIL (July 6, 2015), <https://caselaw.4ipcouncil.com/cjeu-decisions/huawei-v-zte>.

87. *Case Law post CJEU ruling Huawei v ZTE*, 4IPCOUNCIL (July 6, 2015), <https://caselaw.4ipcouncil.com/cjeu-decisions/huawei-v-zte> (quoting Case C-170/13, *Huawei*

characterized as “holdout.”⁸⁸ Patent holdout (a.k.a. hold-out) is bad faith negotiating behavior by an implementer that unduly delays a license or forces an SEP owner to sue for infringement, compelling ultimately a “license as adjudicated” by a court.⁸⁹

Subsequent to the *Huawei* decision, numerous courts of national jurisdiction in the UK and EU have identified a myriad of circumstances in which implementers have engaged in “holdout” tactics. In these cases, the courts have ruled that SEP owners were right to request or receive injunctive relief for the infringement of their patents.⁹⁰

In 2019, for example, the Court of Appeal of The Hague in the Netherlands ruled that Asus was infringing the SEPs owned by Philips, and that Asus was engaging in holdout tactics that justified issuing an injunction against Asus for its continuing infringement of Philips’ SEPs.⁹¹ In *Philips v. Asustek*, the Court of Appeal acknowledged that Asus had raised some licensing issues in its negotiations with Philips, but it concluded that these were

Technologies Co. Ltd. V. ZTE Corp. and ZTE Deutschland GmbH, ECLI:EU:C:2015:477, ¶ 65 (July 16, 2015).

88. *Unwired Planet v. Huawei*, [2018] EWCA Civ 2344 (Oct. 23, 2018), at ¶ 5 (“As we shall explain, the negotiation of licenses for SEPs on FRAND terms may be far from straightforward, however. . . . [T]he infringer may refuse to engage constructively or behave unreasonably in the negotiation process and so avoid paying the license fees to which the SEP owner is properly entitled, a process known as ‘hold-out.’”); see also Anne Layne-Farrar & Koren W. Wong-Erwin, *An Analysis of the Federal Circuit’s Decision in Ericsson v. D-Link*, CPI ANTITRUST CHRON. 5 n.14 (Mar. 2015) (“[H]oldout [is] when licensees either refuse to take a RAND license or delay in doing so”).

89. Trial Transcript, *Optis v. Apple*, Case No. 19-cv-00066, 221:9-23 (E.D. Tex. Aug. 12, 2020) (No. Dkt. 490) (“This is another element of Apple’s strategy. This is, once again, from an internal Apple document. Apple talks about a range of approaches, and one of the approaches it likes to use is called license as adjudicated. This is the plans of Apple’s lawyers. And why do they want to say license as adjudicated? Well, that’s a funny word for, let someone sue us. Now, why in the world would you want to wait for someone to sue you for patent infringement? Well, we actually know the answer to that, because it’s in their internal documents. The reason for it is because they want to delay payments. They want to avoid having paid the money for as long as possible.”); see also *Optis Cellular Tech. L.L.C., Optis Wireless Tech. L.L.C. & Unwired Planet Int’l Ltd. v Apple Inc.*, [2022] EWCA Civ 1411 (Oct. 27, 2022), at ¶ 115 (“Apple’s behaviour in declining to commit to take a Court-Determined Licence once they had been found to infringe . . . and their pursuit of their appeal, could well be argued to constitute a form of hold out”).

90. See, e.g., Bundesgerichtshof [BGH] [Federal Court of Justice] Nov. 24, 2020, KZR 35/17 (Ger.); *Unwired Planet International Ltd v. Huawei Technologies Co. Ltd* [2020] UKSC 37, ¶ 26; Hof’s-Hague 7 May 2019 (Koninklijke Philips N.V./Asustek Computers INC); *TQ Delta v Zyxel Communications*, UK High Court of Justice - HP-2017-000045 - [2019] EWHC 745 (Pat), 18 March 2019; Landesgericht, Mar. 18, 2019, O 73/14 (Ger.); Landesgericht, Jan. 29, 2016, O 66/15 (Ger.).

91. Hof’s-Hague 7 May 2019 (Koninklijke Philips N.V./Asustek Computers INC);

merely stalling tactics by Asus.⁹² Underneath a patina of negotiating tactics, Asus was engaging in the “behaviour also referred to as ‘hold-out.’”⁹³ Thus, when negotiations formally broke down and Philips filed lawsuits for patent infringement against Asus in courts in the UK, Germany, France, and the Netherlands, the Court of Appeal of The Hague held that Philips was justified in seeking an injunction against Asus as an infringing implementer engaging in holdout.

In the same year as the *Asus* decision in the Netherlands, the UK High Court of Justice ruled in *TQ Delta v ZyXEL Communications* that ZyXEL engaged in “patent holdout” by delaying negotiations and refusing to accede to a license on FRAND terms for the use of SEPs owned by TQ Delta.⁹⁴ Given ZyXEL’s explicit “holdout” practices, the UK Court of High Justice granted an injunction against ZyXEL, explaining that it would be “unjust” not to issue an injunction because this “would enable ZyXEL to benefit from their strategy of hold-out.”⁹⁵ If the injunction was denied, or if the injunction was stayed during an appeal by ZyXEL, this “would amount to a compulsory licence of the patentee’s exclusive rights and deprive it of meaningful protection in circumstances where the Defendants have elected not to enforce the [F]RAND undertaking.”⁹⁶

In 2020, the German Federal Court of Justice held that Sisvel, an SEP owner, rightly sought an injunction against Haier given Haier’s holdout tactics. In *Sisvel v Haier*,⁹⁷ the Federal Court of Justice explicitly recognized that an implementer cannot claim to be a willing licensee if it predicates a license on the condition that a court must first decide that the SEPs are valid and infringed.⁹⁸ The court explained that, if it accepted Haier’s argument, this would force SEP owners like Sisvel to engage in many years of litigation before any SEP license would be executed. This would distort the licensing market for SEPs, as implementers would be incentivized to holdout given the added negotiating leverage created by the fact that they are receiving revenues from their infringing use of the SEPs while SEP owners would receive nothing from the as-yet unlicensed use of their patented technologies.

92. *Id.* at ¶ 4.179.

93. *Id.*

94. *TQ Delta v. ZyXEL Commc’ns*, UK High Court of Justice - HP-2017-000045 - [2019] EWHC 745 (Pat), dated 18 March 2019, at ¶ 12.

95. *Id.* at ¶ 13.

96. *Id.* at ¶ 22.

97. Bundesgerichtshof [BGH] [Federal Court of Justice] Nov. 24, 2020, KZR 35/17 (Ger.).

98. *See id.* at ¶ 95.

The Federal Court of Justice further observed that Haier’s contention was unjustified that the FRAND commitment required Sisvel to accept the national-level license offered by Haier. Haier was using Sisvel’s SEPs in the global innovation economy, and thus Haier had no “legitimate interest” in a “selective licensing” program that was limited to only its corporate affiliates in a single country (Germany).⁹⁹ Haier’s license offers would not create licenses of Sisvel’s global portfolio of SEPs in any country other than Germany; Sisvel would be forced to engage in a costly and lengthy litigation campaign in which Sisvel would be required to sue Haier’s corporate affiliates throughout the world “patent by patent and country-by-country.”¹⁰⁰ The restricted scope of Haier’s license confirmed that its counteroffers in the negotiations were merely pretextual.

In sum, the Federal Court of Justice held that Haier’s conduct as a whole reflected a deliberate campaign of “patent hold-out.”¹⁰¹ According to Haier’s arguments, Sisvel would have to engage in years, if not decades, of licensing efforts and lawsuits throughout the world in innumerable countries before Sisvel could even request an injunction against Haier for its ongoing infringement of Sisvel’s SEPs. According to the Federal Court of Justice, Haier was clearly exploiting the “structural disadvantage” in the use of SEPs in the telecommunications sector of the global innovation economy: SEP owners cannot sue implementers or request an injunction until after a FRAND offer is made and there is some evidence of holdout tactics or bad-faith by the implementer.¹⁰² At the same time, the implementer can use the SEPs and profit from this infringing use while the SEP owner makes nothing, creating undue leverage for the implementer against the SEP owner. Since Haier was an implementer engaging in holdout and Sisvel provided both notice to Haier of both its infringement and made a FRAND offer, the Federal Court of Justice concluded Sisvel had met its obligations under the *Huawei* framework and thus could seek injunctive relief.¹⁰³

Lastly, in 2020, the UK Supreme Court held in *Unwired Planet v. Huawei* that SEP owners have the right to seek an injunction against an implementer who is committing ongoing infringement and engaging in “the mischief of ‘holding out.’”¹⁰⁴ Although the UK is no longer part of the EU, its courts continue to

99. *Id.* at ¶ 117.

100. *Id.*

101. *Id.* at ¶ 61.

102. *Id.*

103. *See id.* at ¶ 52.

104. *Unwired Planet Int’l Ltd. v. Huawei Technologies Co. Ltd.* [2020] UKSC 37, ¶ 10 (referring to clause 3.2 of the ETSI Policy).

apply the *Huawei* framework in granting injunctions to SEP owners.¹⁰⁵ Among many legal issues raised in *Unwired Planet*, the court rejected Huawei's argument that an SEP owner must license and enforce its respective national patents only on a country-by-country basis, precluding global portfolio licenses of SEPs and enforcement of SEPs in the global innovation economy. Aside from a country-by-country enforcement rule being "impractical,"¹⁰⁶ the UK Supreme Court recognized the lack of balance between SEP owners and implementers in Huawei's proposed enforcement rule. If licenses and enforcement were limited in such a way, an implementer simply "would have an incentive to hold out country by country until it was compelled to pay."¹⁰⁷ It is notable that the UK Supreme Court in *Unwired Planet* engaged in the same analysis and reasoned to the same conclusion as the German Federal Court of Justice in *Sisvel*, although these cases were decided only months apart from each other in late 2020.¹⁰⁸

Ultimately, the UK Supreme Court recognized that Unwired Planet—and Conversant in its SEP infringement lawsuit filed against Huawei and ZTE and consolidated with Unwired Planet's lawsuit against Huawei—had demonstrated that it had been willing to grant a license on FRAND terms to Huawei. Since Unwired Planet and Conversant had shown a willingness to license on FRAND terms with Huawei and ZTE, the UK Supreme Court granted an injunction as "necessary in order to do justice" if the offer of the FRAND-compliant license was not accepted by Huawei and ZTE as infringing implementers.¹⁰⁹

These summaries represent only an illustrative sample of the numerous court decisions in the UK, EU, and in other countries around the globe that find implementers to be engaging in a myriad of holdout strategies. These and other courts have consistently affirmed the preexisting right of SEP owners to receive injunctions under their national patent laws. Accordingly, they have issued injunctions for ongoing infringement of SEPs when an implementer has notice of infringement and is engaging in holdout tactics, and the SEP owner has offered a license on FRAND terms or is negotiating in good faith to a FRAND-compliant license. In reaffirming the right of an SEP owner to request and receive an injunction, the CJEU recognized in *Huawei* that holdout

105. *See id.* at ¶ 157 ("The scheme set up by the CJEU [in *Huawei*] . . . provides the SEP owner with a route map which . . . will ensure it can seek an injunction").

106. *Id.* at ¶ 166.

107. *Id.* at ¶¶ 168–69 (quoting *Unwired Planet International Ltd v. Huawei Technologies Co. Ltd* [2018] EWCA (Civ) 2344, ¶ 111).

108. *See Bundesgerichtshof [BGH] [Federal Court of Justice] Nov. 24, 2020, KZR 35/17 (Ger.)*.

109. *Unwired Planet Int'l Ltd.*, at ¶ 169.

by implementers against license offers by SEP owners is a commercial reality that can only be addressed by the appropriate legal remedy of an injunction to balance the market asymmetry between SEP owners and implementers.¹¹⁰

V. CONCLUSION

Despite claims by commentators and courts in the United States, the FRAND commitment does not preclude the award of an injunction to an SEP owner. The ETSI IP rights policy is an exemplar of the legal rules and commercial norms in FRAND commitments among SDOs. Clause 6.1 in the ETSI IP rights policy implements a policy of balancing the interests of SEP owners and implementers, and thus it foregoes any per se rules or restrictive mandates dictating royalty rates, licensing terms, or the absence of injunctive relief for SEP owners. Its express terms require only one action by SEP owners: they must be “prepared to offer an irrevocable license” on FRAND terms. It is notable that the ETSI IP rights policy does not even mandate that an SEP owner enter into a license, but only that it be prepared to *offer* a license on FRAND terms.

The FRAND commitment in the ETSI IP rights policy does not preclude injunctions for SEP owners. The conclusion is clear from its express terms, its historical provenance in the failed 1993 Undertaking, the other provisions in the ETSI directives and guidelines, and in ETSI’s rejection of attempts to amend Clause 6.1 subsequent to its adoption in 1994: Clause 6.1 does not impose any per se rules prohibiting injunctions as legal remedies nor any other mandates of commercial practices or royalties. For this reason, courts in multiple jurisdictions have issued injunctions to SEP owners who are committed to making offers of FRAND licenses under the ETSI IP rights policy when implementers have been unwilling to enter into licenses and engaged in holdout tactics. It is time for U.S. courts and commentators to recognize and apply this overwhelming legal authority.

110. *See supra* note 44 (explaining the fundamental function of an injunction as a necessary legal predicate for a contractual negotiation to occur in the marketplace).

PATENTS AS HEDGES

Ted M. Sichelman[†]

ABSTRACT

The overriding justification offered for patents has been to optimally induce innovative technological activity by preventing free riding—that is, uncompensated appropriation of innovative information by third parties. Yet, patent law presents several puzzles for its putative free riding rationale. First, ordinary patent infringement has never required copying. Second, recent empirical studies have shown that copying is often costly and time-consuming. Third, there are many costly and risky economic activities subject to free riding that are not protected by patent-like rights. Some commentators have relied upon these doubts of patent law’s free riding premise to propose weakening patent rights, such as by requiring copying as an element of infringement. This Article extends the incentive theory of patents to explain why patents should reach wholly independent activity. Leveraging the work of Joseph Schumpeter, I argue that patents best promote innovation when used as “hedgies” against potential competition. On this account, innovators who are first to the market can enjoy supernormal profits without patents or other IP rights. Patents reduce the risk of profit erosion from competition—of which free riding is merely one form—and stem the concomitant erosion of profits, thereby increasing incentives to innovate. Nonetheless, overly suppressing competition may dampen innovation and lead to other social costs. Fine-tuning the nature and scope of patent rights therefore requires a delicate balance between these competing forces.

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I. INTRODUCTION

Patent infringement is commonly portrayed as a form of theft.¹ From groundbreaking inventions such as the steamboat,² airplane,³ laser,⁴ telephone,⁵

1. See, e.g., Internet Movie Database, Plot Summary, Flash of Genius, <https://www.imdb.com/title/tt1054588/> (last visited Dec. 13, 2015) (describing the 2008 film as one in which “Ford [has] stolen [the inventor-protagonist’s] design”).

2. See generally Frank D. Prager, *The Steamboat Interference: 1787-1803*, 40 J. PAT. OFF. SOC’Y 611 (1958).

3. See George Bittlingmayer, *Property Rights, Progress, and the Aircraft Patent Agreement*, 31 J.L. & ECON. 227, 230–31 (1988). See generally Herbert A. Johnson, *The Wright Patent Wars and Early American Aviation*, 69 J. AIR L. & COM. 21 (2004).

4. See generally *Gould v. Schawlow*, 363 F.3d 908 (C.C.P.A. 1966); NICK TAYLOR, *LASER: THE INVENTOR, THE NOBEL LAUREATE, AND THE THIRTY-YEAR PATENT WAR* (2000).

5. SETH SHULMAN, *THE TELEPHONE GAMBIT* (2008) (describing how Alexander Graham Bell may have wrongfully copied part of Elisha Gray’s patent application). See also *The Telephone Cases*, 126 U.S. 1, 534 (1888) (consolidating patent infringement cases related

and television,⁶ to more mundane ones, like the intermittent windshield wiper⁷ and the Monopoly board game,⁸ historians, Hollywood, and bloggers alike have documented disputes involving allegations of “stealing” inventions.⁹

Although they eschew the theft terminology, legal scholars have generally grounded the rationale for patents in preventing what otherwise would be low-cost “free riding”—essentially, the copying of inventive ideas.¹⁰ Along this line of reasoning, without some mechanism to prevent free riding, “competition [would] drive prices down to a point where the inventor receives no return on the original investment in research and development.”¹¹ Similarly, economists’ “public goods” explanation of patents hinges upon the “non-excludability” of

to Alexander Graham Bell’s patents to “improvements in telegraphy” and “improvements in electric telephony”).

6. G.R.M. Garratt & A.H. Mumford, *The History of Television*, 99 PROCS. IEE PART IIIA TELEVISION 25–40 (1952). See generally JOSEPH H. UDELSON, *THE GREAT TELEVISION RACE: A HISTORY OF THE AMERICAN TELEVISION INDUSTRY, 1925-1941* (1st ed. 1982).

7. John Seabrook, *The Flash of Genius*, NEW YORKER (Jan. 3, 1993), <http://www.newyorker.com/magazine/1993/01/11/the-flash-of-genius> (discussing, *inter alia*, Bob Kearns invention of the intermittent windshield wiper and the money earned in settlements in patent disputes); FLASH OF GENIUS (Intermittent Productions 2008); *Kearns v. Ford Motor Co.*, 32 F.3d 1541, 1543 (Fed. Cir. 1994).

8. See Daniel J. Schaeffer, *Not Playing Around: Board Games and Intellectual Property Law*, 7 LANDSLIDE 40, 42 (2015) (discussing Parker Brothers’ patent for the *Monopoly* board game, invented by Charles Darrow).

9. For an example of a typical blog post on this topic, see Chris Barker, *10 Great Business Ideas That Were Actually Stolen*, BUS. CAREER GUIDE (Nov. 10, 2012), <http://www.businesscareersguide.com/10-great-business-ideas-that-were-actually-stolen/>.

10. A. Samuel Oddi, *Un-Unified Economic Theories of Patents—The Not-Quite-Holy Grail*, 71 NOTRE DAME L. REV. 267, 275–77 (1996) (discussing the “reward theory” of patent law and particularly pointing to support for the reward theory based on preventing “free riding”); Mark A. Lemley, *Property*, 83 TEX. L. REV. 1031, 1032 (2005) [hereinafter Lemley, *Property*] (“Protectionists . . . rely on the rhetoric of real property, with its condemnation of ‘free riding’ by those who imitate or compete with intellectual property owners.”); Mark A. Lemley, *The Economics of Improvement in Intellectual Property Law*, 75 TEX. L. REV. 989, 1084 (1997) [hereinafter Lemley, *Economics of Improvement*] (“[T]he ‘reward theory’ of patent law is essentially incentive-based: inventors must be rewarded in order to (a) encourage more inventions, or (b) prevent ‘free-riding.’”); Ted Sichelman, *Commercializing Patents*, 62 STAN. L. REV. 341, 373 (2010) (noting that patents are “designed” to “prevent free riding”) [hereinafter Sichelman, *Commercializing Patents*]; WARD S. BOWMAN JR., *PATENT ANTITRUST LAW: A LEGAL AND ECONOMIC APPRAISAL* 30–32 (1971) (justifying patent law’s reward theory in order to prevent free riding by “copyists”).

11. Rebecca S. Eisenberg, *Patents and the Progress of Science: Exclusive Rights and Experimental Use*, 56 U. CHI. L. REV. 1017, 1025 (1989) (“If successful inventions are quickly imitated by free riders, competition will drive prices down to a point where the inventor receives no return on the original investment in research and development.”).

information—particularly, the inability to easily prevent others from appropriating information generated by inventors.¹²

Yet, in contrast with copyrights and trade secrets, patent infringement does not require copying.¹³ In other words, wholly independent activity by third parties can nonetheless be infringing.¹⁴ Importantly, direct infringement effectively sounds in strict liability; knowledge of the patent is not required.¹⁵

12. See, e.g., STEPHEN MARTIN, INDUSTRIAL ORGANIZATION IN CONTEXT 498 (2010) (“[T]he currently most fashionable rationale for the institution of intellectual property is that the public good aspects of information mean some legal support for appropriability is necessary.”); JOHN LEACH, A COURSE IN PUBLIC ECONOMICS 173–74 (2004) (explaining how patents are a response to the underproduction of knowledge that would otherwise occur because “knowledge is a public good”); see also Lemley, *Property*, *supra* note 10, at 1054 (“Once the information has been disclosed outside a small group, however, it is extremely difficult to control. Information has the characteristics of a ‘public good’—it may be ‘consumed’ by many people without depletion, and it is difficult to identify those who will not pay and prevent them from using the information.”). See generally Paul Samuelson, *The Pure Theory of Public Expenditure*, 36 REV. ECON. & STAT. 387, 387–89 (1954) (introducing the notion of “public goods”).

13. See *Kewanee Oil Co. v. Bicron Corp.*, 416 U.S. 470, 478 (1974). Although trademark infringement nominally does not require copying, whether the alleged infringer appropriated the goodwill of the trademark holder is typically an important factor in the infringement analysis. See Barton Beebe, *An Empirical Study of the Multifactor Tests for Trademark Infringement*, 94 CALIF. L. REV. 1581, 1628 (2006) (reporting that the intent of the infringer to appropriate the goodwill of the mark creates “a nearly un-rebuttable presumption of a likelihood of confusion”).

14. Technically, patent law doctrine assumes that all infringers are on constructive notice of the patent via its publication. See *Sontag Chain Stores Co. v. National Nut Co.*, 310 U.S. 281, 295 (1940) (finding that publication of a patent provides “implied knowledge of the . . . patent”). Additionally, sometimes marking of patented productions by the patentee is said to provide constructive notice. Christopher A. Cotropia & Mark A. Lemley, *Copying in Patent Law*, 87 N.C. L. REV. 1421, 1442 n.95 (2009) (“[M]arking may constitute constructive notice of infringement.”) [hereinafter Cotropia, *Copying*]. Nonetheless, if an infringer began its activity prior to publication of the patent, disclosure of related information, or any uses or sales of the patented invention—in other words, the infringer simply had no knowledge of the patent or any information relating to it—then it should generally be treated an “independent inventor.” Cf. *Samson Vermont, Independent Invention as a Defense to Patent Infringement*, 105 MICH. L. REV. 475, 496 (2006) (contrasting “independent inventors” with those entities that are “pirates or firms that attempted to invent around the patent”) [hereinafter Vermont, *Independent Invention*].

15. Mark A. Lemley, *Should Patent Infringement Require Proof of Copying?*, 105 MICH. L. REV. 1525 (2007) (“Patent infringement is a strict liability offense.”) [hereinafter Lemley, *Should Patent Infringement Require Proof of Copying?*]; Roger D. Blair & Thomas F. Cotter, *Strict Liability and Its Alternatives in Patent Law*, 17 BERKELEY TECH. L.J. 799, 800 (2002) (“Patent infringement is a strict liability tort in the sense that a defendant may be liable without having had any notice, prior to the filing of an infringement action, that her conduct was infringing.”) [hereinafter Blair, *Strict Liability*]; Mark A. Lemley, *Inducing Patent Infringement*, 39 U.C. DAVIS L. REV. 225, 235 (2005) (“Direct patent infringement is a strict liability offense.”). In contrast,

In this regard, the Supreme Court has couched the role of patents in quite general terms.¹⁶ Specifically, in *Kewanee v. Bicron Oil*, a prominent case that considered the aims of intellectual property law, the Court broadly remarked, “[t]he patent laws . . . [offer] a right of exclusion for a limited period as an incentive to inventors to risk the often enormous costs in terms of time, research, and development.”¹⁷ The Court emphasized, “[patent] protection goes not only to copying the subject matter, which is forbidden under the Copyright Act . . . but also to independent creation.”¹⁸ Nonetheless, the Court has never explained why patent protection extends to “independent creation.”¹⁹

This disjunction between theory and practice is puzzling: If the aim of patents is to prevent copying and free riding, then why should independent activity be actionable as patent infringement?²⁰ Earlier scholars have primarily

indirect infringement requires actual knowledge of the patent-at-issue, or at least “willful blindness” to such knowledge. See *Global-Tech v. S.E.B.*, 563 U.S. 754 (2011); cf. Ted Sichelman, *Patent Law Revisionism at the Supreme Court?*, 45 LOY. U. CHI. L.J. 307 (2013) (arguing that the Supreme Court’s decision in *Global-Tech* obfuscated the historical doctrine, which did not require knowledge of the patent as a prerequisite for indirect infringement).

16. *Kewanee*, 416 U.S. at 480.

17. *Id.*

18. *Id.* at 478. See also *id.* at 490 (“While trade secret law does not forbid the discovery of the trade secret by fair and honest means, e.g., independent creation or reverse engineering, patent law operates ‘against the world,’ forbidding any use of the invention for whatever purpose for a significant length of time.”).

19. *Id.*; *Bonito Boats, Inc. v. Thunder Craft Boats, Inc.*, 489 U.S. 141, 155 (1989) (discussing how, in contrast to patents, with trade secrets the “public at large remain[s] free to discover and exploit the trade secret through . . . independent creation” but never explaining the rationale behind the different approaches).

20. See Lemley, *Should Patent Infringement Require Proof of Copying?*, *supra* note 15 (analyzing the possibility of an independent invention defense); Vermont, *Independent Invention*, *supra* note 14 (concluding that, under certain circumstances, independent invention should bar a finding of patent infringement); Oskar Liivak, *Negligent Innovation*, 48 FLA. ST. U. L. REV. 607 (2021); Adam J. MacLeod, *Patent Infringement As Trespass*, 69 ALA. L. REV. 723, 730 (2018); Patrick R. Goold, *Patent Accidents: Questioning Strict Liability in Patent Law*, 95 IND. L.J. 1075 (2020); Mark A. Lemley & Robin Feldman, *Is Patent Enforcement Efficient?*, 98 B.U. L. REV. 649, 667 (2018); Oskar Liivak, *Rethinking the Concept of Exclusion in Patent Law*, 98 GEO. L.J. 1643, 1647 (2010); Carl Shapiro, *Prior User Rights*, 96 AM. ECON. REV. 92 (2006); Vincenzo Denicolò & Luigi Alberto Franzoni, *Patents, Secrets, and the First-Inventor Defense*, 13 ECON. & MGMT. STRATEGY 517 (2004); Manfredi La Manna, Ross Macleod & David de Meza, *The Case for Permissive Patents*, 33 EUR. ECON. REV. 1427 (1989); Stephen M. Maurer & Suzanne Scotchmer, *The Independent Invention Defense in Intellectual Property*, 69 ECONOMICA 535 (2002); Elisabetta Ottoz & Franco Cugno, *The Independent Invention Defense in a Cournot Duopoly Model*, 12 ECON. BULL. 1 (2004); Emeric Henry, *Runner-up Patents: Is Monopoly Inevitable?*, 112 SCANDINAVIAN J. ECON. 417 (2010); James J. Anton & Dennis A. Yao, *Expropriation and Inventions: Appropriable Rents in the Absence of Property Rights*, 84 AM. ECON. REV. 190 (1994); Stephen M. McJohn, *A New Tool for Analyzing Intellectual Property*, 5 NW. J. TECH. & INTELL. PROP. 101, 116 (2006).

posited that although free riding is the primary concern of patent law, it is often difficult to prove copying in practice, which justifies holding putative “independent” inventors liable for infringement.²¹ Yet, the evidentiary-focused view is wanting in an important respect: if the alleged infringer can prove with hard evidence that it *absolutely did not imitate* the patentee’s invention, then why shouldn’t it escape infringement?²²

Other theories attempting to explain the conundrum contend that imposing a copying requirement would unduly weaken incentives to innovate.²³ Yet, the costs of intellectual property—including costs to consumers in the form of higher-than-usual (“supracompetitive”) pricing,²⁴ to downstream innovators in the form of transaction costs,²⁵ and to the public

21. Robert P. Merges, *A Few Kind Words for Absolute Infringement Liability in Patent Law*, 31 BERKELEY TECH. L.J. 1, 1–2 (2016) [hereinafter Merges, *A Few Kind Words*]; Richard A. Posner, *Misappropriation: A Dirge*, 40 HOUS. L. REV. 621, 626 (2003) (“What tips the balance against an independent-discovery defense, however, is the difficulty of determining independent discovery by the methods of litigation and the resulting likelihood that the courts would commit many errors in adjudicating patent infringement claims in cases in which independent discovery was the defense.”).

22. The America Invents Act and many foreign patent systems do allow a “prior user” defense that applies when an alleged infringer can show use (typically, commercial use) some period of time prior to the patent’s filing date, but do not go so far as to provide immunity from infringement to all independent inventors. See 35 U.S.C. § 273 (2011) (setting forth the requirements for the prior user defense under the America Invents Act); see also John Neukom, *A Prior Use Right for the Community Patent Convention*, 12 EUR. INTELL. PROP. REV. 165, 165–66 (1990) (discussing prior user rights in Europe).

23. Vermont, *Independent Invention*, *supra* note 14, at 476 (“To weaken patent protection is to increase the risk that inventors will postpone invention.”); Lemley, *Should Patent Infringement Require Proof of Copying?*, *supra* note 15 (speculating that an independent invention defense may unduly weaken patent rights); Keith M. Kupferschmid, *Prior User Rights: The Inventor’s Lottery Ticket*, 21 AIPLA Q.J. 213, 219 (1993) (“Such a defense would severely weaken the patent and in effect weaken the incentives of the patent system.”).

24. Jonathan M. Barnett, *Private Protection of Patentable Goods*, 25 CARDOZO L. REV. 1251, 1269 (2004) (“As a legally created monopoly over an intellectual good, a patent entitlement imposes significant social costs. These costs include: (1) administrative costs (incurred by the patent office and innovators) of prosecuting patents, issuing patents and adjudicating disputes relating to patent infringement, (2) rent-seeking costs incurred by innovators seeking to win a patent, (3) supracompetitive pricing power exerted by the patent holder (or, more specifically, the deadweight loss resulting from the patent holder’s output restrictions), and (4) restricted access to the patented good by subsequent improvers.”); Ian Ayres & Gideon Parchomovsky, *Tradable Patent Rights*, 60 STAN. L. REV. 863, 867 (2007) (“Traditionally, patent scholarship focused, by and large, on the price effects of patent protection. The main problem theorists noted was that patent protection allowed patentees to engage in supracompetitive pricing, generating a social deadweight loss.”) [hereinafter Ayres, *Tradable Patent Rights*].

25. See Michael A. Heller & Rebecca S. Eisenberg, *Can Patents Deter Innovation? The Anticommons in Biomedical Research*, 280 SCI. 698, 699 (1998) (“Each upstream patent allows its

from administrative and other external costs²⁶—can only be justified if intellectual property is essential to incentivizing innovation.²⁷ Because these theories do not sufficiently explain why and when stronger intellectual property rights are necessary—that is, relative to ordinary market incentives—they do not adequately justify the absence of copying from the elements of patent infringement.²⁸ In this regard, the “strong patent rights” theories tend to lack substantial empirical support.²⁹

Another line of argument in the economics literature is more promising. Namely, the well-known economist Joseph Schumpeter argued that the

owner to set up another tollbooth on the road to product development, adding to the cost and slowing the pace of downstream biomedical innovation.”); Lemley, *Economics of Improvement*, *supra* note 10, at 1054 (“[E]ven the average transaction costs associated with an intellectual property license are unlikely to be trivial.”); Robert P. Merges & Richard R. Nelson, *On the Complex Economics of Patent Scope*, 90 COLUM. L. REV. 839, 874 (1990) (“A substantial literature documents the steep transaction costs of technology licensing, and there is indirect evidence that these costs increase when major innovations are transferred. Moreover, various studies have indicated that transaction costs tend to be very high if licenses are tailored to particular licensees.”).

26. See Lemley, *Property*, *supra* note 10, at 1058–59.

27. In this Article, I generally use the term “invention” to refer to the designs and related knowledge required to receive patent protection and associated prototypes, if any. See Robert P. Merges, *Commercial Success and Patent Standards: Economic Perspectives on Innovation*, 76 CALIF. L. REV. 803, 807 (1988) [hereinafter Merges, *Commercial Success*] (“[T]he innovation will in all likelihood be different in significant respects from the invention due to the changes necessary to turn the invention into a commercial product.”). I use the term innovation to refer to the entire commercial process of inventing and transforming an invention into a commercially viable product or method, plus improvements to the original product or services. See, e.g., Federico Munari & Maurizio Sobrero, *Corporate Governance and Innovation*, in CORPORATE GOVERNANCE, MARKET STRUCTURE AND INNOVATION 3 (Mario Calderini et al. eds., 2003) (remarking that innovation starts “with the generation of new knowledge targeted to the discovery of new products and processes, and ending with their commercial exploitation”); cf. JOSEPH A. SCHUMPETER, *THE THEORY OF ECONOMIC DEVELOPMENT: AN INQUIRY INTO PROFITS, CAPITAL, CREDIT, INTEREST, AND THE BUSINESS CYCLE* 66 (Redvers Opie trans., Transaction Publishers 1983) (1934) (contending that innovation consists of novel goods, production methods, markets, production inputs, and forms of organization). I also use the term “innovation” to refer to the commercial product or service used by consumers. See, e.g., Jan Fagerberg, *Innovation: A Guide to the Literature*, in THE OXFORD HANDBOOK OF INNOVATION 4 (Jan Fagerberg et al. eds., 2005) (“Invention is the first occurrence of an idea for a new product or process, while innovation is the first attempt to carry it out into practice.”).

28. See *infra* notes 112–117 and accompanying text. Another line of theories investigates the costs generated by duplicated R&D (rent dissipation theory) and the high costs of coordinating downstream R&D in improving an invention (prospect theory). See *infra* notes 128–154 and accompanying text. I discuss explanatory limitations in these theories below. See *id.*

29. See *infra* note 138 and accompanying text.

suppression of competition is essential to promoting innovation.³⁰ In Schumpeter's view, monopolists would have greater incentives to innovate because they could recoup all of the profits of their innovations.³¹ Patents—as a form of “legal” monopoly—thereby promote innovation.³²

The Schumpeterian approach, however, suffers from three deficiencies. First, despite the popularity of such an approach, like the “strong IP rights” theories, Schumpeter (and his followers) have not adequately acknowledged the important role that competition can play in promoting innovation.³³ Second, although Schumpeter classified patents as one of several strategies for “insuring or hedging” for investment “under rapidly changing conditions,” his remark was casual and brief, and neither he nor Schumpeterian theorists have explained the precise legal role patents play in suppressing competition to promote innovation.³⁴ In this regard, Schumpeterian theory has not squarely disputed the view that free riding is the primary basis on which to ground patent rights.³⁵ Indeed, much of Schumpeter's own argument is directed towards the competitive threat stemming from free riding.³⁶ Third, Schumpeterians—as well as the industrial organization literature more generally³⁷—although properly characterizing patents as legal monopolies,

30. JOSEPH A. SCHUMPETER, CAPITALISM, SOCIALISM, AND DEMOCRACY 106 (3d ed. 1950) [hereinafter SCHUMPETER, CAPITALISM] (“[P]erfect competition is not only impossible but inferior . . .”). See also John F. Duffy, *The Marginal Cost Controversy in Intellectual Property*, 71 U. CHI. L. REV. 37, 39–41 (2004) (describing intellectual property as a “special case of natural monopoly”).

31. SCHUMPETER, CAPITALISM, *supra* note 30, at 81–106.

32. See *id.* Schumpeterian thinking has featured prominently in the industrial organization literature. See Richard C. Levin, Wesley M. Cohen & David C. Mowery, *R&D Appropriability, Opportunity, and Market Structure: New Evidence on Some Schumpeterian Hypotheses*, 75 AM. ECON. REV. PAPERS & PROCS. NINETY-SEVENTH ANNUAL MEETING AM. ECON. ASS'N 20, 20–24 (1985); Kathleen R. Conner, *A Historical Comparison of Resource-Based Theory and Five Schools of Thought Within Industrial Organization Economics: Do We Have a New Theory of the Firm?*, 17 J. MANAGE. 121, 121–54 (1991).

33. SCHUMPETER, CAPITALISM, *supra* note 30, at 106 (asserting that perfect competition is “inferior in internal, especially technological, efficiency”). See also INNOVATION AND GROWTH: SCHUMPETERIAN PERSPECTIVES (F.M. Scherer ed., 1985) (collecting sixteen essays examining Schumpeter's views on innovation). See generally Michael A. Carrier, *Two Puzzles Resolved: Of the Schumpeter-Arrow Stalemate and Pharmaceutical Innovation Markets*, 93 IOWA L. REV. 393, 402–05 (2008) (contrasting Schumpeterian with competitive paradigms of innovation).

34. SCHUMPETER, CAPITALISM, *supra* note 30, at 87–88. See also Arti Kaur Rai, *Regulating Scientific Research: Intellectual Property Rights and the Norms of Science*, 94 NW. U. L. REV. 77, 121 (1999) (noting that “[i]n the specific context of biotechnology, the argument that a patent monopoly provides a hedge against competition and uncertainty in the development process has some merit” but not addressing the specifics of how patents precisely achieve that goal).

35. Schumpeter, *supra* note 30, at 81–106.

36. See *id.*

37. See *infra* notes 38–39, 264–275 and accompanying text.

wrongly views these rights as affording exclusive rights to practice the invention and, hence, real options to commercialize.³⁸ Rather, patents are merely negative rights to exclude others from practicing the patented invention and, although patents may *indirectly* provide positive rights to exclusively commercialize an invention, they do not always do so.³⁹

In this Article, I extend the Schumpeterian approach to offer a novel theory of patent law that extends and refines the free-riding, public goods account.⁴⁰ Like the Schumpeterians, I posit that patents are a form of a “hedge”—that is, an economic instrument to reduce risk. However, such a hedge insures against the competitive risk of *any kind*, not merely free riding.⁴¹ Moreover, contrary to the traditional reward theory, patents are not necessary for an inventor to charge supracompetitive prices.⁴² Rather, because patents are generally awarded to the first inventor—and that inventor (or its licensees) typically will be the first to commercialize—there will be no competition and, hence, a first-mover advantage for the inventor.⁴³ During this period, the

38. See Nicholas Bloom & John Van Reenen, *Patents, Real Options and Firm Performance*, 112 *ECON. J.* 97, 97–116 (2002); Alan C. Marco, *The Option Value of Patent Litigation: Theory and Evidence*, 14 *REV. FIN. ECON.* 323, 323–51 (2005); Marc Baudry & Béatrice Dumont, *Patent Renewals as Options: Improving the Mechanism for Weeding Out Lousy Patents*, 28 *REV. INDUS. ORG.* 41, 41–62 (2006); Arvids A. Ziedonis, *Real Options in Technology Licensing*, 53 *MGMT. SCI.* 1618, 1618–33 (2007). Cf. Michael Abramowicz, *The Danger of Underdeveloped Patent Prospects*, 92 *CORNELL L. REV.* 1065 (2007) (presenting the case for underdevelopment of patented inventions using real options theory).

39. See *infra* notes 264–275 and accompanying text. Some legal scholars have recognized the option afforded by patents to “exclude” others from the marketplace, but they have wrongly added other options to the mix, such as the option to commercialize, license, and the like. See Amelia S. Rinehart, *Patents as Escalators*, 14 *VAND. J. ENT. & TECH. L.* 81, 99 (2011) (“[T]he patent owner exercises his option by exploiting his right to exclude, by leveraging the patent to commercialize the technology, by licensing others to compete with him, by foregoing commercialization and licensing for revenue, and/or by litigating to obtain remedies from infringers.”); Shaun Martin & Frank Partnoy, *Patents as Options*, in *PERSPECTIVES ON COMMERCIALIZING INNOVATION* 303–05 (F. Scott Kieff & Troy A. Paredes eds., 2011) (recognizing a litigation option value to patents but also a development option value); Christopher Cotropia, *Describing Patents as Real Options*, 34 *J. CORP. L.* 1127, 1137–38, 1149 (2009) (relying on the exposition by Martin & Partnoy to postulate a commercialization option and a litigation option, though noting that commercialization benefits “do not involve the patent right directly”).

40. See *infra* Part II.B.

41. See *id.*; cf. *Kimble v. Marvel Entm’t, LLC*, 135 S. Ct. 2401, 2413 (2015) (“The patent laws—unlike the Sherman Act—do not aim to maximize competition (to a large extent, the opposite).”).

42. See *id.*

43. See *id.*; see also Oskar Liivak, *Maintaining Competition in Copying: Narrowing the Scope of Gene Patents*, 41 *U.C. DAVIS L. REV.* 177, 212 (2007) (“Potential or actual competition helps to

inventor (or its licensees) can charge supracompetitive prices, even if for a very short period of time.⁴⁴

The patent is a hedge that reduces the risk that the patentee's supracompetitive pricing will be eroded by competitors, because a patent forecloses competitors from making, selling, or using any product or service within the scope of the patent's claims.⁴⁵ In this regard, patents are *not* "real call options" to *affirmatively* commercialize the patented good.⁴⁶ Instead, they are "real put options" to foreclose competition.⁴⁷ Like a financial put option, the holder of a patent can elect to force a third party (here, an infringer) to purchase an asset (here, a retroactive license to the patent); additionally, the patentholder can force the infringer either to cease any further infringement or to continue its license, depending on the circumstances.⁴⁸

In many instances, first-mover advantages—especially those backed by "complementary assets," such as marketing or manufacturing power—can be sufficient to incentivize innovation.⁴⁹ Thus, ordinary competitive markets can

drive the price down to average cost. If the patentee is the first to arrive in some new technological market, then he can start pricing the invention at the monopoly price. In part, these early abnormal profits are the first-mover advantage." Here I assume that the invention is new and sufficiently differentiated from other products and services so as to provide a market advantage. See Greg Vetter, *Patenting Cryptographic Technology*, 84 CHI.-KENT L. REV. 757, 774–75 (2010) (noting the use of patents for product differentiation).

44. See *infra* Part II.B; Liivak, *supra* note 43, at 212.

45. See *infra* Part II.B.

46. See *supra* notes 38–39 and accompanying text.

47. See Vermont, *supra* note 20, at 496 n.60 ("[P]atents confer only the right to exclude and not an affirmative right to exploit a patch of technology."); Merges & Nelson, *supra* note 25, at 860–62. Cf. Raffaele Oriani & Luigi Sereno, *Advanced Valuation Methods: The Real Options Approach*, in THE ECONOMIC VALUATION OF PATENTS: METHODS AND APPLICATIONS 141–59 (Federico Munari & Raffaele Oriani eds., 2011) (explaining that patents provide a put option in the form of litigation but wrongly contending that patents also provide a call option to commercialize the invention).

48. See generally IAN AYRES, *OPTIONAL LAW: THE STRUCTURE OF LEGAL ENTITLEMENTS* 18–19 (2005) (defining a legal put option as "an option to choose court-determined damages . . . or injunctive relief").

49. See generally David J. Teece, *Profiting from Technological Innovation: Implications for Integration, Collaboration, Licensing and Public Policy*, 15 RSCH. POL'Y 285 (1986) (discussing the benefits of first-mover advantages and complementary assets; a number of surveys indicate that first-mover advantage is more effective than patents in promoting innovation in some industries); Richard C. Levin, Alvin K. Klevorick, Richard R. Nelson & Sidney G. Winter, *Appropriating the Returns from Industrial Research and Development*, 3 BROOKINGS PAPERS ON ECON. ACTIVITY 783 (1987); Edwin Mansfield, *Patents and Innovation: An Empirical Study*, 32 MGMT. SCI. 173 (1986); William L. Baldwin & Gerald L. Childs, *The Fast Second and Rivalry in Research and Development*, 36 S. ECON. J. 18, 21 (1969); Janusz A. Ordover, *Economic Foundations and Considerations in Protecting Industrial and Intellectual Property*, 53 ANTITRUST L.J. 503, 507 (1984).

often lead to the optimal level of innovation.⁵⁰ The traditional economic view, however, is that most innovation markets are subject to the so-called “public goods” problem of information assets—namely, the difficulty of excluding competitors from appropriating information about the innovation for their own benefit.⁵¹

Yet, innovations are not solely composed of information—rather, patents cover tangible products and useable services, and the details surrounding how to build and use these products and services are often not public, not codified, or simply not codifiable.⁵² Thus, in practice, patented goods and services are typically not pure public goods, because they are—at least partially—excludable even absent legal protection.⁵³ The inability of competitors and others to obtain information about the patented good or service will often significantly raise the costs of copying.⁵⁴ Indeed, the difficulty of copying has been used to justify weakening of patent rights, or their elimination altogether.⁵⁵

Despite these barriers to imitation, I contend in this Article that market barriers to optimal levels of innovation often remain. Specifically, the general threat of competition to innovators tends to present risks that often do not

50. See Dan L. Burk & Mark A. Lemley, *Policy Levers in Patent Law*, 89 VA. L. REV. 1575, 1618 (2003) (“[C]ompanies have ample incentives to develop business methods even without patent protection, because the competitive marketplace rewards companies that use more efficient business methods.”).

51. See generally JOHN BATES CLARK, *ESSENTIALS OF ECONOMIC THEORY* 360 (1927) (“Why should one *entrepreneur* incur the cost and risk of experimenting [in making and selling] . . . a new machine if another can look on, ascertain whether the device works well or not, and duplicate it if it is successful?”).

52. Dan L. Burk, *The Role of Patent Law in Knowledge Codification*, 23 BERKELEY TECH. L.J. 1009, 1022 (2008) (“[T]he [person of ordinary skill in the art’s] ability to make and use the invention described in the patent may also depend upon uncodified information.”); Peter Lee, *Transcending the Tacit Dimension: Patents, Relationships, and Organizational Integration in Technology Transfer*, 100 CALIF. L. REV. 1503 (2012) (“[M]uch scientific and technical knowledge is tacit.”). Of course, some areas of knowledge are nearly fully codifiable, such as pharmaceutical drugs, presenting greater free riding concerns. *Id.* at 1528. (“[P]harmaceutical inventions, which tend to be more mature and more easily codified than other types of university inventions.”).

53. Cf. Amy Kapczynski & Talha Syed, *The Continuum of Excludability and the Limits of Patents*, 122 YALE L.J. 1900, 1921–22 (2013) (positing that some inventive goods are “highly excludable under existing technological, normative, and institutional conditions”).

54. See WILLIAM D. NORDHAUS, *INVENTION, GROWTH, AND WELFARE: A THEORETICAL TREATMENT OF TECHNOLOGICAL CHANGE* 89 (MIT, 1969) (“It is well known that a firm tries not to disclose key parts of the invention in order to reduce the chance of imitation, thereby reducing the effective diffusion of knowledge.”).

55. See, e.g., Lucas S. Osborn, Joshua M. Pearce & Amberlee Haselhuhn, *A Case for Weakening Patent Rights*, 89 ST. JOHN’S L. REV. 1185, 1234 (2015).

justify the *private* costs of innovative activity that is otherwise *socially* desirable.⁵⁶ Given the large costs and risks involved in research & development and the commercialization process—as well as the often large differential between the private, market value and the public, social value of technological innovations—patents or some other regulatory exclusivity will often be necessary to maximize social welfare.⁵⁷

Unlike the Schumpeterians, the hedging theory presented here is ultimately agnostic as to whether strong or weak intellectual property rights optimally promote innovation in a given industry, because just as barriers to entry are often essential to innovation, so is competition.⁵⁸ As Kenneth Arrow and later scholars have properly recognized, competition can serve several important roles in the innovation process, from increasing the number of potential innovators for a given project to decreasing consumer deadweight losses.⁵⁹ Not only will optimal intellectual property rights turn on unique static aspects of industries, they will also vary based on the evolving nature of industries and consumers.⁶⁰ Because we cannot be certain of what the future holds in terms of innovation, as well as consumer tastes for innovation, I argue that it is in fact impossible even in principle to discern the ideal contours of intellectual property rights.⁶¹ Instead, we must (rightfully or wrongfully) assume that the future is much like the past, or operate with some rough prediction of what

56. See *infra* Section III.A.

57. See *infra* Section III.B.

58. See John H. Barton, *Patents and Antitrust: A Rethinking in Light of Patent Breadth and Sequential Innovation*, 65 ANTITRUST L.J. 449, 464 (1997) (“The positive effects of the intellectual property rights on innovation may, thus, not outweigh the negative effects of entry barriers on competition and further research.”); *infra* Section III.A.

59. See Kenneth J. Arrow, *Economic Welfare and the Allocation of Resources for Invention*, reprinted in THE RATE AND DIRECTION OF INVENTIVE ACTIVITIES: ECONOMIC AND SOCIAL FACTORS 609, 619–20 (Richard R. Nelson ed., 1962). See also Mark A. Lemley & Lawrence Lessig, *The End of End-to-End: Preserving the Architecture of the Internet in the Broadband Era*, 48 UCLA L. REV. 925, 960–62 (2001) (arguing that the Internet was highly innovative because its architecture required competition rather than monopoly bottlenecks); *infra* note 296 and accompanying text.

60. See Lemley, *Property*, *supra* note 10, at 1066 (“The optimal scope, strength, and duration of intellectual property protection depend on the type of creation at issue, on the nature of innovation in the particular industry in question, on the particular kind of invention (and inventor) at issue, and on the market context.”); Ayres, *Tradable Patent Rights*, *supra* note 24, at 884 (“[A]ll the important issues of developing optimal intellectual property rights turn on the government’s imperfect information—or possibly the question of how best the government might economize on the patentee’s (and others’) private information.”).

61. Cf. Kenneth W. Dam, *The Economic Underpinnings of Patent Law*, 23 J. LEGAL STUD. 247, 266 (1994) (“A patent system operates over time. To be an efficient system it must optimize the flow of innovation over time. The patent system must thus balance innovation today against innovation tomorrow.”).

the future holds for innovative activity, and attempt to work within the confines of our limited knowledge of the present.⁶²

Nonetheless, hedging theory provides a rationale for increasing the strength of patent rights beyond what is justified merely by free riding theories and without resort to prospect or rent-dissipation—which is still squarely within the realm of incentives for innovation theories. Notably, like insurance more generally, purchasing a hedge against competition may—*narrowly viewed*—be a net private and social cost.⁶³ Yet, like insurance, reducing risk will incentivize the insured party to engage in risky and costly activities—here, research, development, and commercialization—that it otherwise would not have.⁶⁴

The theory of patents as hedges offered in this Article contributes to the literature in three related ways. First, the theory provides a better explanatory account of incentive to innovate rationales for patent law.⁶⁵ Second, hedging theory provides a more coherent rationale of why patents rights extend beyond mere free-riding and public goods concerns, thereby implicitly rejecting these dominant models as satisfactory accounts.⁶⁶ Unlike “strong patent rights” rationales, hedging theory is grounded on empirical studies, which take into account both the innovation-promoting and innovation-dampening effects of suppressing competition.⁶⁷ Third, contrary to the industrial organization literature, the theory provides a more accurate and more detailed description of how patents function as hedges. Patents work essentially as options—not to allow for commercialization, but rather to foreclose competition.⁶⁸ In this regard, hedging may often be costly. An important implication of this reflection is that empirical studies purporting to show that patents are net social costs—even if correct (which is doubtful)—cannot be relied upon as a guide to policymaking, particularly because they do not quantify the benefits of patents in reducing risk from competition.⁶⁹

62. See *infra* Section IV.B.

63. See *infra* Section IV.C.

64. See *infra* Section IV.C.

65. See *infra* Part III.

66. See *infra* Parts II–III.

67. See *infra* Parts III–IV.

68. See *infra* Section III.B.

69. See generally JAMES BESSEN & MICHAEL J. MEURER, PATENT FAILURE: HOW JUDGES, BUREAUCRATS, AND LAWYERS PUT INNOVATORS AT RISK (2008) (purporting to show that patents are an overall net private cost to patent holders based on the use of event studies and estimates of licensing revenues). *But see* Glynn S. Lunney, Jr., *On the Continuing Misuse of Event Studies: The Example of Bessen and Meurer*, 16 J. INTELL. PROP. L. 35 (2008) (criticizing Bessen and Meurer’s use of event studies).

The Article proceeds as follows. Part II describes the standard, reward theory of patents, as well as alternative utilitarian theories, including prospect, commercialization, and rent dissipation theories.⁷⁰ In so doing, I critique these theories for failing to sufficiently explain why patent infringement extends beyond free riding. Building off Schumpeterian theories of innovation, Part III sets forth a hedging theory of patents, explaining its economic underpinnings and applications in real-world settings. Part IV then explains that competition not only may suppress innovation but also may promote it. It further describes how the ambivalent role of competition in promoting innovation leads to a complex balancing act that patent law must perform to achieve optimal incentives. Indeed, I posit that in a dynamic setting it is theoretically impossible to select an optimal regime. Nonetheless, by making some reasonable assumptions about the evolving nature of innovative industries and consumers, as a practical matter, patents—as well as other forms of intellectual property—can potentially improve social welfare by promoting innovation. In this regard, I conclude by emphasizing the need for robust empirical research to better inform the shaping of intellectual property rights.

II. PUZZLES AND PROBLEMS WITH STANDARD THEORIES OF PATENT LAW

The standard justification for patents in the legal literature is that research and development (R&D) is a costly and risky endeavor that is subject to low-cost copying.⁷¹ Economists similarly focus on the lack of “excludability” of the information generated by R&D, which allows third parties to appropriate such

70. This Article generally omits Lockean, Kantian, and other natural rights theories, because it addresses economic theories of patents. See *infra* note 118. In any event, these theories are unlikely to explain the absence of copying as an element of infringement, because independent invention arguably does not “wrongly” interfere with the natural or individual rights of inventors. See, e.g., A. Samuel Oddi, *TRIPS – Natural Rights and a “Polite Form of Economic Imperialism”*, 29 VAND. J. TRANSNAT’L L. 415, 433 (1996) (“Copying an invention . . . becomes immoral because it is an incident of a natural property rights entitlement of the inventor.”) (Italics added).

71. See *supra* note 10 and accompanying text; Peter S. Menell, *Tailoring Legal Protection for Computer Software*, 39 STAN. L. REV. 1329, 1361 (1987) (“If the costs of emulating are low, the dominant firm might not be able to recover its research and development costs.”); Steve P. Calandrillo, *An Economic Analysis of Intellectual Property Rights: Justifications and Problems of Exclusive Rights, Incentives to Generate Information, and the Alternative of a Government-Run Reward System*, 9 FORDHAM INTELL. PROP. MEDIA & ENT. L.J. 301, 303 (1998) (“The rationale runs that in the absence of copyright or patent protection covering an individual’s or firm’s information creation, the low cost of copying such works will induce competitors to enter and ‘steal’ another’s product without penalty. Hence, rivals may profit from another’s intellectual efforts without expending any energy or costs other than the relatively minor costs required to duplicate the socially valuable creation.”).

information without paying for it.⁷² The inability to exclude, coupled with the typically “nonrivalrous” nature of information—namely, its ability to be enjoyed by multiple consumers without diminishing its value—implies that technological information is typically a “public good.”⁷³ Like other public goods, private actors will generally not have sufficient incentives to produce them absent some form of government intervention.⁷⁴

On this standard approach—termed “reward” theory by legal scholars—patents provide legal rights to exclude others from making, using, and selling the patented invention, thereby eliminating—or at least substantially reducing—the benefits to others from copying.⁷⁵ This reduction in benefits in turn provides an incentive (a “reward”) for firms and individuals to engage in socially valuable R&D.⁷⁶ Specifically, by excluding others from appropriating the patentee’s inventive efforts, the patentee can recoup profits in the marketplace that are “supernormal,” or higher than what the patentee would earn in an ordinary, competitive market.⁷⁷

72. See Arrow, *supra* note 59, at 609 (noting that the fundamental theory behind intellectual property is that without incentives innovators will not innovate because competitors and third parties would free ride off their innovations); David J. Teece, *Competition, Cooperation, and Innovation: Organizational Arrangements for Regimes of Rapid Technological Progress*, in *ESSAYS IN TECHNOLOGY MANAGEMENT AND POLICY* 447, 461 (2003) (“Because of fundamental weaknesses in the system of intellectual property law, leakage and free riding are commonplace.”).

73. See Paul M. Romer, *Endogenous Technological Change*, 98 J. POL. ECON. 71, 74 (1990) (“By definition, public goods are both nonrival and nonexcludable.”).

74. See David J. Teece, *Profiting from Technological Innovation: Implications for Integration, Collaboration, Licensing and Public Policy*, 15 RES. POL’Y 285, 302 (1986) (“This will eventually cripple the innovator, unless it is assisted by governmental processes.”).

75. See Kevin G. Rivette & David Kline, *Discovering New Value in Intellectual Property*, 57 HARV. BUS. REV. 54, 57–58 (1999) (“Hitachi’s automotive airflow sensor would be easy for rivals to copy, for example, but the company has built such an effective patent wall around it that rivals were forced to look for more complex and expensive . . . design approaches”); Mark F. Grady & Jay I. Alexander, *Patent Law and Rent Dissipation*, 78 VA. L. REV. 305, 310–14 (1992) (describing the “long intellectual history of reward theory”).

76. See Arrow, *supra* note 59, at 609 (noting the disincentives to disclose novel information and knowledge in the absence of legal protection to prevent the use of such information and knowledge).

77. See Burk, *supra* note 52, at 1010 (“[T]he dominant justification for the patent system has shifted toward an economic rationale based upon incentives. Under this prevalent view, the grant of exclusive rights deters quick imitation of the claimed invention and allows a period of supernormal profits that help to recoup the investment made in developing the invention.”); Ted Sichelman & Stuart J.H. Graham, *Patenting by Entrepreneurs: An Empirical Study*, 17 MICH. TELECOMM. & TECH. L. REV. 111, 178 (2010) (“[W]e find that startups—like large firms—are primarily motivated to file for patents to prevent copying by competitors, presumably in order to earn supernormal profits.”).

This theory has been espoused in scores of treatises, books, and articles.⁷⁸ An influential article on the economics of patent law by Kenneth Dam is a typical case in point:

[I]t is important to recognize the primary problem that the patent system solves. This problem—often called the appropriability problem—is that if a firm could not recover the costs of invention because the resulting information were available to all, then we could expect a much lower and indeed suboptimal level of innovation. In short, the patent system prevents others from reaping where they have not sown and thereby promotes research and development (R&D) investment in innovation.⁷⁹

Mark Lemley has summed up the scholarly zeitgeist well in his reflection that “commentators [have an] almost obsessive preoccupation with identifying and rooting out that great evil of the modern economic world—free riding.”⁸⁰ Perhaps it is not surprising that the free riding view dominates the discussion—the first patent statute in history, from the Venetian Republic in 1474, is couched in this rationale: “Now, if provision were made for the works and devices discovered by such persons, *so that others who may see them could not build them . . .* more men would apply their genius, would discover, and would build devices of great utility and benefit to our commonwealth.”⁸¹

Yet, if free riding is the central concern of patent law, then why can activity that is clearly *not* free riding still constitute patent infringement? Although there is a substantial scholarly literature on the puzzle of why “independent invention” is actionable as infringement, the explanations are wanting, especially in view of the incentives-focused approach of reward theory.⁸² Indeed, the strongest reason offered on this basis is that copying is difficult to prove as an evidentiary matter.⁸³ As Robert Merges has noted, copying may often be “inadvertent” or done “in obscure and subtle ways, leaving little or no evidence that copying has indeed occurred.”⁸⁴ Merges bolsters the

78. See Michael A. Carrier, *Unraveling the Patent-Antitrust Paradox*, 150 U. PA. L. REV. 761, 820 (2002) (“The standard utilitarian justification for patents is that they address the ‘public good’ characteristics of inventions by increasing appropriability and preventing imitation by free riders.”).

79. Dam, *supra* note 61, at 247.

80. Lemley, *Property*, *supra* note 10, at 1033.

81. Giulio Mandich, *Venetian Patents (1450-1550)*, 30 J. PAT. OFF. SOC’Y 166, 177 (1948) (emphasis added).

82. See *supra* note 20 (cataloguing sources setting forth theories of why patent law eschews independent invention as a defense to patent infringement).

83. Cf. Cotropia, *Copying*, *supra* note 14, at 1422 (“We find that a surprisingly small percentage of patent cases involve even allegations of copying, much less proof of copying”).

84. Merges, *A Few Kind Words*, *supra* note 21, at 1–2.

evidentiary explanation: allowing an independent invention defense would cause potential infringers to be overly cautious in the receipt of outside information. For instance, potential infringers might set up costly “clean room” approaches in which engineers are walled off from outside information or eschew the use of certain information entirely—which, in turn, would thwart innovative activity.⁸⁵

However, there are already strong incentives not to be labeled a “copyist,” because evidence of copying can support a charge of willful infringement, indirect infringement, and simply serve to strengthen a primary charge of infringement in front of a jury.⁸⁶ Additionally, in copyright law, copying can be proved merely by demonstrating access to the copyrighted work and substantial similarity of the copied work to the copyrighted work.⁸⁷ For this reason, many software companies engage in clean-room approaches to software development.⁸⁸ If the free flow of information were a substantial economic concern, presumably such a weak test for copying would not be allowed.

As such, promoting the free-flow of technological information does not appear to answer the question of why an independent invention defense is not generally allowed in patent law. In any event, even if one subscribes to any of the evidentiary-centered views, doing so does not foreclose the possibility that the traditional, free riding, public goods theories of patent law are inadequate. In other words, both an evidentiary theory and a revised incentive theory may explain the absence of copying as an element of patent infringement.

Indeed, there are at least three major reasons why the standard incentive theory is implausible, or at least incomplete.⁸⁹ First, as noted earlier—and in contrast to copyright infringement and trade secret misappropriation—

85. *Id.* (“Technological communities thrive on ubiquitous and unregulated communication.”).

86. Cotropia, *Copying*, *supra* note 14, at 1436–37 (“[T]erms such as copying come with heavy baggage . . . Allowing the use of the terms is particularly detrimental in jury cases.”).

87. Mark A. Lemley & Eugene Volokh, *Freedom of Speech and Injunctions in Intellectual Property Cases*, 48 DUKE L.J. 147, 163 (1998) (“[P]laintiffs need merely show access and sufficient similarities between the two works to raise an inference of copying (and therefore of infringement.)”; 4–13 NIMMER ON COPYRIGHT § 13.01 (2015) (“Legions of cases promulgate the twin requirements of access plus substantial similarity.”).

88. See generally Mamta Garg & Manoj Kumar Jindal, *Reverse Engineering - Roadmap to Effective Software Design*, 1 INT’L J. RECENT TRENDS ENG. 186 (2009).

89. Here, I ignore criticisms that reward theory does not sufficiently account for post-invention activity, such as commercialization, and return to this issue below.

copying is not a prerequisite for patent infringement.⁹⁰ Even if a third party is completely unaware of the patent-at-issue—or even the information disclosed in the patent-at-issue—if that third party makes, uses, or sells the patented invention, it will be liable for infringement.⁹¹ Indeed, one recent empirical study found that outside of pharmaceutical litigation, which often involves generic drug copies of branded drugs, copying was discussed in less than five percent of opinions regarding patent infringement.⁹² Many believe that an even higher percentage of suits filed by non-practicing entities (NPEs), often termed “patent trolls,” are against independent inventors.⁹³ Despite strong reasons to doubt these claims, it is incontrovertible that a sizable share of infringement does not involve copying.⁹⁴

Second, copying is sometimes very costly, and according to several surveys, is on average a substantial fraction of the patentee’s original costs of inventing.⁹⁵ In other words, although information may be nonexcludable, the use of that information in implementing a commercially viable invention is

90. Cotropia, *Copying*, *supra* note 14, at 1421 (“To infringe a copyright or trade secret, defendants must copy the protected IP from the plaintiff, directly or indirectly. But patent infringement requires only that the defendant’s product falls within the scope of the patent claims.”).

91. See Lemley, *Should Patent Infringement Require Proof of Copying?*, *supra* note 15, at 1525 (“Patent infringement is a strict liability offense.”); Roger D. Blair & Thomas F. Cotter, *An Economic Analysis of Seller and User Liability in Intellectual Property Law*, 68 U. CIN. L. REV. 1, 6 (1999) (“Because patent infringement (like copyright and trademark infringement) is a strict liability tort, the patentee may enjoin the unauthorized manufacture, use, or sale of the invention, regardless of the infringer’s state of mind.”).

92. Cotropia, *supra* note 90, at 1458. There are a variety of reasons to question the soundness of the particular percentage of copying found in this study, but the generally claim that allegations of copying are relatively low in patent infringement suits seems quite well-founded.

93. Lemley, *Should Patent Infringement Require Proof of Copying?*, *supra* note 15, at 1532 (“But selling patents can also put them in the hands of patent trolls who use those patents to hold up independent inventors that have actually commercialized the technology.”); *cf.* Mark A. Lemley & A. Douglas Melamed, *Missing the Forest for the Trolls*, 113 COLUM. L. REV. 2117, 2148–49 (2013) (“One study found that, in software and computer technology, roughly 97% of patent suits are filed against independent, inventors, not copiers.”).

94. See *supra* notes 90–93.

95. See Edwin Mansfield, Mark Schwartz & Samuel Wagner, *Imitation Costs and Patents: An Empirical Study*, 91 ECON. J. 907, 909 (1981) (finding in an empirical study that the average ratio of imitation costs to innovation costs was about 65% in various industries where products receive patent protection, but that patents only increased imitation costs on average by about 11%); Glynn S. Lunney, Jr., *Trademark Monopolies*, 48 EMORY L.J. 367, 454 (1999) (discussing the Mansfield et al. study); Glynn S. Lunney, Jr., *E-Obviousness*, 7 MICH. TELECOMM. & TECH. L. REV. 363, 401–03 (2001) (same).

frequently quite costly.⁹⁶ Moreover, a large share of essential information regarding an invention may not be codifiable, or may simply be withheld by patentee.⁹⁷ In this regard, there is no duty to update a patent disclosure once it is filed, which allows the patentee to develop trade secrets that may provide it an advantage in making, using, and improving its patented invention.⁹⁸ Thus, as a practical matter, the fruits of R&D are at least partially excludable, which on the standard approach, weakens the theoretical justification for patents. In other words, the “public goods” rationale for patents omnipresent in the economics literature does not withstand empirical scrutiny, at least as an all-encompassing explanation for patents.⁹⁹ In this regard, patents do not protect the *information* generated by inventors—rather, patents provide a right to prevent the manufacture, use, or sale of *tangible embodiments* of inventions.¹⁰⁰ Merely using the information within a patent document—as opposed to the patented embodiment—has never constituted infringement *per se*.¹⁰¹ Although innovation may cost more than imitation, the difference does not

96. See Henry E. Smith, *Intellectual Property as Property: Delineating Entitlements in Information*, 116 *YALE L.J.* 1742, 1758 (2007) (“But the resources used to develop and commercialize . . . information *are* rival. They cannot be used by more than one person and are often nonrenewable.”).

97. See *supra* note 52.

98. Roy E. Hofer & L. Ann Fitzgerald, *New Rules for Old Problems: Defining the Contours of the Best Mode Requirement in Patent Law*, 44 *AM. U. L. REV.* 2309, 2337 (1995) (“There is no duty to update the best mode disclosure in an application after its filing date.”); 4 *ANNOTATED PAT. DIGEST* § 27:14 (“After the patent issues, there generally is no duty of disclosure or duty to update the previously submitted disclosures unless the issued patent is put into a reexamination or reissue proceeding.”); *Engel Indus., Inc. v. Lockformer Co.*, 946 F.2d 1528, 1534 (Fed. Cir. 1991) (“There is no opportunity for an inventor to include subsequent improvements or modifications in an application or patent after filing.”).

99. See *supra* note 12 (setting forth “public goods” rationales for the patent system).

100. See 35 U.S.C. § 101 (2012) (“Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.”); *Application of Sarkar*, 588 F.2d 1330, 1333 (C.C.P.A. 1978) (“[I]nventions which Congress is constitutionally empowered to make patentable are tangible embodiments of ideas in the useful, or technological, arts.”).

101. Some scholars have asserted that “patents do not protect the concrete or tangible embodiments of an invention, but rather the inventive concept behind it.” Emily Michiko Morris, *Intuitive Patenting*, 66 *S.C. L. REV.* 61, 88 (2014). Taken literally, this claim is incorrect. Although a patent’s scope may extend beyond the tangible embodiment invented *by the inventor*, patents never prevent the use of ideas or information in a patent other than in the context of making, using, or selling an embodiment of the invention, or components of such of an embodiment, or indirectly encouraging or aiding in such infringement. See *generally* *Markman v. Westview Instruments, Inc.*, 52 F.3d 967, 980 (Fed. Cir. 1995) (“The written description part of the specification itself does not delimit the right to exclude. That is the function and purpose of claims.”); *SRI Int’l v. Matsushita Elec. Corp. of Am.*, 775 F.2d 1107, 1121 (Fed. Cir. 1985) (“Specifications teach. Claims claim.”).

appear to justify particularly strong patent rights, at least on the standard, reward theory.¹⁰²

Third, many costly and risky activities are subject to low-cost free riding but do not receive any form of IP protection.¹⁰³ For instance, if an enterprising chef opens the first Moroccan restaurant in a town and it turns out to be successful, she cannot prevent anyone else from opening up another one down the street with the same menu items, general décor, and prices.¹⁰⁴ This is so even if it cost as much to start the first restaurant as many forms technological R&D and its risk of failure was just as high.¹⁰⁵ In general, there are many other forms of information generated by commercial activity that are nonexcludable and nonrival—especially pricing and marketing information—and, hence, public goods, that the law does not protect by IP rights.¹⁰⁶

Several scholars have relied heavily on these three observations to contend that the scope and length of patent protection should be much less than what is provided under current law.¹⁰⁷ For example, if copying is so costly, perhaps

102. Cf. Kevin Rhodes, *The Federal Circuit's Patent Nonobviousness Standards: Theoretical Perspectives on Recent Doctrinal Changes*, 85 NW. U. L. REV. 1051, 1080 (1991) (“The reward theory thus predicts that standards of patentability should restrict the awarding of patents to those cases in which patent rights are absolutely necessary to foster technological innovation.”).

103. Cf. Sichelman, *Commercializing Patents*, *supra* note 10, at 360 (“Rather, a commercializer will often need to undertake costly and risky scientific testing, market testing, market research, and marketing to determine how to commercialize an invention in the most profitable manner, generating information that—in the absence of robust patent protection—would typically be subject to free riding by others.”).

104. See Naomi Straus, *Trade Dress Protection for Cuisine: Monetizing Creativity in a Low-IP Industry*, 60 UCLA L. Rev. 182, 186 (2012) (“Oddly, however, our current intellectual property (IP) laws provide little or no protection for the actual dishes Keller creates and serves in the restaurant.”). Cf. *Taco Cabana Int’l, Inc. v. Two Pesos, Inc.*, 932 F.2d 1113, 1118 (5th Cir. 1991) (where the décor of a Mexican restaurant, including “the shape and general appearance of the exterior of the restaurant, the identifying sign, the interior kitchen floor plan, the decor, the menu, the equipment used to serve food, the servers’ uniform and other features reflecting the total image of the restaurant” were protectable by trade dress).

105. T.J. Jacobberger, *The Cost of Opening a Restaurant in San Francisco*, INSIDE SCOOP SF (Jan. 21, 2011), <http://insidescoopsf.sfgate.com/blog/2011/01/21/the-cost-of-opening-a-restaurant> (estimating that opening a restaurant in San Francisco requires about \$ 2.5 million).

106. See Sichelman, *Commercializing Patents*, *supra* note 10, at 373 (“[M]uch commercialization is not protectable by patents, copyrights, trademarks, trade secrets, or other forms of market regulation.”); Michael Abramowicz, *The Danger of Underdeveloped Patent Prospects*, 92 CORNELL L. REV. 1065, 1099 (2007) (“[S]ome forms of patent development do not entitle the original patent holders to new patents.”). See generally Mark A. Lemley, *Ex Ante versus Ex Post Justifications for Intellectual Property*, 71 U. CHI. L. REV. 129, 129 (2004) (“Ideas are public goods: they can be copied freely and used by anyone who is aware of them without depriving others of their use.”).

107. See *infra* notes 108–111 and accompanying text.

patent rights are not as important to excluding others as commonly believed.¹⁰⁸ Some commentators go so far as to propose that no patent protection is the optimal state of affairs;¹⁰⁹ others simply argue that patent law does not apply particularly well in areas such as software.¹¹⁰ Regarding the view that patent protection should be weakened, the relatively free market is often a better means of promoting technological innovation than “enclosing” it in property-based confines.¹¹¹

The major theoretical response to critiques suggesting that the patent system be weakened or abolished has mainly been to accept the reward theory and refine its premises. One line of argument admits that copying may be costly on average, but cautions that it is still less than the original cost of invention, especially in certain technological fields.¹¹² Yet, these arguments clearly counsel for weaker patent protection relative to its theoretical

108. See *supra* note 102.

109. See Michele Boldrin & David Levine, *The Case Against Intellectual Property*, 92 AM. ECON. REV. 209, 209 (2002) (“‘[I]ntellectual property’ has come to mean not only the right to own and sell ideas, but also the right to regulate their use. This creates a socially inefficient monopoly, and what is commonly called intellectual property might be better called ‘intellectual monopoly.’”); MICHELE BOLDRIN & DAVID LEVINE, *AGAINST INTELLECTUAL MONOPOLY* (2008) (“[W]ithout patents we would have more, not less, marvelous machines and inventions. . . [P]atent law is largely the unwelcome consequence of competitive innovation and poor legislation, and not the source of innovation at all.”).

110. See Pamela Samuelson, Randall Davis, Mitchell D. Kapor & Jerome H. Reichman, *A Manifesto Concerning the Legal Protection of Computer Programs*, 94 COLUM. L. REV. 2308, 2343 (1994) (“The dual character of computer programs—which are both writings and machines at the same time—has presented some difficulties for those wanting to use patent law as a means of legal protection for software innovations.”); Burk & Lemley, *Policy Levers in Patent Law*, *supra* note 50, at 1622–23 (“Software patents are important, but the relatively low fixed costs associated with software development, coupled with other forms of overlapping intellectual property protection for software, mean that innovation in software does not depend critically on strong, broad protection.”).

111. James Boyle, *The Second Enclosure Movement and the Construction of the Public Domain*, LAW & CONTEMP. PROBS., Winter/Spring (2003) (likening patents to a “second enclosure movement” analogous to that of real property and challenging the need for such enclosure); Michele Boldrin & David K. Levine, *Against Intellectual Monopoly*, 21 SYRACUSE SCI. & TECH. REP., 130 (2009). Cf. J.H. Reichman & Jonathan A. Franklin, *Privately Legislated Intellectual Property Rights: Reconciling Freedom of Contract with Public Good Uses of Information*, 147 U. PA. L. REV. 875, 966 (1999) (“We should not give entrepreneurs legal monopolies (or contractual equivalents) to undertake investments they would make anyway, in their own business interests, because the social costs of such monopolies in lessened competition and other negative collateral effects are almost certain to outweigh the benefits.”).

112. See, e.g., David S. Olson, *On NPEs, Holdups, and Underlying Faults in the Patent System*, 99 CORNELL L. REV. ONLINE 140, 148 (2014) (“If the costs of copying are very low, patents may be needed to prevent appropriation of the value of invention without bearing any of the costs.”).

baseline.¹¹³ Another approach is to distinguish technological from non-technological innovation on the grounds that technological innovation is more costly and risky (as well as more socially valuable). For example, designing, developing, testing, and marketing a new cancer treatment is much costlier and riskier than creating an innovative restaurant entrée. Relatedly, some scholars argue that adopting an independent invention defense would, generally speaking, weaken overall incentives to innovate.¹¹⁴ Yet, these “strong” patents rebuttals do not explain exactly why greater incentives are in fact—as an empirical matter—necessary to promote optimal levels of innovation. Nor do they explain how patent law’s premise of preventing free riding interacts with the imposition of necessary limits to patent protection.¹¹⁵ Indeed, on an unbounded strong patents theory, patents would last forever.¹¹⁶ Rather, meaningful explanations of the boundaries of patent protection are essential to a coherent theory of patent law.¹¹⁷

To be certain, several scholars have rejected the standard reward theory of patent law.¹¹⁸ These approaches primarily rely on—or respond to—Edmund Kitch’s “prospect theory,” likening patents to historical mineral claim rights, which allowed prospectors to exclude others as they mined their discovered

113. *See id.*

114. *See supra* note 23 and accompanying text; Lemley, *supra* note 23, at 1528 (“[If] an independent invention defense would significantly reduce the incentives to innovate, the potential losses for society are substantial.”).

115. *See infra* Section III.A (discussing the ways in which competition may promote innovation).

116. *Cf.* William M. Landes & Richard A. Posner, *Indefinitely Renewable Copyright*, 70 U. CHI. L. REV. 471, 471 (2003) (raising “questions concerning the widely accepted proposition that economic efficiency requires that copyright protection should be limited in its duration”).

117. *See infra* Part III.

118. *See, e.g.*, Edmund W. Kitch, *The Nature and Function of the Patent System*, 20 J.L. & ECON. 265, 275–80 (1977); F. Scott Kieff, *Property Rights and Property Rules for Commercializing Inventions*, 85 MINN. L. REV. 697, 707–12 (2001); John F. Duffy, *Rethinking the Prospect Theory of Patents*, 71 U. CHI. L. REV. 439, 443–47 (2004) [hereinafter Duffy, *Rethinking Prospect Theory*]; Michael Abramowicz & John Duffy, *Intellectual Property for Market Experimentation*, 83 N.Y.U. L. REV. 337 (2008); F. Scott Kieff & Troy A. Paredes, *An Approach to Intellectual Property, Bankruptcy, and Corporate Control*, 82 WASH. U. L.Q. 1313, 1319 (2004) (“[T]he reward theory fails to explain much of the positive IP law framework.”); Ted Sichelman, *supra* note 106, at 364–65 (arguing the reward theory is to blame for under-commercialization); Ted Sichelman, *Markets for Patent Scope*, 1 IP THEORY 42–43 (2010) (cataloguing various scholars who have rejected standard reward theory). Because this article is focused on innovation incentives in an economic context, I do not discuss non-utilitarian theories of patent law. *See, e.g.*, ROBERT P. MERGES, *JUSTIFYING INTELLECTUAL PROPERTY* (2011); Tom G. Palmer, *Are Patents and Copyright Morally Justified? The Philosophy of Property Rights and Ideal Objects*, 13 HARV. J.L. & PUB. POL’Y 817 (1990); Justin Hughes, *The Philosophy of Intellectual Property*, 77 GEO. L.J. 287 (1988).

vein of minerals.¹¹⁹ According to Kitch, the “prospect” that patents protect is “a particular opportunity to develop a known technological possibility . . . shortly after its discovery.”¹²⁰ Prospect theory encompasses two major theoretical prongs.¹²¹ The first is that post-invention commercialization is costly and subject to free riding.¹²² In other words, patents in practice do not only incentivize invention but also commercialization of invention.¹²³

However, as Michael Burstein has noted, this insight merely expands the traditional reward theory to cover commercialization as well as invention.¹²⁴ As such, this prong does not reject the core free-riding premise of reward theory.¹²⁵ Yet, it may help to explain why independent invention is not a defense to patent infringement—namely, independent inventors may free ride not off the invention itself, but rather the post-invention commercialization activity of the original inventor, such as regulatory approval, marketing, and the like.¹²⁶ Although “commercialization theories” of patents provide a theoretical justification for the lack of an independent *invention* defense, then why not adopt an independent invention *and* commercialization defense?¹²⁷ In

119. Kitch, *supra* note 118, at 266, 271–75.

120. *Id.* at 265–67.

121. *See id.* at 276.

122. *See id.* (“[T]he patent owner has an incentive to make investments to maximize the value of the patent without fear that the fruits of the investment will produce unpatentable information appropriable by competitors.”).

123. *See* Kieff, *supra* note 118, at 703 (“[T]he treatment of patents as property rights is necessary to facilitate investment in the complex, costly, and risky commercialization activities required to turn nascent inventions into new goods and services.”); Sichelman, *Commercializing Patents*, *supra* note 10.

124. Michael J. Burstein, *Exchanging Information Without Intellectual Property*, 91 TEXAS L. REV. 227, 241 (2012) (“[C]ommercialization theorists have successfully focused attention on a more nuanced model of the innovation process than that which underlies the classical incentive or reward theory.”). *See also* Michael J. Burstein, *Reply—Commercialization Without Exchange*, 92 TEX. L. REV. 45, 46 (2014) (“To the extent that [commercialization theory] focuses on incentives to commercialize, those incentives are part and parcel of the broader incentives-based theory of intellectual property and subject to that theory’s well-developed critiques.”).

125. *See id.*

126. *See* Sichelman, *Commercializing Patents*, *supra* note 10; *see also* Ted Sichelman, *Commercializing Information with Intellectual Property*, 92 TEX. L. REV. 35, 42 (2014) (“The multifaceted nature of technological information exchange arguably does little to protect commercializers against appropriability concerns in activities such as market testing and marketing, distribution, and commercial improvements, because unlike technological information, it appears most commercial information is fairly homogeneous and nonexcludable.”).

127. *See generally* Sichelman, *Commercializing Patents*, *supra* note 118, at 343–44 (noting that firms that are more efficient than the inventor may undertake “independent commercialization efforts”).

any event, because of commercialization theory's mooring to free riding, it does not provide a sufficiently generalized theory of patent law.¹²⁸

The second prong of prospect theory asserts that having a single owner over a broad technological prospect via a strong patent right promotes efficient commercialization and further development of the invention.¹²⁹ Specifically, patents as prospects allow the patentee to effectively coordinate other actors who provide inputs into commercialization and follow-on invention as well as to send signals to potential competitors not to undertake such efforts, which reduces duplicative efforts and overall "rent dissipation."¹³⁰ This "efficient coordination" aspect of prospect theory provides a coherent theoretical reason why patent law extends beyond free riding, whether in the invention or commercialization phase.¹³¹ Specifically, if infringement were coupled to copying, a patentee would not be able to efficiently coordinate post-invention activity because third-party "independent" inventors could intervene

128. See also *infra* notes 135–139 and accompanying text (discussing further limitations of the standard account of commercialization theory).

129. See Kitch, *supra* note 118, at 276 ("Once a patent has been issued, other firms can learn of the innovative work of the patent holder and redirect their work so as not to duplicate work already done."); see also Dep't of Justice & Fed. Trade Commission, Antitrust Guidelines for the Licensing of Intellectual Property § 2.3 (1995) ("Licensing . . . can facilitate integration of the licensed property with complementary factors of production. This integration can lead to more efficient exploitation of the intellectual property, benefiting consumers . . . [L]icensing also can increase the incentive for [IP] creation and thus promote greater investment in research and development.")

130. Rent dissipation generally refers to "erosion of profits due to another firm . . . competing in the product market," often in a manner that can suboptimally diminish incentives to innovate. See ASHISH ARORA, ANDREA FOSFURI & ALFONSO GAMBARDILLA, *MARKETS FOR TECHNOLOGY: THE ECONOMICS OF INNOVATION AND CORPORATE STRATEGY* 179–82 (2001). In this regard, some studies indicate that "patent races" induce too many market actors to duplicate each other's R&D efforts. See generally Luís Cabral, *Bias in Market R&D Portfolios*, 12 INT'L J. INDUS. ORG. 533 (1994); Partha Dasgupta, *The Welfare Economics of Knowledge Production*, 4 OXFORD REV. ECON. POL'Y 8 (1988); Partha Dasgupta & Eric Maskin, *The Simple Economics of Research Portfolios*, 97 ECON. J. 581 (1987); Joseph Zeira, *Innovation, Patent Races, and Endogenous Growth* (Kennedy Sch. of Gov't Faculty Research Working Paper Series, Working Paper No. RWP02-047, 2002), [http://ksgnotes1.harvard.edu/Research/wpaper.nsf/rwp/RWP02-047\\$File/rwp02_047_zeira.pdf](http://ksgnotes1.harvard.edu/Research/wpaper.nsf/rwp/RWP02-047$File/rwp02_047_zeira.pdf); Urs Fischbacher & Christian Thöni, *Excess Entry in an Experimental Winner-Take-All Market* (Zurich Inst. for Empirical Research in Econ., Working Paper No. 86, 2002), <http://ssrn.com/abstract=282729>. Yet, other studies indicate the benefit of multiple different entities competing to produce a given innovation. See *infra* note 305.

131. See Lemley, *supra* note 20, at 1531 (recognizing that if patents serve an important role in coordinating follow-on invention, then such coordination would be thwarted by an independent invention defense).

in the coordination process.¹³² More generally, third-party intervention thwarts “markets for technology,” including the assignment and licensing of the patent¹³³—selling a non-exclusive right is arguably more difficult than selling an exclusive one.¹³⁴

As a legal matter, a broad prospect patent cannot foreclose third parties from patenting improvements to the patent, which as John Duffy explains, “undermine[s] the ability of a prospect patent holder to . . . coordinat[e] and contro[l] further investment in the innovation.”¹³⁵ The ability of the patentee to coordinate parties efficiently is often dubious given high transaction costs in licensing in many fields.¹³⁶ Additionally, many inventive firms, especially large ones, commercialize their inventions without any input from third parties, obviating the need for coordination.¹³⁷ Moreover, the empirical evidence in favor of Kitch’s coordination model is generally lacking.¹³⁸ Although Kitch’s model may apply to certain industries, such as biotechnology, it does not fully explain why patent law has eschewed

132. See *id.*; Kitch, *supra* note 118, at 277–78 (“[A] patent system lowers the cost of the owner of technological information of contracting with other firms possessing complementary information and resources.”).

133. ARORA ET AL., *supra* note 130; Robert P. Merges, *Intellectual Property and the Cost of Commercial Exchange: A Review Essay*, 93 MICH. L. REV. 1570, 1590–91 (1995) (recognizing that patents can lower transaction costs in markets for technology).

134. See Lemley, *supra* note 20, at 1531 (“In comparison, it is harder (though admittedly not impossible) to sell trade secrets, in part because there is no guarantee that the buyer will have any exclusivity.”).

135. Duffy, *Rethinking Prospect Theory*, *supra* note 118, at 442–43.

136. Robert P. Merges, *Rent Control in the Patent District: Observations on the Grady-Alexander Thesis*, 78 VA. L. REV. 359, 374 (1992) (“A substantial literature documents the steep transaction costs of technology licensing.”); Paul J. Heald, *A Transaction Costs Theory of Patent Law*, 66 OHIO ST. L.J. 473 (2005). See also Peter S. Menell & Suzanne Scotchmer, *Intellectual Property*, in 2 HANDBOOK OF LAW AND ECONOMICS 1473, 1503 (A. Mitchell Polinsky & Steven Shavell eds., 2008) (“Kitch was the earliest, and perhaps most extreme, licensing optimist.”). See generally RICHARD A. POSNER, *ECONOMIC ANALYSIS OF LAW* 34 (7th ed. 2007) (“[T]he costs of effecting a transfer of rights—transaction costs—are often prohibitive, and when this is so, giving someone the exclusive right to a resource may reduce rather than increase efficiency.”).

137. See Teece, *supra* note 74 (describing how large firms generally possess the complementary assets necessary to commercialize their own inventions).

138. See Duffy, *Rethinking Prospect Theory*, *supra* note 118; Sichelman, *Commercializing Patents*, *supra* note 10; Merges & Nelson, *supra* note 25, at 870–72; Donald G. McFetridge & Douglas A. Smith, *Patents, Prospects, and Economic Surplus: A Comment*, 23 J.L. & ECON. 197 (1980); Roger Beck, *The Prospect Theory of the Patent System and Unproductive Competition*, 5 RSCH. L. & ECON. 193 (1983).

“independent invention” as a general defense to infringement.¹³⁹ Notably, even if the coordination prong of prospect theory turns out to be correct, it does not foreclose a complementary, reward-based theory that explains why independent invention should not generally be a defense to infringement.

One response to the limitations of prospect theory’s coordination prong is “rent dissipation” theory, primarily advanced by Mark Grady and Jay Alexander, later refined by Duffy and others.¹⁴⁰ Like Kitch, rent dissipation theorists are concerned with the possibility that the social value of the innovation in excess of one innovator’s R&D costs may be eroded by multiple innovators racing to conceive of the invention in the first instance, improve it, or potentially keep it secret.¹⁴¹ Unlike Kitch, Grady and Alexander do not always view broad patent protection as optimal—for instance, a socially valuable invention that is already perfect, with no possibility for technological improvement—or can only be improved in obvious ways—should not necessarily be patentable.¹⁴² Such an invention provides no signal for later improvements, and patent protection in the form of large rents would merely induce a race among many innovators, leading to duplicated R&D costs that could dissipate all of the social value associated with the invention.¹⁴³ Grady and Alexander suggest that their view better explains the case law of patentable

139. See Ted Sichelman & Stuart J.H. Graham, *Patenting by Entrepreneurs: An Empirical Study*, 17 MICH. TELECOMM. & TECH. L. REV. 111, 164 (2010) (“Specifically, biotechnology firms place much greater emphasis on patenting to obtain licensing revenue than all other firms, including medical device, (venture-backed) hardware, and software and Internet firms (with these latter segments all roughly clustered together in their rankings)”). Another sector that arguably fits this model is university patenting. The Bayh-Dole Act, which allows universities to patent technology that would arguably have been invented absent the patent system, is premised upon a prospect-style, *ex post* view of patents. See Jerry Thursby & Marie Thursby, *Knowledge Creation and Diffusion of Public Science with Intellectual Property Rights* 7 (2007), http://mgt.gatech.edu/directory/faculty/thursby_m/pubs/thursby_thursby_2007.pdf (“[T]he argument pertains not to *ex ante* incentives for invention, but to incentives *ex post* for downstream users to invest in commercialization of federally funded inventions.”); DAVID C. MOWERY, RICHARD R. NELSON, BHAVEN N. SAMPAT & ARVIDS A. ZIEDONIS, *IVORY TOWER AND INDUSTRIAL INNOVATION* 59, 86–87 (2004).

140. Grady & Alexander, *supra* note 75; Duffy, *supra* note 118. See also Robert P. Merges, *Comment, Rent Control in the Patent District: Observations on the Grady-Alexander Thesis*, 78 VA. L. REV. 359 (1992); McFetridge & Smith, *supra* note 138.

141. See Grady & Alexander, *supra* note 140, at 308–09 (positing various forms of rent dissipation).

142. See *id.* at 321–22 (“Inventions with little potential for further improvement are still less likely to receive patents because the prospect of a rent-dissipating race among improvers is unlikely.”).

143. See *id.*

subject matter and obviousness, in which seemingly valuable and original inventions are denied patent protection.¹⁴⁴

As an initial matter, I argue below that rent dissipation theory's implicit assumption that there are always multiple innovators ready to race is not correct. Many inventions are not ideas waiting to be developed, but rather ideas in themselves, only known to the inventor.¹⁴⁵ Moreover, even if the idea is generally known, often innovation markets are illiquid because only one or a few firms can tool up fast enough to develop and commercialize the innovation.¹⁴⁶ These temporal barriers may substantially limit the amount of rent dissipation in R&D races.¹⁴⁷ Moreover, Duffy suggests that Grady and Alexander (as well as Kitch) overlook an important beneficial feature of broad patent protection—inducing inventors to invent *earlier* than they otherwise would have.¹⁴⁸ On Duffy's view, the acceleration of invention and the concomitant acceleration of patent expiration tend to outweigh any cost from rent dissipation.¹⁴⁹

Despite these limitations, rent dissipation certainly plays a significant role in many R&D processes.¹⁵⁰ Moreover, rent dissipation theory could provide a reason why patent infringement reaches independent activity—namely, the broader the reach of a patent, the more likely it is to deter duplicated efforts, thereby reducing dissipated rents.¹⁵¹ Yet, previous rent dissipation theorists either assumed that patents were premised on a free riding rationale, or simply abstracted away from the issue.¹⁵² Additionally, as Grady and Alexander make

144. *See id.* Parts IV–VI. For instance, Grady and Alexander explain why the Supreme Court invalidated the highly commercially successful plow shank in *Graham v. John Deere* on the ground that no further improvements could be made to it, thus solving the apparent puzzle of why the Court essentially ignored its success in making its finding of obviousness. *See id.* at 345–46.

145. *See id.*

146. *See id.*

147. *See id.*

148. Duffy, *supra* note 118, at 443–44.

149. *See id.* at 443–47, 465 (“The prospect features of the patent system are useful not because they eliminate competitive rent dissipation, but because they channel rent-seeking behavior into the third form of rent dissipation—early patenting—which is socially desirable because it dissipates private but not social rents.”).

150. *See, e.g.,* Matthew Erramouspe, *Staking Patent Claims on the Human Blueprint: Rewards and Rent-Dissipating Races*, 43 UCLA L. REV. 961, 975 (1996) (presenting evidence of rent dissipation in the field of biotechnology).

151. *Cf.* Grady & Alexander, *supra* note 140, at 347–49 (exploring the role of rent dissipation and patent infringement doctrine).

152. *See id.* at 312 (“We have no quarrel with this version of reward theory and accept it as an inevitable justification for the patent system.”); Duffy, *supra* note 118, at 440–42 (noting that both the reward and prospect theories are grounded on the threat of potential appropriation).

clear, sometimes narrower patent protection reduces rent dissipation, because an invention may not signal broad improvements.¹⁵³ Thus, any explanatory power of rent dissipation regarding why independent invention should not be countenanced would need to turn on fact-specific inquiries and fine empirical distinctions, which, like coordination theory, are generally lacking in the literature.¹⁵⁴ And, like coordination theory, rent dissipation theory does not foreclose a complementary, reward theory-grounded explanation of why patent infringement should generally encompass independent invention.

In sum, other than for evidentiary reasons, the dominant theories of patenting, from reward theory to commercialization theory to rent-dissipation theory, do not adequately explain—theoretically and empirically—why patent law does not operationalize its free-riding premise. These shortcomings present the question of whether another theory can account for the absence.

III. PATENTS AS HEDGES AGAINST COMPETITION

A. BEYOND FREE RIDING AS THE FUNDAMENTAL ORGANIZING PRINCIPLE FOR PATENTS

1. *The Economic Role of Competitive Risk in Innovation Markets*

Using the work of Joseph Schumpeter and others in the field of industrial organization as a starting point, I offer a novel explanation of why patent law extends beyond copying that applies to both pre- and post-invention activity. Specifically, I contend that the free-riding theory of patent law is a subset of a more general category of behavior—namely, market competition—that threatens optimal levels of innovation. As I explain further below, patents are a “hedge”—specifically, a real put option¹⁵⁵—to reduce the risk of competition

153. See *id.* at 348 (explaining why narrow patent scope can reduce rent dissipation).

154. See *supra* notes 137–139 and accompanying text. Indeed, rent dissipation models are consistent with a regime in which multiple innovators are simultaneously awarded patents. See Maurer & Scotchmer, *supra* note 20, at 540–42; Manfredi La Manna, Ross Macleod, & David De Meza, *The Case for Permissive Patents*, 33 EUR. ECON. REV. 1427 (1989).

155. As explained further below, a put option provides its holder the right, but not the obligation, to sell an underlying asset at a specified price (the strike price) within a certain period of time (before the expiration date). If the holder of the put option believes the price of the underlying asset is going to fall, they can use the put option as a hedge against that potential loss. See generally JOHN C. HULL, *OPTIONS, FUTURES, AND OTHER DERIVATIVES* (9th ed. 2015). In the context of patents, the asset is the profit stream derived from selling a unique product at a supernormal price, the value of which may diminish from potential competition. The patent is a “real” put option that allows its holder to elect to foreclose competition through an injunction or force an infringing competitor to pay the patentholder prior to patent expiration, thereby diminishing the risk from competition. See also *infra* notes 271–275 and accompanying text.

that could otherwise diminish a patentee's (or its licensees') supernormal profits derived from first-mover advantages and other barriers to entry, such as complementary assets, access to capital, marketing muscle, production capabilities, and distribution networks.¹⁵⁶

My approach draws on the work of economists, particularly Schumpeter and his followers, who have espoused the view that dampening competition can promote innovation.¹⁵⁷ In this regard, Schumpeter casually remarked that patents act as a form of insurance or a “hedg[e]” for investment under “rapidly changing conditions.”¹⁵⁸ Specifically, he contended that:

The main value to a concern of a single seller position that is secured by patent or monopolistic strategy does not consist so much in the opportunity to behave temporarily according to the monopolist schema, as in the protection it affords against temporary disorganization of the market and the space it secures for long-range planning.¹⁵⁹

However, Schumpeter and others have not explained in suitable detail how patents work generally to suppress competition, rather than merely free riding, in order to induce innovation.¹⁶⁰ Indeed, much of Schumpeter's and related work focuses on the pernicious effects of imitation.¹⁶¹ Thus, while the industrial organization literature has envisioned patents as forms of legal monopoly that often confer market power,¹⁶² these descriptions have not

156. See Ashish Arora & Marco Ceccagnoli, *Patent Protection, Complementary Assets, and Firms' Incentives for Technology Licensing*, 52 MGMT. SCI. 293 (2006); David J. Teece, *Profiting from Technological Innovation*, 15 RES. POL'Y 285 (1986).

157. SCHUMPETER, CAPITALISM, *supra* note 30; Philippe Aghion, Nick Bloom, Richard Blundell, Rachel Griffith & Peter Howitt, *Competition and Innovation: An Inverted-U Relationship*, Q.J. ECON. 701, 703 (2005) (engaging in empirical analysis of the relationship between innovation and competition partly based on Schumpeter's theory).

158. SCHUMPETER, CAPITALISM, *supra* note 30, at 87–88.

159. *Id.* at 102–03 (describing patents as a “restrictive practice[]” that diminishes competition).

160. See *id.* Indeed, many economists use the number of granted patents to estimate the interaction between competition and innovation. See Aghion, *supra* note 157, at 703. However, because patents play a direct role in suppressing competition, and patented inventions are infrequently commercialized, these studies are subject to significant endogeneity and identification problems.

161. SCHUMPETER, CAPITALISM, *supra* note 30, at 81–106.

162. It is important to distinguish a legal monopoly, which is some legal right that allows its holder to exclude third parties that make, use, sell, or perform some other action with respect to the subject matter of the monopoly, and an economic monopoly, which generally is market power so strong that its holder can price its products falling within the scope of a legal monopoly well above marginal cost (including opportunity costs). Legal monopolies, like

suitably explained why legal intervention to suppress competition *per se*—intervention well beyond preventing free riding and associated public goods problems—is necessary to foster innovation.¹⁶³ Nor has the industrial organization literature recognized the precise form of patents as “put” options; instead, wrongly labeling patents as “call” options to exclusively commercialize (or license) an invention.¹⁶⁴ As is well recognized in the legal literature, patents afford negative rights to exclude others, not positive rights to exclusively practice the invention.¹⁶⁵

In this Section, I focus on the claim that optimally incentivizing technological innovation requires suppressing competition beyond the scope of free riding and the related public goods problem. The argument proceeds in three steps. The first step is the well-known fact that much technological innovation often yields social benefits far in excess of private benefits.¹⁶⁶ In

patents, may – but frequently do not – confer an economic monopoly. Economists are often quick to “correct” legal scholars who refer to patents as “monopolies,” but the original usage of “monopoly” was indeed the legal monopoly variant, not the economic one. *See generally* HAROLD G. FOX, *MONOPOLIES AND PATENTS: A STUDY OF THE HISTORY AND FUTURE OF THE PATENT MONOPOLY* 24–26 (1947) (discussing origins of word “monopoly”). A review of the oldest references of the term “monopoly” in Google Books confirms as much.

163. *See generally* Peter Lee, *Reconceptualizing the Role of Intellectual Property Rights in Shaping Industry Structure*, 72 VAND. L. REV. 1197, 1205 (2019) (describing the traditional public goods and free riding approaches of economic and industrial organization theory to patents).

164. *See supra* notes 38–39.

165. *See* Adam Mossoff, *Exclusion and Exclusive Use in Patent Law*, 22 HARV. J.L. & TECH. 321, 327 (2009) (explaining that a patent provides the right to exclude, but not “the affirmative right to make, use, or sell”); 5 DONALD S. CHISUM, CHISUM ON PATENTS § 16.02[1] (2008); Abrahamowitz, Baudry & Bloom, *supra* note 38.

166. *See, e.g.*, Dan L. Burk & Mark A. Lemley, *Policy Levers in Patent Law*, 89 VA. L. REV. 1575, 1587 (2003) (“It is well established that the social returns to innovation exceed the private returns.”); Brett M. Frischmann & Mark A. Lemley, *Spillovers*, 107 COLUM. L. REV. 257, 268 (2007) (“There is no question that inventions create significant social benefits beyond those captured in a market transaction.”); Nestor E. Terleckyj, *Effects of R&D on the Productivity Growth of Industries: An Exploratory Study* (Nat’l Planning Ass’n, Report No. 140, 1974); M. Ishaq Nadiri, *Innovations and Technological Spillovers* (Nat’l Bureau of Econ. Research, Working Paper No. 4423, 1993), https://www.nber.org/system/files/working_papers/w4423/w4423.pdf; Edwin Mansfield, John Rapoport, Anthony Romeo, Samuel Wagner & George Beardsley, *Social and Private Rates of Return from Industrial Innovations*, 91 Q.J. ECON. 221, 233–34 (1977); Leo Sveikauskas, *Technology Inputs and Multifactor Productivity Growth*, 63 REV. ECON. & STAT. 275, 277 (1981); Akira Goto & Kazuyuki Suzuki, *R&D Capital, Rate of Return on R&D Investment and Spillover of R&D in Japanese Manufacturing Industries*, 71 REV. ECON. & STAT. 555, 563 (1989); Jeffrey I. Bernstein & M. Ishaq Nadiri, *Interindustry R&D Spillovers, Rates of Return, and Production in High-Tech Industries*, 78 AM. ECON. REV. 429 (1988); Frederick Scherer; Jeffrey Bernstein & M. Ishaq Nadiri, *Product Demand, Cost of Production, Spillovers, and the Social Rate of Return to R&D* 4 (Nat’l Bureau of Econ. Research, Working Paper No. 3625, 1991); *see* Using Linked Patent and R&D Data to Measure Interindustry Technology Flows, *in* R&D, PATENTS, AND

this regard, public goods typically confer substantial positive externalities, and while I argued earlier that innovative products and services are not pure public goods, the information embodied in innovations partakes of attributes of traditional public goods.¹⁶⁷ Like public parks or educational institutions, innovations like the computer, automobile, and penicillin provide benefits well beyond the private value captured by the inventors and commercializers of these products.¹⁶⁸ When private returns are substantially less than social returns, often society must—typically via government intervention in the market—take action to ensure that the optimal level of valuable innovative activity occurs.¹⁶⁹

The second step involves an elementary proposition of economics: in order for a rational market actor to engage in costly and risky activity, it must earn a suitable risk-adjusted return on its investment in time, money, and other resources.¹⁷⁰ For a nearly riskless activity, such as depositing money into

PRODUCTIVITY 450 (Zvi Griliches ed., 1984); *see also* Zvi Griliches, *The Search for R&D Spillovers*, 94 SCANDINAVIAN J. ECON. 29, 43 (Supp. 1992) (“In spite of [many] difficulties, there has been a significant number of reasonably well done studies all pointing in the same direction: R&D spillovers are present, their magnitude may be quite large, and social rates of return remain significantly above private rates.”).

167. Brett M. Frischmann, *An Economic Theory of Infrastructure and Commons Management*, 89 MINN. L. REV. 917, 967 (2005) (“[T]he production of public goods has the potential to generate positive externalities for nonpaying consumers (incidental beneficiaries or free riders), and the production of nonmarket goods generates diffuse positive externalities, often realized by nonparticipants or nonconsumers.”). *See supra* note 12.

168. PAUL N. EDWARDS, *From “Impact” to Social Process: Computers in Society and Culture*, in HANDBOOK OF SCIENCE AND TECHNOLOGY STUDIES 257 (Sheila Jasanoff et al. eds., 2011) (assessing the societal impact of computers); H.B. Brown, *The Status of the Automobile*, 17 YALE L.J. 223 (1908) (assessing the impact of the introduction of automobiles in society); W. Brian Arthur, *The Structure of Invention*, 36 RSCH. POL’Y, 274 (2007) (describing commonalities among how radical novel technologies come into being, including the invention of penicillin).

169. *See* Bronwyn H. Hall, *The Private and Social Returns to Research and Development*, in TECHNOLOGY, R&D, AND THE ECONOMY 140, 140 (1996) (explaining that “[t]he principal argument for government intervention in industrial innovation has always been the potential gap between the private and social returns to innovative activity”).

170. *See* JOHN CRAVEN, INTRODUCTION TO ECONOMICS: AN INTEGRATED APPROACH TO FUNDAMENTAL PRINCIPLES 248 (Basil Blackwell ed., 1984) (stating that rewards must be commensurate with risks to induce firms to act); Lemley, *Free Riding*, *supra* note 12, at 1050 (“economic theory properly requires . . . the capture of returns sufficient to recoup the investment”); Kapczynski & Syed, *supra* note 53, at 1908 (“Conventional economic actors will only produce a good when they can appropriate sufficient returns to recoup the capitalized costs of providing the good.”). In some instances, innovators are motivated by non-economic considerations, but surely these motivations are insufficient to motivate the socially optimal level of innovation.

savings accounts, the returns are very low—sometimes, close to zero.¹⁷¹ On the other hand, venture capitalists—who invest in startups, which tend to fail at a rate of 80% or higher—often look for ten-fold or greater returns on their investments.¹⁷²

Ordinary market activity in equilibrium typically demands normal, competitive returns, but not supernormal returns, because the risk undertaken is precisely “normal,” that is, ordinary given the opportunity costs relative to available alternatives. For instance, if I open a nondescript coffee and donut cart on a street corner in a metropolitan area because I see lines at similar stands nearby, I am likely in the short-run to earn an ordinary, competitive return. In this instance, I undertake ordinary risk that other coffee and donut carts will pop up, crowding out my revenues and profits,¹⁷³ but presumably startup and entry costs are low, and I can at least earn most of these fixed costs back with a “first-mover” advantage before additional carts appear.¹⁷⁴ I may even engage in some mild form of innovation by adding new snacks or drinks to maintain profits, which other cart vendors may imitate.¹⁷⁵ Additionally, if there is too little profit with more coffee carts on the street—especially when they add my new snacks to their menus—I know the newcomers will likely exit before I do during this period of “shakeout,” in which some firms will leave the market from an inability to earn sufficient profit.¹⁷⁶ In the long run,

171. For historical rates of treasury bills, see *Interest Rate Statistics*, U.S. DEPT. OF TREASURY, <https://www.treasury.gov/resource-center/data-chart-center/interest-rates/Pages/Historic-LongTerm-Rate-Data-Visualization.aspx> (last visited June 11, 2023).

172. Benjamin E. Gaddy, Varun Sivaram, Timothy B. Jones & Libby Wayman, *Venture Capital and Cleantech: The Wrong Model for Energy Innovation*, 102 ENERGY POL'Y 385, 390 (2017) (showing failure rates of 75-90% among venture capital backed startups in software, medical technologies, and cleantech). See Colin M. Mason & Richard T. Harrison, *Is it worth it? The rates of return from informal venture capital investments*, 17 J. BUS. VENTURING 211 (2002); see also Tyzoon T. Tyebjee & Albert V. Bruno, *A Model of Venture Capitalist Investment Activity*, 30 MGMT. SCI. 1051 (1984) (describing a five-step process used by venture capitalists in risk assessment).

173. See ALEXANDER ELDER, *COME INTO MY TRADING ROOM* 59 (2002) (“Imagine you’re . . . running a fruit and vegetable stand. You take a risk each time you buy a crate of tomatoes. If your customers do not buy them, that crate will rot on you. That’s a normal business risk.”).

174. See SCHUMPETER, *CAPITALISM*, *supra* note 30, at 88 (“Every successful corner may spell monopoly for the moment.”).

175. See generally Toshihiko Mukoyama, *Innovation, Imitation, and Growth with Cumulative Technology*, 50 J. MONETARY ECON. 361 (2003) (discussing the interaction of innovation with imitation).

176. See generally Steven Klepper, *Entry, Exit, Growth, and Innovation over the Product Life Cycle*, 86 AM. ECON. REV. 562, 565 (1996) (describing typical industry lifecycle patterns).

the market will enter equilibrium, and I will earn ordinary, competitive profits.¹⁷⁷

Thus, *ordinary* market activity—even if it is costly, risky, and subject to free riding—will typically not require supernormal returns to induce it.¹⁷⁸ Moreover, the level of private production of ordinary market activity will generally be optimal, because the social gains from this activity tend not to exceed the private gains, at least by much.¹⁷⁹ As such, intellectual property rights or other regulatory exclusivities (other than perhaps trademarks to prevent consumer confusion) are generally unnecessary to promote ordinary market activity, at least in equilibrium.¹⁸⁰

Technological innovation, on the other hand, has a much higher failure rate,¹⁸¹ and thus presents much greater risk than ordinary market activity.¹⁸² This includes technological, regulatory, and commercial risk.¹⁸³ For instance,

177. See generally Kenneth J. Arrow & Gerard Debreu, *Existence of an Equilibrium for a Competitive Economy*, 22 *ECONOMETRICA* 265 (1954) (providing “proofs” of equilibrium in an integrated model of production, exchange, and consumption).

178. See Ted M. Sichelman, *Taking Commercialisation Seriously*, 33 *EUR. INT. PROP. REV.* 200, 201 (2011) (“[A]lthough the manufacture and sale of non-innovative, ordinary commercial products, such as paper clips, will involve risks—generally, only ordinary returns are needed to induce a commercializer to take those risks.”).

179. Cf. Richard R. Nelson, *The Simple Economics of Basic Scientific Research*, 67 *J. POLY ECON.* 297 (1959) (explaining that scientific R&D is different from most other economic endeavors in that the social value it produces exceeds the benefits its producers can capture in the market).

180. See *supra* note 169.

181. A study estimated that one-third of all new technological product launches fail. Robert G. Cooper & Elko J. Kleinschmidt, *New Products: What Separates Winners from Losers*, 4 *J. PROD. INNOV. MGMT.* 169, 170, 174 (1987). Of course, many fewer products make it from the lab to the store shelf. Sichelman, *Commercializing Patents*, *supra* note 10, at 360–61 (“[P]roduct innovation is plagued by high risks: both the large amounts at stake and the high probability of failure” (internal citations omitted)).

182. See generally Emmett Eldred & Michael McGrath, *Commercializing New Technology-I*, 40 *RSCH. TECH. MGMT.* 41, 45 (1997) (describing how the development of new technology entails more uncertainty than usual product development); Mariana Mazzucato & Massimiliano Tancioni, *Innovation and Idiosyncratic Risk: An Industry- and Firm-level Analysis* 17 *INDUST. & CORP. CHANGE* 789 (2008) (finding a statistically significant relationship between firm-level R&D intensity and firm-level volatility of returns); Gerard J. Wedig, *How Risky is R and D? A Financial Approach*, 72 *REV. ECON. & STAT.* 296, 303 (1990) (concluding as an empirical matter that investment in R&D is riskier than in other assets).

183. See Thomas M. Jorde & David A. Teece, *Rule of Reason Analysis of Horizontal Arrangements: Agreements Designed to Advance Innovation and Commercialize Technology*, 61 *ANTITRUST L.J.* 579, 583 (1993) (“[C]ommercialization is both costly and risky, perhaps even more so than R&D activity.”); Eldred & McGrath, *supra* note 182, at 41 (“Realizing the promise of new technologies through their commercialization into new products is far from

in the pharmaceutical industry, roughly only one in 5,000 compounds screened at the discovery phase ultimately are approved for commercial use.¹⁸⁴ Of course, not all innovation is equally risky—for example, minor changes to an existing software application may be relatively straightforward.¹⁸⁵ Yet, when compared to other forms of investment in the market, innovative technological activity tends to be riskier.¹⁸⁶

Thus, on average, for technological innovation to be undertaken, innovators will generally require higher returns than those generated by ordinary market activity.¹⁸⁷ Will the market provide such returns? At first glance, one might argue that if market players in a risky industry require greater returns, they will price accordingly so that their profit is commensurate with the risk undertaken. Otherwise, these market actors will exit the market.¹⁸⁸ Thus, in equilibrium, although some industries are riskier than others, the riskier industries will earn greater profits on average than in other industries—but still *normal* profits from a competition perspective.¹⁸⁹

However, like rent dissipation theories, this neoclassical model of raising prices to account for greater risk assumes that potential innovators are roughly

easy.”); Josh Lerner, *The Returns to Investments in Innovative Activities: An Overview and an Analysis of the Software Industry*, in MICROSOFT, ANTITRUST AND THE NEW ECONOMY: SELECTED ESSAYS 467 (David S. Evans ed., 2002) (“By their very nature, efforts to accomplish significant innovations are associated with high levels of uncertainty.”).

184. See Barbara M. Bolten & Tracy DeGregorio, *Trends in Development Cycles*, 1 NATURE REV. DRUG DISCOVERY 335, 336 (2002) (“The attrition rate of compounds during the long and risky drug development process is enormous, with roughly 1 in 5,000 compounds that are screened in early-stage discovery making it through to approval.”); John DiMasi, Henry Grabowski & Joseph Vernon, *Returns on R&D for 1990s New Drug Introductions*, 20 PHARMACOECONOMICS 11, 23 (2002) (“Many of the uncertainties that exist for a new [pharmaceutical] product (i.e. its clinical profile in terms of risks and benefits, the introduction of substitute products, the size of market demand, etc.), are usually not resolved until late in the R&D process.”).

185. See Burk & Lemley, *supra* note 50, at 1622–23 (“Software patents are important, but the relatively low fixed costs associated with software development, coupled with other forms of overlapping intellectual property protection for software, mean that innovation in software does not depend critically on strong, broad protection.”).

186. See *supra* notes 181–185. Moreover, innovation—because it is quite new—can lead to products and services that are unregulated one day but regulated the next (or impose large tort liability). The possibility of regulation—and its attendant costs and delays—as well as tort liability, further reduces the expected returns to investment in innovation.

187. See *supra* note 170.

188. See generally Franco Modigliani & Merton H. Miller, *The Cost of Capital, Corporation Finance and the Theory of Investment*, 48 AM. ECON. REV. 261 (1958) (offering a model of “risk premiums” that are required in return for investment in risky ventures).

189. See generally Eugene F. Fama & Kenneth R. French, *The Cross-Section of Expected Stock Returns*, 47 J. FIN. 427 (1992) (discussing how stock market returns relate to industry risk in markets in equilibrium).

similar. It also implicitly assumes that there is a sufficient supply of potential innovators to engage in socially valuable activity. Both of these assumptions are arguably wrong in most situations. Rather, at least in many technological industries, there is a limited set of potential firms and individuals that can realistically bear the cost and have a sufficiently high likelihood of success—especially given the rapid pace of technological change—in inventing and commercializing particular classes of technological innovations.¹⁹⁰ In actuality, the costs for all but a small number of potential innovators are often too large to invest sufficiently in R&D and commercialization.¹⁹¹ This stems from limitations in capital and know-how, regulatory barriers, long-term industry trends, and mere randomness.¹⁹² In general, technological innovators who can invest sufficient resources will be fairly low in number and mainly heterogeneous in nature.¹⁹³

Because innovation is often a very risky as well as an uncertain endeavor—in the Knightian sense—this heterogeneity may lead to an undersupply of potential innovators. Specifically, in face of this uncertainty and risk, less efficient, more risk-averse innovators may not be able to earn sufficient returns to justify innovation investments when more efficient, less risk-averse competitors are also racing to develop the same innovation (even absent free riding).¹⁹⁴ In other words, given the large competitive threat, some innovators

190. See generally Michael E. Porter, *The Five Competitive Forces That Shape Strategy*, 86 HARV. BUS. REV. 78, 80–83 (2008) (describing the dynamics of market entry in technology and other industries).

191. See generally Wesley M. Cohen & Daniel A. Levinthal, *Absorptive Capacity: A New Perspective on Learning and Innovation*, 35 ADMIN. SCI. Q. 128, 136 (1990) (contending that only firms that have already invested in learning and innovation can effectively recognize, assimilate, and apply new knowledge).

192. See generally JOHN SUTTON, *TECHNOLOGY AND MARKET STRUCTURE* (1998).

193. See generally Maryann P. Feldman & Richard Florida, *The Geographic Sources of Innovation: Technological Infrastructure and Product Innovation in the United States*, 16 ANNALS ASS'N OF AM. GEOGRAPHERS 210, 214 (1994) (describing the specialization required for various locales to become innovation centers in particular technological industries).

194. See Aghion et al., *supra* note 157 at 701–02. There is a further wrinkle of importance in this description of innovation and risk. Large firms, which tend to be necessary to commercialize and disseminate innovative technologies, are composed of individual actors, who often are risk-averse. Indeed, larger firms arguably tend to employ the most risk-averse individuals. Because these highly risk-averse individuals make decisions regarding innovative activity, they will demand an even greater return in the marketplace. Although firms' shareholders may be relatively risk-neutral, as a growing body of literature ably demonstrates, there are substantial barriers between shareholders and managers that create high agency costs, preventing firms from making optimal decisions on behalf of the shareholders. In this regard, I disagree with the sentiment of F.M. Scherer, Lemley, and others that “nominally rational corporations . . . systematically overinvest in high-risk, high-reward activities.” Lemley, *supra*

at the margins will drop out of the race.¹⁹⁵ Thus, contrary to the standard neoclassical model, which assumes an infinite supply of homogeneous innovators willing to enter the race for the proper potential fee, markets for innovation—at least for highly valuable innovations—can be fairly illiquid.¹⁹⁶ Because innovation involves different approaches, often stemming from random variation and at least partial serendipity among innovators, a smaller group of potential innovators—all other factors equal—will arguably decrease the odds of success.¹⁹⁷ This implies that there will be random pockets in which innovation will be undersupplied, particularly for high-value innovations.

Heterogeneity in the potential pool of innovators might not be an acute problem if innovations' private and social values were generally equivalent. Indeed, the neoclassical model works fairly well in ordinary, competitive markets because small deviations from homogeneity and competition tend to be unimportant in terms of social welfare.¹⁹⁸ Yet, as described earlier, the social benefits from innovative technological activity often far exceed the private benefits.¹⁹⁹ The ensuing questions are quite difficult to answer: Exactly how much more innovative technological activity is needed beyond what is induced

note 17, at 1529 (citing F.M. Scherer, *The Innovation Lottery*, in *EXPANDING THE BOUNDARIES OF INTELLECTUAL PROPERTY: INNOVATION POLICY FOR THE KNOWLEDGE SOCIETY 3* (Rochelle Cooper Dreyfuss et al. eds., 2001). Although independent inventors may do so, corporations—especially large ones—tend towards less risky, incremental innovation that generally is of less social value than riskier, disruptive innovation. See Rebecca M. Henderson & Kim B. Clark, *Architectural Innovation: The Reconfiguration of Existing Product Technologies and the Failure of Established Firms*, 35 *ADMIN. SCI. Q.* 9, 11 (1990); CLAYTON M. CHRISTENSEN, *THE INNOVATOR'S DILEMMA: WHEN NEW TECHNOLOGIES CAUSE GREAT FIRMS TO FAIL* (1997).

195. See Arrow, *supra* note 59, at 610–14 (arguing that risk-aversion will lead to underinvestment in invention); Josh Lerner, *Patenting in the Shadow of Competitors*, 38 *J. L. & ECON.* 463 (1995) (finding that firms with high litigation costs tend to avoid patenting in product markets comprising other firms that have low litigation costs).

196. See GEORGE J. STIGLER, *THE ORGANIZATION OF INDUSTRY* 124 (1968) (“The prospects of monopoly pricing will lead to such a scale of investment in producing knowledge that it will return only the competitive rate of return on average.”); Yoram Barzel, *Optimal Timing of Innovations*, 50 *REV. ECON. & STAT.* 348, 349 (1968) (“[C]ompetition among potential innovators may deprive innovations of all their special economic value.”).

197. See Thomas M. A. Fink, M. Feeves, R. Palma & R. S. Farr, *Serendipity and Strategy in Rapid Innovation*, 8 *NATURE COMM'NS* 2002, 2003 (2017) (“In science, many of the most important discoveries have serendipitous origins.”).

198. See Arnold C. Harberger, *Monopoly and Resource Allocation*, 44 *AM. ECON. REV.* 77, 84 (1954).

199. Of course, there are many other activities for which the social benefits far exceed the private benefits, but arguably innovative technological activity results in this divergence much more consistently than the vast majority of economic activities.

by private incentives?²⁰⁰ And what additional incentives are needed to generate it? Economists have often assumed that private actors should internalize all of the social benefits of innovation to induce optimal levels of it.²⁰¹ In contrast, Mark Lemley has argued that we should only provide returns exactly necessary to induce optimal levels of technological innovation and that these returns need not distribute all of the social value of an innovation to the innovators—leaving some surplus on the table for consumers may just do as well in incentivizing innovation.²⁰²

Unlike much of the theoretical debate regarding patent law, it is unnecessary to resolve this debate to appreciate the importance of suppressing competition to induce technological innovation. Given technological innovation's often substantial costs and risks—particularly the risk of competition—coupled with its substantial social benefits, ordinary market incentives are unlikely to absorb society's total demand for technological innovation.²⁰³ Rather, in order for innovators to have sufficient incentives to innovate, their returns must be supracompetitive.

First-mover advantage and complementary assets—such as market advantages in distribution, production, marketing, and capital aggregation—provide innovators with a first layer of supernormal returns.²⁰⁴ Like the coffee cart example, innovators who invent and commercialize products and services that are truly novel and nonobvious will—absent patent protection—be in a unique position in the marketplace simply by being the first. If the novel, nonobvious innovation has no close substitutes, the innovator will immediately enjoy supernormal profits, even if for a very limited period of

200. Cf. Merges & Nelson, *supra* note 25, at 875 (“Property rights that are too narrow will not provide enough incentive to develop the asset.”).

201. See, e.g., Suzanne Scotchmer, *Standing on the Shoulders of Giants: Cumulative Research and the Patent Law*, 5 J. ECON. PERSP. 29, 34 (1991) (stating that for “fully efficient incentives,” each innovator “must earn the entire social surplus of his innovation”); Steven Shavell & Tanguy van Ypersele, *Rewards Versus Intellectual Property Rights*, 44 J.L. & ECON. 525, 530 (2001) (“Under the patent system, the incentive to invest is always inadequate because monopoly profits are less than social surplus.”); cf. Harold Demsetz, *Toward a Theory of Property Rights*, 57 AM. ECON. REV. 347, 348 (1967) (“A primary function of property rights is that of guiding incentives to achieve a greater internalization of externalities.”).

202. See Lemley, *Property*, *supra* note 12, at 1057 (“Economic theory offers no justification for awarding creators anything beyond what is necessary to recover their total average costs.”).

203. See Nelson, *supra* note 179 (explaining that when the social benefits of an activity exceed its private returns in the market, some additional mechanism may be necessary to incentivize the activity).

204. See Teece, *supra* note 49 (describing the importance of “complementary assets” in profiting from technological innovation).

time.²⁰⁵ Indeed, such profits are often called “Schumpeterian” profits.²⁰⁶ Again, like the coffee cart example, if R&D and commercialization costs (including the costs of failure) are low, then the innovator may be able to earn a sufficient risk-adjusted return on its investment merely from its first-mover advantage and complementary assets.²⁰⁷ If the risk of competition is low, the first-mover period may be fairly long absent any patent or other intellectual property protection.²⁰⁸

However, if R&D and commercialization costs are high, complementary assets are weak, and first-mover advantages are minimal, then often it will be difficult for the innovator to earn a sufficient risk-adjusted return on its investment. First-mover periods may be short because of the threat that a third party can copy or reverse engineer the innovation—or appropriate information relating to the commercialization of the innovation—at a relatively low cost.²⁰⁹ Yet, first-mover advantages—particularly absent complementary assets to protect those advantages—can be quickly eroded *simply because it is likely a third party will independently develop the innovation*.²¹⁰ Thus, optimal risk-adjusted returns to technological innovation must take into account *independent* invention, and not merely free riding.

2. *Free Riding vs. Competition*

There are at least six potential counterarguments to the previous line of argument. First, if the innovator market is so illiquid, one may question whether projects with high R&D and commercialization costs are likely to attract multiple, independent innovators—if not, then perhaps legal protection

205. The reference to an “innovator” here need not be a single entity. For instance, an inventor may contract or license an invention for commercial production and sale to third parties – in which case, the entire group would enjoy potential first-mover advantages that are potentially reinforced by complementary assets.

206. See generally William D. Nordhaus, *Schumpeterian Profits in the American Economy: Theory and Measurement* (Nat’l Bureau of Econ. Research, Working Paper No. 10433, 2004).

207. In certain industries, network effects may further cement a first-mover advantage. See Mark A. Lemley & David McGowan, *Legal Implications of Network Economic Effects*, 86 CALIF. L. REV. 479, 530 (1998) (“Network effects may actually enhance this technological first-mover advantage, because the tipping effect may produce a rapid supracompetitive return before imitators can effectively reverse engineer.”).

208. See Marvin B. Lieberman & David B. Montgomery, *First-Mover Advantages*, 9 STRATEGIC MGMT. J. 41, 42, 44–47 (1988).

209. See Osborn et al., *supra* note 55 at 1232–33.

210. See Constantinos C. Markides & Paul A. Geroski, FAST SECOND: HOW SMART COMPANIES BYPASS RADICAL INNOVATION TO ENTER AND DOMINATE NEW MARKETS 120–31 (2005) (explaining that besides “imitative” second-movers, there are also “fast” second-movers, which need not copy from the first-mover, but may enter a new product and quickly erode any benefit to the first-mover).

beyond that necessary to prevent free riding is not so essential. The response is that although high costs will certainly reduce the number of potential entrants, these costs will have less of an effect for the most valuable innovations in the marketplace. High market-value innovations arguably will be high social-value innovations.²¹¹ Moreover, a small number of the most valuable innovations often account for a disproportionate amount of market and, hence, social value.²¹² As such, high development and commercialization costs are unlikely to provide a sufficient barrier to entry.

Second, one may also doubt the social value of an innovation that another can independently develop so close in time to the original innovation—indeed, simultaneous invention is often evidence of obviousness.²¹³ However, invention is often serendipitous in time and its nearly coincidental occurrence does not necessarily signal low social value.²¹⁴ (Of course, simultaneous invention may be driven by a race for a patent, but the arguments here are meant to abstract away from the possibility of patent protection.²¹⁵)

211. See generally Dietmar Harhoff, Francis Narin, F. M. Scherer & Katrin Vopel, *Citation Frequency and the Value of Patented Inventions*, 81 REV. ECON. & STAT. 511, 511 (1999) (noting that high citation counts can indicate both high market and social value).

212. See Alexander E. Silverman, *Myth, Empiricism, and America's Competitive Edge: The Intellectual Property Antitrust Protection Act*, 43 STAN. L. REV. 1417, 1432 n.63 (1991) (“A very small percentage of patents commands the lion’s share of the economic value; the remaining patents are worth little.”) (citing a variety of sources).

213. Mark A. Lemley, *The Myth of the Sole Inventor*, 110 MICH. L. REV. 709, 712 (2012) (“While patent law is based on the belief that important inventions are exceptional—that is, not obvious to most people in the field—the history of major inventions doesn’t bear out that belief. The overwhelming majority of inventions, including the overwhelming majority of so-called ‘pioneering’ inventions, are in fact developed by individuals or groups working independently at roughly the same time.”); *In re Merck & Co., Inc.*, 800 F.2d 1091, 1098 (Fed. Cir. 1986) (“Neither are we persuaded by appellant’s contention that the Board erred in relying on the contemporaneous independent invention of others to support its holding of obviousness.”).

214. See generally ROBERT K. MERTON, *THE SOCIOLOGY OF SCIENCE: THEORETICAL AND EMPIRICAL INVESTIGATIONS* 279–308 (1973) (casting doubt on the assertion that simultaneous scientific discovery necessarily indicates low social value).

215. Lemley *supra* note 213, at 712 (“Invention might be motivated, or at least hastened, not merely by the hope of reward but by the fear of losing a race to a competitor who in turn obtains a dominant patent.”); Daralyn J. Durie & Mark A. Lemley, *A Realistic Approach To The Obviousness Of Inventions*, 50 WM. & MARY L. REV. 989, 1007 n.96 (2008) (“[I]t may be that simultaneous invention resulted from a patent race that would not have occurred in the absence of the prospect of a patent reward.”). For a discussion of patent races, see generally SUZANNE SCOTCHMER, *INNOVATIONS AND INCENTIVES* 100–03, 112–14, 120–23 (2004); Partha Dasgupta & Joseph Stiglitz, *Uncertainty, Industrial Structure, and the Speed of R&D*, 11 BELL J. ECON. 1, 11–12 (1980); see also Pankaj Tandon, *Rivalry and the Excessive Allocation of Resources to Research*, 14 BELL J. ECON. 152 (1983) (suggesting that incentives of firms in competition with each other result in such firms producing duplicative R&D outcomes).

Additionally, firms and individuals may have difficulty estimating the market value of an innovation.²¹⁶ In this case, by sheer randomness, some innovations will be produced by multiple independent innovators. This variance in independent innovation will create risks of competition for the original innovator, which may dampen incentives for innovative activity in ways that cannot always easily be priced into the good or service or insured against in the private market. Finally, even if a competitor does not copy from the original innovator per se, the simple fact that the original innovator has produced a working invention or commercially viable product may provide valuable information that reduces the risk to the competitor.²¹⁷ In other words, the mere fact that “it can be done” may substantially decrease a competitor’s perceived risk of failure, spurring it to enter the market and compete in a manner that reduces the original innovator’s profits.²¹⁸

Third, Robert Merges has argued that the “need for market exclusivity” is based on the assumption that inventions “culminate in a single market-covering patent” and hence the need does not necessarily apply to “one component of . . . multi-component technologies.”²¹⁹ Although the standard story for exclusivity turns on a patent covering a discrete product, the cost, risk, and competition rationales presented earlier typically apply equally to or nearly to the same extent as patents covering a single or a few components of complex products. In some instances, an inventor can commercialize a component and sell that directly to an integrator that combines the component

216. See generally Zvi Griliches, Bronwyn H. Hall & Ariel Pakes, *R&D, Patents, and Market Value Revisited: Is There a Second (Technological Opportunity) Factor?* (Nat’l Bureau of Econ. Research, Working Paper No. 2624, 1988) (examining factors including patenting activity as a metric in assessing the market value of innovations and finding “little evidence of a second factor which can be clearly identified with technological opportunity”).

217. See Sichelman, *Commercializing Patents*, *supra* note 10, at 360–61; Sichelman, *Taking Commercialisation Seriously*, *supra* note 178, at 201.

218. See Scotchmer & Maurer, *supra* note 20, at 543 (“[M]erely knowing that someone has invented a product can be important for expected costs of duplication in cases where significant *ex ante* doubts exist about whether the proposed product can be made at all.”).

219. Merges, *supra* note 21, at 4. Merges argues that another assumption of the market exclusivity story is that it applies solely to “very high-cost research projects.” *Id.* at 4. I agree, with the caveat that this statement is not particularly meaningful without defining “very high.” Merges appears to assume that “very high” is on the order pharmaceutical innovation, which is on the order of \$1 billion per successfully commercialized small molecule drugs. *Id.* at 4. Clearly, the exclusivity function of patents plays an important role well below these levels of R&D and commercialization. Of course, many R&D projects are less than \$1 million, and whether the blunt instrument of patent protection is always sensible for such small projects is questionable.

with other parts to form a complex product.²²⁰ Yet, even in instances in which the component must be manufactured alongside unpatented components—in a competitive market, an inventor undertaking risky and costly R&D must typically enjoy supernormal returns to justify its investment. As noted earlier, the fact that a patentee licenses, rather than commercializes, the underlying invention does not negate the benefits to innovation from suppressing competition.²²¹ Hence, the observation that much invention today involves aspects of multi-component products does not defeat the need for exclusivity in the form of a hedge against risk of competition.²²² The optimal mix of remedies available to the patent holder of a component may arguably vary from those available to a holder over a discrete product, but such differences do not defeat the need for some form of protection against the erosion of supernormal profits to spur optimal levels of R&D and commercialization for components of complex products.²²³

Fourth, copying is required to show infringement for other areas of intellectual property law that concern innovative activity, namely trade secret and copyright law, seemingly rebutting the need for patent rights to capture independent invention.²²⁴ However, trade secrecy and copyright doctrines can adequately be explained on other grounds. For trade secrecy, dispensing with copying would require some mechanism to capture the scope of the trade secret right, which would be difficult as an evidentiary matter without some government-administered registration system, which would undermine the secrecy of the underlying information.²²⁵ Additionally, trade secret law often concerns the aggregation of information that is otherwise public, but in its assembled form can qualify for trade secret protection—such as customer lists,

220. See generally Sebastian K. Fixson, *Product Architecture Assessment: A Tool to Link Product, Process, and Supply Chain Design Decisions*, 23 J. OPERATIONS MGMT. 345 (2005) (examining modular, component-based approaches to product design and manufacturing).

221. See *supra* notes 43-44 and accompanying text.

222. Damien Geradin & Anne Layne-Farrar, *Patent Value Apportionment Rules for Complex, Multi-Patent Products*, 27 SANTA CLARA COMPUT. & HIGH TECH. L.J. 763, 763 (2011) (“The vast majority of the products developed by the information technology (“IT”) industry are technologically complex, incorporating hundreds or thousands of different components, and many of these components read on an increasingly large number of patents held by a number of third parties.”).

223. See generally Ted Sichelman, *Purging Patent Law of “Private Law” Remedies*, 92 TEX. L. REV. 517 (2014).

224. See *Kewanee Oil Co. v. Bicron Corp.*, 416 U.S. 470, 474–75 (1974).

225. 4 LEGAL COMPLIANCE CHECKUPS § 29:6 (2022) (“There is no procedure for somehow ‘registering’ a trade secret to enhance or perfect the right in a trade secret. Rather, trade secret rights are established and maintained by following reasonable procedures to maintain the secrecy.”); Duncan M. Davidson, *Common Law, Uncommon Software*, 47 U. PITT. L. REV. 1037, 1058 (1986) (“Registration normally would vitiate trade secret protection.”).

marketing data, and the like.²²⁶ Precluding the independent assembly of such information would arguably be economically inefficient and, hence, trade secret law would likely need to adopt some form of patent law's nonobviousness doctrine to separate truly innovative information from mere aggregation of public domain information.²²⁷ This is especially so under an absolute liability regime not requiring copying for infringement, because this would entail abandoning the reverse engineering defense, which serves as a sort of obviousness gating function in trade secret law.²²⁸ Thus, for reasons other than incentivizing innovative activity, requiring copying in trade secret law is sensible. As for copyright law, true independent creation within the scope of the rights afforded by copyright law is quite rare.²²⁹ Indeed, copying serves as a strong proxy for bounding copyright scope by prophylactically removing from infringement the independent creation of "ideas" (which is likely to be common), reducing massive information costs in discerning the idea/expression dichotomy in copyright law.²³⁰ So, like trade secret law, other reasons justify copying as an element of copyright infringement.

Fifth, some have argued that the divide between the legal monopoly afforded by perfect exclusivity and the duopoly (or oligopoly) that would likely arise from imperfect exclusivity or even a "free" market is quite narrow.²³¹ More specifically, if the difference between monopoly profits earned under a patent regime that did not countenance any form of competition and oligopoly profits earned in a regime that allowed independent creation is small, then

226. Andrew Beckerman-Rodau, *The Choice Between Patent Protection and Trade Secret Protection: A Legal and Business Decision*, 84 J. PAT. & TRADEMARK OFF. SOC'Y 371, 379 (2002) ("[C]ourts have held customer lists, in some cases, to be trade secrets. Additionally, pure information, such as marketing data, ideas, formulas and negative data, are potentially protectible as trade secrets but ineligible for patent protection.").

227. See John Gladstone Mills, Donald Cress Reiley & Robert Clare Highley, 1 Pat. L. Fundamentals § 4:8 (2d ed. 2023) ("Most courts have emphatically rejected the notion that anything like an unobviousness standard applies to trade secrets.").

228. Robert G. Bone, *A New Look at Trade Secret Law: Doctrine in Search Of Justification*, 86 CALIF. L. REV. 241, 265 (1998) ("[T]he inventor's commercial success through secrecy shows that the invention was in fact nonobvious, and deserved a patent, since others presumably took a long time to reinvent it.").

229. John F. Duffy, *Inventing Invention: A Case Study of Legal Innovation*, 86 TEX. L. REV. 1, 9 (2007) ("By contrast, in the copyright area, claims of true independent duplication are much more rare.").

230. Lemley, *Economics of Improvement*, *supra* note 10, at 1014 ("[C]opyright protection does not extend to the ideas, facts, or functional elements of a work, but only to the author's original expression of those ideas or elements."). See 17 U.S.C. § 102(b) (1990).

231. See Ian Ayres & Paul Klemperer, *Limiting Patentees' Market Power Without Reducing Innovation Incentives: The Perverse Benefits of Uncertainty and Non-Injunctive Remedies*, 97 MICH. L. REV. 985, 1031–32 (1999).

incentives to innovate would continue to be high and substantial costs could arguably be averted.²³² However, such a statement depends on a complex analysis of profit under various forms of duopoly, which can vary widely by industry and invention.²³³ In view of the substantial divide between private and social returns for many valuable inventions, at least as a first cut—that is, absent strong evidence otherwise—it seems plausible to assume that the move from monopoly to duopoly or oligopoly would unduly diminish incentives to innovate on the whole. Of course, this is an empirical question at root, and perhaps the answer turns the other way.²³⁴ Unfortunately, there is no sufficient evidence at the moment to know. Ultimately, even if the evidence showed negligible differences in profit, it is conceptually clearer to assume a baseline of absolute exclusivity tempered by safety valves for competition, as I describe in the next Part.²³⁵

Sixth, in many instances inventors who patent inventions have no intent to commercialize them, including through third-party licensees. In many cases, these are preemptive patents that merely prevent competitors from commercializing potential design-arounds to the inventor's other patented products.²³⁶ Alternatively, some inventors may patent yet lack the financial wherewithal or incentive to commercialize or license the patented invention.²³⁷ In yet other cases, patents may be obtained merely for defensive, marketing, or other reasons seemingly unrelated to commercialization. Yet, even in these situations of “paper patenting,” the hedging role of patents plays a useful and often important economic function.²³⁸ In the case of preemptive patenting, patents create an even stronger hedge against competition relative to the original patented product by foreclosing substitutes for that product. Defensive patenting also operates to maintain market advantages in the marketplace by reducing the risk that profits are diminished not by ordinary product competition, but instead by competition for IP that leads to rents in the marketplace. Patenting for marketing and vanity purposes do not easily fit

232. *See id.*

233. *See* Lemley, *supra* note 20, at 1527 n.9 (“[E]conomic theory is all over the map in predicting price under duopoly, with estimates ranging from close to monopoly pricing to pure competitive pricing.”); Burk & Lemley, *supra* note 110, at 1580–95 (explaining how different industries respond to the patent system differently).

234. *See* Vermont, *Independent Invention*, *supra* note 14 (arguing that duopoly would not unduly diminish incentives in the situation of independent invention).

235. *See infra* Section III.A.

236. *See* Richard J. Gilbert & David M. G. Newbery, *Preemptive Patenting and the Persistence of Monopoly*, 72 AM. ECON. REV. 514, 514 (1982).

237. *See* Sichelman, *supra* note 10 at 343.

238. *Cf.* John F. Duffy, *Reviving the Paper Patent Doctrine*, 98 CORNELL L. REV. 1359, 1362–63 (2013).

in the hedging paradigm, but these uses are quite minimal.²³⁹ In any event, the hedging theory presented here is not meant to be an exhaustive explanatory theory for patenting, but rather one complementary to other important functions of patenting.

In sum, if society seeks to incentivize optimal levels of innovative technological activity—namely, levels that generate the greatest level of social benefits relative to the costs of innovation—then it must generally provide supernormal returns greater than those offered solely by first-mover advantages and complementary assets. Importantly, because competitive risk stems not solely from copying and related public goods concerns, these supernormal returns must take into account the risk of competition generally, and not merely the threat of free riding.²⁴⁰ As a baseline, these returns should derive from fully exclusive levels of profits.

B. HEDGING AGAINST COMPETITION IN ORDER TO SPUR INNOVATION

Delivering the supernormal profits that are required for innovators to optimally engage in innovative activity need not stem from market-based rewards.²⁴¹ For example, the government or private parties could offer prizes, subsidies, or tax credits to innovators.²⁴² Alternatively, the government could

239. Patent assertion entities (PAEs) are typically special purpose business entities that acquire patents merely to license and assert them in litigation. But, as I explain further below in the context of the broader category of non-practicing entities (NPEs), even for PAEs, patents still perform a useful economic hedging function by providing at least some compensation back to the original inventor (and, possibly, commercializer) as well as by lending credibility to the general threat of patent infringement suits against would-be infringers. Of course, the costs from the assertion of weak patents must be taken into account, but there is no *a priori* reason to believe that non-commercializing entities are a net social cost and the empirical evidence for such is wanting in my opinion, at least outside of PAEs seeking very low-value settlements on a recurring basis. This is particularly so in view of the much wider net cast by hedging theory for the economic benefits of patents. *See infra* notes 276, 320-325 and accompanying text.

240. *See infra* notes 316–321.

241. *See* ROBERT P. MERGES, PETER S. MENELL, MARK A. LEMLEY, & SHYAMKRISHNA BALGANESH, *INTELLECTUAL PROPERTY IN THE NEW TECHNOLOGICAL AGE* 26 (2022) (“Numerous institutional mechanisms exist for addressing the public goods problem inherent in the production of ideas and information—direct government funding of research, government research subsidies, promotion of joint ventures, and prizes.”).

242. *See id.*; Daniel J. Hemel & Lisa Larrimore Ouellette, *Beyond the Patents-Prizes Debate*, 92 TEX. L. REV. 303, 308 (2013) (“Grants and tax credits provide rewards *ex ante*, before the results of R&D are known. By contrast, prizes and patents provide rewards *ex post*, after an R&D project has produced a novel discovery.”); Michael Abramowicz, *Perfecting Patent Prizes*, 56 VAND. L. REV. 115, 235 (2003) (“Proponents of patent prizes have sought to avoid the deadweight losses associated with intellectual property protection by recommending that a

provide some form of legal exclusivity in the market.²⁴³ Patents fall into this category.²⁴⁴ Unlike prizes, subsidies, or tax credits, patents reward inventors through a market selection mechanism.²⁴⁵ Although there is some circularity in the patent system's level of rewards because the value of an invention in the market depends on the strength of its patent rights, when compared with prizes, subsidies, or tax credits, patents tend to provide financial gains for commercializers of patented products and services that are more commensurate with private market value.²⁴⁶ Yet, because of the exclusionary power of a patent—assuming the patent provides some market power (as many patents do not)²⁴⁷—the patentee will generally price above marginal cost, resulting in not only supernormal profit, but also deadweight losses by pricing out consumers who otherwise could have purchased the patented goods in an ordinary, competitive market.²⁴⁸ This is the standard intellectual property

centralized governmental spending program replace a market-based incentive.”); Benjamin N. Roin, *Unpatentable Drugs and the Standards of Patentability*, 87 TEX. L. REV. 503, 560 (2009) (“Rather than relying on patent reforms to promote the development of socially valuable drugs that currently cannot be patented, Congress itself could finance the development of those drugs.”).

243. In addition to patents, legal exclusivities include government-sanctioned monopolies and other regulatory exclusivities. For instance, pharmaceutical companies are provided data exclusivity when a drug is approved from Food and Drug Administration (FDA), which in effect provides market exclusivity, for a limited period of time. *See* Rebecca S. Eisenberg, *Patents, Product Exclusivity, and Information Dissemination: How Law Directs Biopharmaceutical Research and Development*, 72 FORDHAM L. REV. 477, 481–84 (2003); William E. Ridgway, *Realizing Two-Tiered Innovation Policy Through Drug Regulation*, 58 STAN. L. REV. 1221, 1236–39 (2006).

244. *See, e.g.*, *Pfaff v. Wells Electronics, Inc.*, 525 U.S. 55, 63 (1998) (“[T]he patent system represents a carefully crafted bargain that encourages both the creation and the public disclosure of new and useful advances in technology, in return for an exclusive monopoly for a limited period of time.”).

245. *See generally* Hemel & Ouellette, *supra* note 242 (contrasting non-market and market-based incentives, including patents, to promote innovative activity).

246. Of course, if the commercializer is not the original inventor, it can distribute a portion of its gains to the original inventor through a variety of mechanisms. *See* Sichelman, *Commercializing Patents*, *supra* note 10.

247. *See, e.g.*, HERBERT HOVENKAMP, *ECONOMICS AND FEDERAL ANTI-TRUST LAW* § 8.3, at 219 (1985) (“Many patents confer absolutely no market power on their owners. . . . The economic case for ‘presuming’ sufficient market power . . . is very weak.”); 1 HERBERT HOVENKAMP ET AL., *IP AND ANTI-TRUST: AN ANALYSIS OF ANTI-TRUST PRINCIPLES APPLIED TO INTELLECTUAL PROPERTY LAW* § 4.2 (suggesting the rarity of situations in which patents confer market power); Salem M. Katsh, Jack E. Brown & F.M. Scherer, *Panel Discussion: The Value of Patents and Other Legally Protected Commercial Rights*, 53 ANTI-TRUST L.J. 535, 547 (1984) (“Statistical studies suggest that the vast majority of all patents confer very little monopoly power.”).

248. *See* Sichelman, *Commercializing Patents*, *supra* note 10, at 358.

trade-off between providing incentives to innovate and widespread dissemination of innovations.²⁴⁹

On the hedging theory offered in this Article, this tradeoff is countenanced, in Thomas Jefferson's words, as an "embarrassment" not merely to prevent free riding, but rather competition in any form, even fully independent development of the innovation.²⁵⁰ If an innovator is truly first to sell or use its innovation (either itself or through others), then as mentioned, it will enjoy a first-mover advantage for some limited period of time, even if very brief, which will provide it supernormal profits.²⁵¹ However, the innovator risks depreciation of these profits via competition, particularly if the innovator does not hold strong complementary assets, such as efficient manufacturing, strong marketing, or access to large amounts of capital.²⁵² A competitor may produce the same or better innovation, either by copying *or* by developing the innovation wholly independently. If the competitor can offer a lower price, more value, or use its complementary assets to gain a competitive advantage, it may force the original innovator out of the market or severely reduce its revenues and associated profits.²⁵³ Of course, this risk exists for any market activity, but for ordinary market activity these risks tend to be sufficiently rewarded by ordinary market returns. For innovative activity, ordinary market returns will generally be insufficient.²⁵⁴

249. *See id.*

250. Lemley, *Property*, *supra* note 10, at 1031 ("Thomas Jefferson was of the view that '[i]nventions . . . cannot, in nature, be a subject of property;' for him, the question was whether the benefit of encouraging innovation was 'worth to the public the embarrassment of an exclusive patent.'").

251. *See supra* note 205. In this regard, if there are sufficiently close substitutes for the product that prevent any supernormal profits, then it is doubtful the product is "innovative" in any meaningful sense. Although "commercial" utility is not currently a requirement under patent laws of most nations, it was a requirement in Venetian Republic, the earliest patent system on record, and hedging theory indicates that at least a weak form of commercial utility is sensible as a policy matter. Moreover, such an approach properly views patents not merely as incentivizing R&D, but also commercialization. *See* Ted Sichelman & Sean O'Connor, *Patents as Promoters of Competition: The Guild Origins of Patent Law in the Venetian Republic*, 49 SAN DIEGO L. REV. 1267, 1269 (2012).

252. *See* Teece, *supra* note 49, at 289 (describing the importance of "complementary assets" in profiting from technological innovation); Jorde & Teece, *supra* note 183, at 590 ("Particularly for small firms, innovation may require accessing complementary assets that lie outside the organization.").

253. *See* Teece, *supra* note 49 (presenting examples of how innovators lost to competitors that offered superior products, lower pricing, or better marketing and distribution).

254. *See supra* notes 178–188 and accompanying text.

The core of hedging theory is that patents, as government-backed legal monopolies, act as a form of insurance against competition.²⁵⁵ In economic terms, patents provide a hedge that reduces the patentholder's risk that competition will diminish any supernormal profits enjoyed by it, either directly or via licensing, as a first-mover.²⁵⁶ In this sense, patents are not necessary for supernormal profits, as they are often described.²⁵⁷ Rather, a true "first" innovator can presumptively enjoy supernormal profits from the start, using complementary assets to maintain and extend these profits. Patents further extend the period of supernormal profits by providing an option to prevent potential competition from third parties. Specifically, this option acts as a hedge by affording the patent holder a legal right to exclude competitors over the patented product or process from the market, or require them to pay damages as a penalty for infringement, reducing the level of risk that the innovator's supernormal profits will be eroded by market competition.²⁵⁸ By acting as hedges against profit erosion, patents help ensure that technological innovators have appropriate incentives to undertake costly and risky activities that are socially valuable.²⁵⁹

In contrast to hedging theory, many commentators have described patents as exclusive "options" to commercialize a patented invention.²⁶⁰ For instance, according to Rita McGrath and Atul Nerkar, "a patent confers on the firm the right but not the obligation to make further investments, culminating in a decision whether to commercialize its knowledge or not. Investments made towards commercializing the knowledge underlying the patent are analogous to the exercise price on the real option."²⁶¹ These views, however, do not

255. Cf. IRVING FISHER, *ELEMENTARY PRINCIPLES OF ECONOMICS* 331 (1912) (arguing that patents encourage investment of capital into industries otherwise characterized by "cutthroat competition").

256. See Peter N. Golder & Gerard J. Tellis, *Pioneer Advantage: Marketing Logic or Marketing Legend?*, 30 J. MKTG. RSCH. 158, 161 (1993) (describing several forms of free riding that can erode first-mover and other "pioneer" advantages). Importantly, patents do not guarantee that competition will be foreclosed. Rather, patents are "probabilistic rights" in the sense that showing infringement, validity, and enforceability of a given patent will typically be difficult. See generally Mark A. Lemley & Carl Shapiro, *Probabilistic Patents*, 19 J. ECON. PERSP. 75 (2005).

257. See *supra* note 72.

258. See *supra* notes 40–51 and accompanying text.

259. See Emmanuel Dechenaux, Brent Goldfarb, Marie C. Thursby & Scott Shane, *Appropriability and the Timing of Innovation: Evidence from MIT Inventions* 24 (2003), http://papers.ssrn.com/sol3/papers.cfm?abstract_id=404820 ("Our empirical results provide strong support for the view that the ability to appropriate returns [from post-invention patent protection] is important for inventions whose success is highly uncertain.").

260. See *supra* note 38.

261. Rita Gunther McGrath & Atul Nerkar, *Real Options Reasoning and a New Look at the R&D Investment Strategies of Pharmaceutical Firms*, 25 STRATEGIC MGMT. J. 1, 6 (2004).

accurately characterize the legal rights afforded by a patent.²⁶² In short, modern-day patents merely provide *negative* rights to prevent others from making, using, or selling the patented invention, but do not offer positive rights to the patentee to engage in these activities.²⁶³

In many situations, a patentee will not be able to commercialize its patented invention for at least three reasons.²⁶⁴ First, other patents may cover a portion of the patented invention.²⁶⁵ For instance, if Inventor A patents the wheel and Inventor B patents the buggy, Inventor B will not be able to commercialize the buggy absent a license from Inventor A.²⁶⁶ This situation is fairly common for multi-component products and leads to so-called problem of “blocking patents.”²⁶⁷ Blocking patents also arise when a later inventor improves upon an earlier invention, foreclosing the earlier inventor from commercializing the improvement, even though the improvement technically lies within the scope of the earlier inventor’s patent claims.²⁶⁸ Second, an inventor may be effectively blocked by market forces, such as by lack of access to essential complementary assets held by competitors, sufficient capital to commercialize or even seek licenses for the invention, or other, more valuable opportunities.²⁶⁹ Third, commercialization may be foreclosed by other laws, such as environmental and other regulatory laws.²⁷⁰

Thus, patents are not, as typically claimed, real call options to commercialize, but rather real put options to prevent commercialization by others, that is, as hedges against competition.²⁷¹ As noted earlier, a real put

262. See *supra* note 39 and accompanying text; *infra* notes 255-60 and accompanying text.

263. See *supra* note 38-39.

264. See *infra* notes 265-270.

265. See Bruce W. Burton, Scott Weingust & Alton L. Hare, *The Attorney’s Role in Assisting Clients with Patent Valuation*, LANDSLIDE MAGAZINE 27, 29 (2015) (“[P]atents grant only an exclusionary right, not a right to practice. This permits the scenario where patentee A cannot commercialize products or services covered by the claims of its patent because patentee B has a patent with claims that encompass some element of the claims of patentee A’s patent, and vice versa.”).

266. See *id.*

267. Merges & Nelson, *supra* note 25, at 860–62 (describing blocking patents); Robert Merges, *Intellectual Property Rights and Bargaining Breakdown: The Case of Blocking Patents*, 62 TENN. L. REV. 75 (1994).

268. See Arora, *supra* note 130 at 179–82.

269. See Sichelman, *Commercializing Patents*, *supra* note 10 at 362–76.

270. For instance, patentees of pharmaceutical drugs cannot generally commercialize the drugs without approval from the FDA. See Rebecca S. Eisenberg, *The Role of the FDA in Innovation Policy*, 13 MICH. TELECOMM. & TECH. L. REV. 345 (2006).

271. Because patents do not necessarily provide for exclusive use over the patented good, they are quite different from ordinary property. Cf. Daniel Spulber, *Competition Policy and the*

option in the intellectual property context provides its holder the ability to force infringers either to pay money damages or cease infringement.²⁷² A real call option to exclusively commercialize is typically afforded by the inventor (or its licensees)²⁷³ being first to market—not by a patent right.²⁷⁴ To the extent such commercial exclusivity exists prior to issuance of a patent, the negative rights afforded by a patent may extend the exclusivity—indirectly providing exclusive rights to commercialize—but patents generally do not create market exclusivities in the first instance.²⁷⁵

Importantly, this characterization applies even to patents held by non-practicing entities (NPEs) that are indeed first inventors, because even

Incentive to Innovate: The Dynamic Effects of Microsoft v. Commission, 25 YALE J. REG. 247, 267 (2008) (“For an intellectual product to be considered IP . . . [i]ts owner must have exclusive rights to the choice of how to use the intellectual product.”). This is yet another argument against the standard public good-excludability paradigm for explaining and justifying patents. In other words, patent law does not erect an ironclad fence around the inventor’s claims so as to convert an otherwise public good into an excludable private one in which the owner can do as it pleases behind the fence.

272. See *supra* note 48 and accompanying text.

273. See ARORA ET AL., *supra* note 130, at 32–40 (pointing to more than 15,000 licensing transactions worldwide with a total value of over \$320 billion in the period 1985–1997); KEVIN G. RIVETTE & DAVID KLINE, REMBRANDTS IN THE ATTIC: UNLOCKING THE HIDDEN VALUE OF PATENTS 5 (1999) (estimating that the licensing market grew 700% from \$15 billion in 1990 to well over \$100 billion in 1998); Katherine J. Strandburg, *Users as Innovators: Implications for Patent Doctrine*, 79 U. COLO. L. REV. 467, 484 (2008) (“[P]atents encourage invention primarily by excluding competitors (and thus driving up profits for patent-holding manufacturers) or by facilitating a market for licenses and assignments so that inventors can sell their ideas to others.”).

274. See *supra* notes 43–44 and accompanying text.

275. See *id.* One notable exception is the use of patents under the “*Metallizing* rule” to usurp exclusivity from a holder of a trade secret. In this instance, a commercializer that is first-to-market and maintains an invention as a trade secret may lose its ability to make, use, and sell the invention to a third party that independently discovers and patents the invention. See Dmitry Karshedt, *Did Learned Hand Get It Wrong?: The Questionable Patent Forfeiture Rule of Metallizing Engineering*, 57 VILL. L. REV. 261, 262 (2012) (explaining and critiquing this rule). However, the *Metallizing* rule can be viewed through the lens of hedging theory—specifically, the hedge afforded by patent is so strong that it reduces competitive risk not only from potential future competition, but also from pre-existing competition that is “secret.” Instead of viewing the rule of *Metallizing* as justified on the importance of invention disclosure, one can ground it on the importance of notice to a potential inventor. Much like property recording systems, notice in this instance economizes on transaction costs by providing signals to would-be inventors that an invention is already available in the marketplace. Such notice does not turn on the full disclosure of the invention sufficient to enable a skilled technician to make and use the invention but rather on disclosure sufficient merely to alert others of the type and nature of the invention. The prior user defense of the AIA, noted earlier, provides a limited exception from the *Metallizing* rule. See 35 U.S.C. § 273 (2011) (setting forth the requirements for the prior user defense under the America Invents Act).

independent development and use of an NPE's patented invention deprives the patentee from earning supernormal profits via its current or prospective licensees.²⁷⁶ In this regard, optimal incentives for innovation are essential regardless of the business model of the patentee, and the hedge against competition afforded by patents is a tradeable right that can reduce risk for any potential commercializer of the invention, regardless of whether the commercializer is the inventor.²⁷⁷ In other words, by affording a valuable, tradeable hedge against competition, patent law broadly incentivizes R&D and commercialization efforts regardless of the business structure or strategy of the inventor.

Precision in the characterization of the patent right is important, because viewing patents through the lens of option theory “provides a framework to produce new perspectives on patents” that links to an expansive economics, business, and financial literature, thereby providing a richer framework to analyze the economic value of patents.²⁷⁸ One immediate interest in this endeavor is determining the “price” of purchasing the patent put option.²⁷⁹ Patent law doctrines contain a variety of “gating” functions that set the option price fairly high in order to ensure that the inventions that receive exclusionary rights are indeed socially valuable.²⁸⁰ Novelty and non-obviousness requirements ensure that the invention is sufficiently original so that government interference with ordinary market mechanisms is necessary.²⁸¹ Disclosure doctrines, such as enablement, require that the inventor disclose enough about an invention in a patent—namely, sufficient to enable one of ordinary skill in the art to make and use the invention without undue

276. Even if all potential commercializers forgo licensing, as long as those commercializers were not the first to invent, they deprive the NPE of potential supernormal profits, reducing the incentive to invent.

277. See Sichelman, *supra* note 223, at 550–52 (arguing that generally NPEs and operating companies should “earn exactly the same return on their efforts” in order to promote optimal levels of innovation).

278. Christopher Cotropia, *Describing Patents as Real Options*, 34 J. CORP. L. 1127, 1149 (2009).

279. *Cf. id.* at 1135–37 (attempting to estimate the price of purchasing a call option to commercialize a patented product or service).

280. See Emily Michiko Morris, *Intuitive Patenting*, 66 S.C. L. REV. 61, 81 (2014) (“The patentability requirements of novelty, non-obviousness, utility, and full disclosure (particularly enablement) serve a critical role in adjusting the ever present tension in patent law between stimulating innovation by protecting inventors, and impeding progress by granting patents when not justified by the statutory design.”) (citing *Bilski v. Kappos*, 130 S. Ct. 3218, 3229 (2010)) (internal quotation marks omitted).

281. See 35 U.S.C. §§ 102, 103 (2012) (setting forth novelty and nonobviousness requirements).

experimentation—to justify the scope of the rights afforded to the inventor.²⁸² Patentable subject matter limitations exclude classes of inventions—such as those too closely relating to abstract ideas, natural laws, and natural phenomena—with large potential social costs.²⁸³ Limited patent terms of twenty years help to diminish consumer deadweight losses and incentivize improvements to the invention by placing it into the public domain.²⁸⁴ The high cost of enforcement and the possibility that the patent will be nullified in post-grant proceedings at the Patent Office provides a further gating function by setting a high effective “exercise price” of the option.²⁸⁵

In sum, hedging theory explains why patent infringement as an economic matter extends beyond free riding, both at the level of invention and commercialization, without resorting to Kitchian coordination and related rent-dissipation rationales.²⁸⁶ Because competition may stem from free riding *or* wholly independent activity, in order for patent law to provide optimal incentives—at least for most classes of high-cost, high-risk activity—it must partly suppress competition of any form in order to ensure adequate supernormal returns.²⁸⁷

282. See 35 U.S.C. § 112(a) (“The specification shall contain a written description of the invention . . . in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains . . . to make and use the same, and shall set forth the best mode contemplated by the inventor or joint inventor of carrying out the invention.”).

283. See *Ass’n for Molecular Pathology v. Myriad Genetics, Inc.*, 133 S. Ct. 2107, 2116 (2013) (citing *Mayo Collab. Servs. v. Prometheus Lab’ys, Inc.*, 566 U.S. 66, 70 (2012)) (“We have long held that [Section 101] contains an important implicit exception[:] Laws of nature, natural phenomena, and abstract ideas are not patentable.”) (internal quotation marks omitted); Mark A. Lemley, Michael Risch, Ted Sichelman & R. Polk Wagner, *Life After Bilski*, 63 STAN. L. REV. 1315, 1330–32 (2011) (noting the potential social costs that could arise if certain classes of inventions were patentable).

284. See Andrew W. Horowitz & Edwin L.-C. Lai, *Patent Length and the Rate of Innovation*, 37 INT. ECON. REV. 785, 785 (1996) (finding that patents with very long terms would reduce overall innovation, because although they would induce the development of more significant innovations, they would tend to reduce the frequency of innovation more so); Michael Abramowicz, *The Danger of Underdeveloped Patent Prospects*, 92 CORNELL L. REV. 1065, 1106 (2007) (“If a patent term is too short, the patentee might have socially insufficient incentives to develop the patent by engaging in nonpatentable research and commercialization activities, but if it is too long, excessive deadweight loss will result.”).

285. See Rebecca S. Eisenberg, *Patent Costs and Unlicensed Use of Patented Inventions*, 78 U. CHI. L. REV. 53, 56 (2011) (“[P]atent enforcement costs tend to shelter low-value uses from patent assertion”).

286. See *supra* notes 129–154 (describing coordination and rent-dissipation explanations of patent law).

287. Yet, free riding will tend to diminish profits more so than independent invention. Thus, while a hedging theory may explain why patent infringement extends beyond copying, there are economic reasons to distinguish copying from independent invention in evaluating the appropriate remedy for infringement.

IV. THE BENEFICIAL ASPECTS OF COMPETITION AND THE IMPOSSIBILITY OF OPTIMAL INCENTIVES

A. “MIXED” COMPETITION THEORY OF INNOVATION

Suppressing competition is not the entire story for patent rights, because competition can often help promote innovation, particularly in two instances. First, as explained earlier, innovators are not an infinite resource.²⁸⁸ Instead, there is typically a small set of potential firms and individuals who can realistically bear the cost and have a sufficient likelihood of success in inventing and commercializing particular classes of innovations.²⁸⁹ Given the illiquidity and heterogeneity of most inventor markets, traditional neoclassical theories that predict the number of innovators that will enter a “patent race” will be so large so as to “dissipate” all producer surplus available from the patent are often incorrect.²⁹⁰

Contrary to these models, different innovators frequently cannot undertake R&D efforts toward a given innovation at the same or similar costs.²⁹¹ The costs for all but a small number of potential innovators are usually too large to profitably enter a patent race.²⁹² Often the cost of merely identifying the innovation subject to the race is so large that, as a practical matter, there is only one innovator that can supply it within a reasonable time frame.²⁹³ To the extent patents provide market power to certain firms in a given industry or sector, those firms may crowd out other firms—and, relatedly, may erect barriers to entry for new firms—further diminishing the number of firms that innovate in a given industry or sector.²⁹⁴ All things equal, the fewer the

288. See *supra* notes 190–193 and accompanying text.

289. See *id.*

290. See *id.*

291. See *id.*

292. See *id.*

293. See generally Stanley S. Reynolds & R. Mark Isaac, *Stochastic Innovation and Product Market Organization*, 2 *ECON. THEORY* 525, 539–42 (1992) (examining an “environment in which only a single firm can successfully innovate”).

294. See Lerner, *supra* note 195, at 464–65 (finding that incumbent patenting in the biotechnology industries can deter other firms from entering). See generally Christopher Harris & John Vickers, *Patent Races and the Persistence of Monopoly*, 33 *J. INDUS. ECON.* 461, 461–62 (1985) (asserting that in a patent race, the potential challenger may anticipate that the incumbent will win, in which case challenger will not enter the race); Mark R. Patterson, *Patent Races with No Entrants* 1 (Fordham Law & Econ., Research Paper No. 22, 2002), <https://ssrn.com/abstract=336220> (stating that an inventor who would have won the race may exit after suffering early setbacks because the inventor is unaware that competitors may have suffered similar setbacks).

number of innovating firms in a given industry, the less innovation will occur.²⁹⁵

Although Schumpeter and his exponents have argued that a monopolistic industry structure may yield more innovation than a competitive one, some scholars—such as Arrow—have espoused the opposite.²⁹⁶ And still others have argued that Schumpeter’s and Arrow’s views may both be correct, asserting that the relationship between competition and innovation is an inverted “U-shape” (see Figure 1).²⁹⁷

295. See also JEAN TIROLE, *THE THEORY OF INDUSTRIAL ORGANIZATION* 399 n.23 (1988) (“[T]he existence of several independent research programs is not bad per se, because ‘two chances are better than one.’”).

296. See Arrow, *supra* note 59, at 619–20; Morton I. Kamien & Nancy L. Schwartz, *MARKET STRUCTURE AND INNOVATION* 75–90 (1982) (contending that monopolist firms may ultimately spend less on R&D); F.M. Scherer & David Ross, *INDUSTRIAL MARKET STRUCTURE AND ECONOMIC PERFORMANCE* 660 (3d ed. 1990) (disapproving Schumpeter’s “less cautious” followers); Howard A. Shelanski, *Competition and Deployment of New Technology in U.S. Telecommunications*, 2000 U. CHI. LEGAL F. 85, 85 (concluding that competition motivated innovation more than monopoly in multiple empirical studies of the telecommunications industry); Lemley, *Economics of Improvement*, *supra* note 10, at 1042–44.

297. Aghion et al., *supra* note 157, at 702–05 (finding in a general empirical study that maximal incentives for innovation lie somewhere between a low and high level of competition). See also Peter Lee, *Churn*, 99 WASH. U.L. REV. 1 (2021) (describing the beneficial role for innovation that patent law may play by promoting some competition).

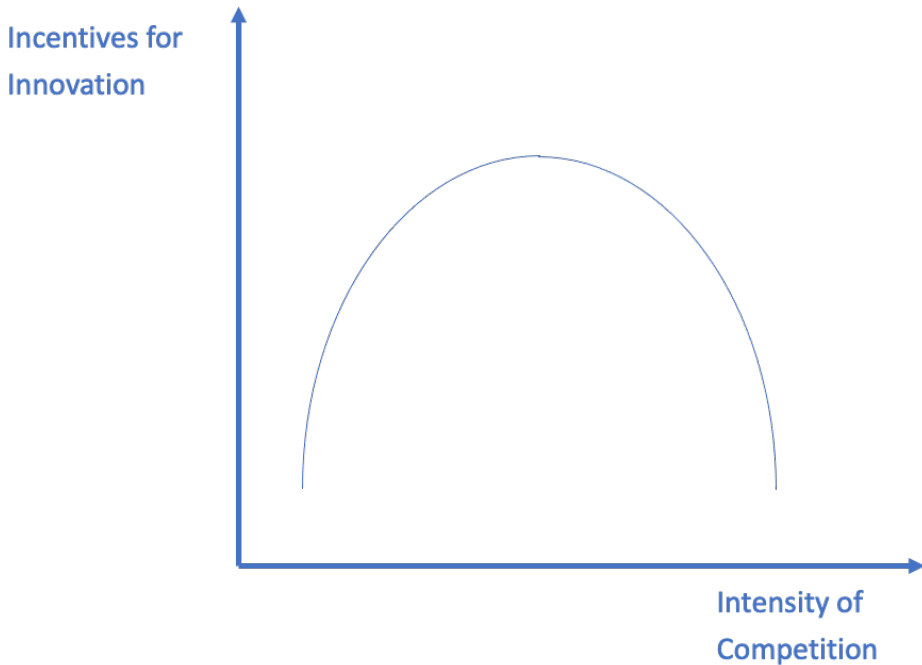


Figure 1. Possible Relationship between Innovation Incentives and Intensity of Competition.²⁹⁸

Whatever the precise optimum, it is important to remain cognizant of the role suppressing competition to inflate innovator returns might play along the temporal dimension: ex ante, it increases the number of potential innovators, yet ex post, it has the exact opposite effect. This dueling aspect of patents may help explain the Schumpeter-Arrow debate's general intractability.

Second, more competition may promote greater commercialization of invention as well as follow-on innovation, especially in markets with high transaction costs in licensing.²⁹⁹ This view directly conflicts with Kitch's

298. See Aghion et al., *supra* note 157 at 720.

299. See generally Carl Shapiro, *Navigating the Patent Thicket: Cross Licenses, Patent Pools, and Standard Setting*, in 1 INNOVATION POL'Y & ECON. 120 (2001) (describing how a "patent thicket [is] a dense web of overlapping intellectual property rights that a company must hack its way through in order to actually commercialize new technology"); cf. Blair, *Strict Liability*, *supra* note 15, at 818 ("The transaction costs of and other obstacles to licensing can be burdensome for a number of reasons, including asymmetric information; the potential for competition from substitutes for the patented invention; the interdependence of potential licensees' demand curves; and the fact that licensees are free to challenge the patent's validity.").

coordination thesis.³⁰⁰ Specifically, if the costs of bargaining are high enough to prevent licensing and related deals, the threat of an infringement suit may prevent others from improving or commercializing the original invention.³⁰¹ In this regard, suppressing independent competition may be particularly problematic when the costs of providing notice of relevant patents to potential infringers are high.³⁰² The nature and extent of “notice externalities” created by the patent system is debatable, but surely some pockets of notice failure exist.³⁰³ Thus, in high-transaction cost settings, weaker patent rights—and in turn, more competition—may lead to more downstream innovation and commercialization.³⁰⁴ Even in industries without high transaction costs, more cutthroat competition may yield greater incentives for market actors to innovate and therefore “escape” the “neck-and-neck” daily race so as to increase profits, despite the limited time afforded by first-mover advantages and complementary assets.³⁰⁵

Besides these innovation-side dynamic costs of patents, suppressing competition increases deadweight losses that generate static costs by reducing consumer welfare.³⁰⁶ For certain innovations, such as pharmaceutical drugs, consumer deadweight losses often are quite large. According to a government study, generic drugs in a mature market are typically 15% of the pre-generic entry price of branded drugs and obtain 90% market share.³⁰⁷ If a

300. Dan L. Burk & Brett H. McDonnell, *The Goldilocks Hypothesis: Balancing Intellectual Property Rights at the Boundary of the Firm*, 2007 U. ILL. L. REV. 575, 587 (2007); Wendy Seltzer, *Software Patents and/or Software Development*, 78 BROOK. L. REV. 929, 961 (2013) (“Kitch’s theory draws heavily on the Coasean counterfactual, in which transaction costs are low and information easily available.”); F. Scott Kieff, *The Case for Registering Patents and the Law and Economics of Present Patent-Obtaining Rules*, 45 B.C. L. REV. 55, 65 (2003) (“Kitch’s response was to argue that the coordination costs are likely to be low in such early stages because there are likely to be only a small number of players then. But this response does not fully answer the problem. As Abramowicz correctly points out, the transaction costs may be high in such a community because the members may have significant cognitive biases. The transaction costs to coordinating may also be high if the racers do not know about each other.”).

301. See Sichelman, *Commercializing Patents*, *supra* note 10 at 362–70.

302. Peter S. Menell, & Michael J. Meurer, *Notice Failure and Notice Externalities*, 5 J. LEGAL ANALYSIS 1, 10 (2013) (“Inadequate notice poses a risk of trespass or infringement upon other resource developers. Inefficient notice regimes raise development costs and generate wasteful litigation.”).

303. See *id.* at 33 (“The imprecision of patent claim scope in the software and business method fields is so bad that many developers ignore patents at the front-end and deal with licensing and litigation.”).

304. See Sichelman, *Commercializing Patents*, *supra* note 10 at 362–76.

305. Aghion et al., *supra* note 157, at 714.

306. See *supra* note 24.

307. FEDERAL TRADE COMMISSION, PAY-FOR-DELAY: HOW DRUG COMPANY PAY-OFFS COST CONSUMERS BILLIONS 8 (2010).

pharmaceutical would have been created and disseminated regardless of the patent, competition would substantially drive down price.³⁰⁸ Thus, in addition to providing dynamic innovation benefits, competition will typically yield static benefits for consumers.³⁰⁹

B. THE IMPOSSIBILITY OF OPTIMAL INCENTIVES IN INTELLECTUAL PROPERTY

Taken as a whole, the importance of suppressing competition—and not just free riding—coupled with the potential costs from doing so present what I believe is an intractable problem in setting the appropriate balance in a dynamic setting to incentivize innovation through intellectual property (and this concern extends beyond patents).³¹⁰ Even if we had perfect information regarding current and all prior technology—including social value, private value, risks, costs, and the like—this intractability would nonetheless arise.³¹¹

Specifically, the uncertainty regarding the social value of what the future might bring technologically will always make it impossible to know whether

308. CONG. BUDGET OFFICE, HOW INCREASED COMPETITION FROM GENERIC DRUGS HAS AFFECTED PRICES AND RETURNS IN THE PHARMACEUTICAL INDUSTRY 13 (1998), cbo.gov/publication/10938 (“Considering only drugs sold through retail pharmacies, the Congressional Budget Office (CBO) estimates that the purchase of generic drugs reduced the cost of prescriptions (at retail prices) by roughly \$8 billion to \$10 billion in 1994.”); Michael A. Carrier, *A Real-World Analysis of Pharmaceutical Settlements: The Missing Dimension of Product Hopping*, 62 FLA. L. REV. 1009, 1034 (2010) (“Allowing the patent holder to claim antitrust immunity for its contracts as if they were litigated injunctions, while evading the risk of patent invalidation, deprives consumers of significant benefits from price competition in the pharmaceutical industry.”) (internal quotations omitted).

309. Cf. Carl Shapiro, *Patent System Reform: Economic Analysis and Critique*, 19 BERKELEY TECH. L.J. 1017, 1041 (2004) (“Given the benefits to consumers and competition when invalid patents are struck down, relying on dual public and private action to challenge patents seems highly desirable, much as we have dual enforcement of the antitrust laws.”). See generally *Northern Pacific Railway Co. v. United States*, 356 U.S. 1, 4 (1958) (“[U]nrestrained interaction of competitive forces will yield the best allocation of our economic resources, the lowest prices, the highest quality and the greatest material progress.”). A related static cost, namely administering the patent system, is also reduced by furthering competition. See Barnett, *supra* note 24 (noting administrative costs).

310. See Steven C. Salop & R. Craig Romaine, *Preserving Monopoly: Economic Analysis, Legal Standards, and Microsoft*, 7 GEO. MASON L. REV. 617, 648–49 (1999) (noting the complications that arise in a dynamic analysis of innovation); see generally Robert Pitofsky, *Antitrust and Intellectual Property: Unresolved Issues at the Heart of the New Economy*, 16 BERKELEY TECH. L.J. 535, 540–41 (2001) (noting the importance of innovation in a “dynamic economy”).

311. Cf. Cass R. Sunstein, *Legal Interference with Private Preferences*, 53 U. CHI. L. REV. 1129, 1159 (1986) (noting the difficulties in economic modeling when there are “endogenously changing tastes,” even in the presence of perfect information).

the structure of current intellectual property rights is optimal.³¹² The level at which we suppress competition today will affect the nature of future innovation, and it is impossible to balance the value of innovation today with an unknown value tomorrow.³¹³ Thus, intellectual property is caught in a double-bind: an intellectual property “impossibility” theorem.³¹⁴ The only practical approach is to assume that the changes arising tomorrow relative to the state of the world today are roughly the same as the changes that arose today relative to yesterday. While practical, it is unlikely to appropriately balance the pro- and anti-innovative effects of decreased competition.

Ultimately, on a hedging view, intellectual property rights should begin at exactly that point where supernormal returns are absolutely necessary to incentivize socially desirable innovation over some reasonably short time period (e.g., twenty years), premised on the assumption that progress is fairly stable over long periods of time. These supernormal returns are generated by providing exclusionary legal rights that suppress competition, not just free riding.³¹⁵ As such, antitrust or competition law should play little to no role *within the proper scope* of the rights afforded by a properly issued patent. On the other hand, outside of these confines—for instance, for ordinary market activity—antitrust should generally play an active role, promoting strong competition, at least where the market cannot do so without regulatory intervention.³¹⁶ Unfortunately, given limited information and high information costs, it is often difficult, if not impossible, to determine the “proper” scope of patent rights.³¹⁷ Instead, patent law operates more along a fuzzy spectrum—

312. See Daniel J. Solove, *Privacy and Power: Computer Databases and Metaphors for Information Privacy*, 53 STAN. L. REV. 1393, 1452 (2001) (“Because this value is linked to uncertain future uses, it is difficult, if not impossible, for an individual to adequately value her information.”).

313. See Richard A. Posner, *Antitrust in the New Economy*, 68 ANTITRUST L.J. 925, 938 (2001) (noting how the “rapid[ity] of innovation” may “make[] the future wholly uncertain”).

314. Cf. Suzanne Scotchmer, *Standing on the Shoulders of Giants: Cumulative Research and the Patent Law*, 5 J. ECON. PERSP. 29, 34–35 (1991) (explaining the “double marginalization” that occurs between a first and second innovator because it is “impossible to give the surplus to both parties” in a manner that results in socially optimal incentives to innovate).

315. See *supra* Part II.

316. See *Bonito Boats, Inc. v. Thunder Craft Boats, Inc.*, 489 U.S. 141, 146 (1989) (“The Patent Clause itself reflects a balance between the need to encourage innovation and the avoidance of monopolies which stifle competition without any concomitant advance in the ‘Progress of Science and the useful Arts.’”); Louis Kaplow, *The Patent-Antitrust Intersection: A Reappraisal*, 97 HARV. L. REV. 1813, 1829–37 (1984).

317. Herbert Hovenkamp, *Patents, Property, and Competition Policy*, 34 J. CORP. L. 1243, 1248 (2009) (“Insofar as competition policy is concerned, some of the biggest shortcomings of the patent system relate to its status as a system of property rights. The problems relate to two very general subjects that are well known to property lawyers: boundaries and priority . . .

where patent law ends and antitrust law begins can be quite a fraught process for those involved.³¹⁸ Patent and antitrust law may conflict in these boundary zones in ways that cannot be resolved in any determinate manner.

C. EXPLAINING AWAY “PATENTS AS A SOCIAL COST”

Several scholars have recently questioned whether patents—at least in their current form—yield any net social benefits.³¹⁹ In an influential study, James Bessen and Michael Meurer conclude that patent litigation overall yields at least a net private cost outside of the chemical and pharmaceutical industries. Furthermore, they contend that these costs outweigh any benefits from the value of patents in the marketplace, as determined in essence from renewal rates and aggregate estimated licensing fees.³²⁰ As such, they assert that “[patents likely provide] a net disincentive for innovation for the firms who fund the lion’s share of industrial R&D; that is, patents tax R&D.”³²¹ Although there are notable flaws in this study, making its conclusions somewhat suspect,³²² even supposing their findings are correct, the hedging theory presented here runs counter to their conclusion that patents act as a “tax” on R&D.

Rather, like the purchase of insurance more generally, an innovative firm that purchases a hedge against competitive threats to its own or its licensees’ profit stream would be expected to spend a significant sum to acquire and exercise the hedge.³²³ Yet, because the hedge reduces risk in the overall innovative process, particularly in the commercialization of invention, it provides significant private and social economic value that is not captured by the valuation methods used by Bessen and Meurer. Specifically, because

[M]uch of patent/antitrust doctrine arises from the fact that these ordinary and essential property limitations are so poorly defined within the patent system.”); Craig Allen Nard, *Legal Fictions and the Role of Information in Patent Law*, 69 VAND. L. REV. 1517, 1535 (2016) (“The *Morse* case also highlights a broader policy issue in patent law: the determination of optimal claim scope—a very difficult endeavor.”).

318. See generally Lee, *supra* note 297 (discussing the intersection of patents and antitrust in the context of Schumpeterian theory).

319. See Bessen & Meurer, *supra* note 69, at 5; MICHELE BOLDRIN & DAVID K. LEVINE, *AGAINST INTELLECTUAL MONOPOLY* (2008); Richard Stallman, *Patent Law Is, at Best, Not Worth Keeping*, 45 LOY. U. CHI. L.J. 389 (2013).

320. See Bessen & Meurer, *supra* note 69, at 99–118.

321. *Id.* at 144.

322. See, e.g., Glynn S. Lunney, Jr., *On the Continuing Misuse of Event Studies: The Example of Bessen and Meurer*, 16 J. INTEL. PROP. L. 35, 37, 49–56 (2008).

323. Cindy W. Ma & Algis T. Remeza, *Life is Full of Derivatives*, 25 No. 3 FUTURES & DERIVATIVES L. REP. 7 (2005) (“However, the only sure way to lock in a price is to sell it, which may not be possible. A put option can prevent losses from a stock price decline, but put options alone are costly.”).

renewals occur well after the point at which hedging risk is most important, patent values derived from renewal rates are very unlikely to reflect the economic value provided by firms using patents as hedges.³²⁴ Similarly, one would not necessarily expect litigation to provide net positive returns to patentholders. Rather, because patentholders are repeat players—and the credible threat of litigation increases the value of patents as a hedge in the market—litigation may in fact be an expense that firms tolerate in return for ensuring that patents properly function as hedges.³²⁵ In sum, by shifting from a static, neoclassical view that patents generate incentives by providing market power to price above competitive rates to a dynamic, Schumpeterian view that patents are primarily hedges to reduce risk of profit erosion from competition, the appropriate economic measure of how well patents perform their economic function itself shifts considerably.

V. CONCLUSION

At this point in the Article, one may quip that I have “hedged” against my own thesis of patents as tools to *suppress* competition in order to promote innovation by stressing the importance of *promoting* competition for the same end.³²⁶ Unfortunately, my general view is that at least at present, there is no sufficiently rigorous theory to offer us a way out of the competition dilemma in innovation, other than in certain industrial pockets in which the answer is fairly clear. Rather, achieving the optimal balance between suppressing and promoting competition in the innovation process can only be answered by rigorous empirical research.

Armchair and even mathematically grounded theorizing will arguably be inadequate for the task, as there are many relevant variables that likely interact

324. See Jonathan M. Barnett, *supra* note 309, at 1280 (“[L]ow renewal rates may have little to say about the relative effectiveness of patent protection to the extent that they simply reflect the fact that innovations are patented early in the innovative process and most turn out to have no or limited commercial application.”). Another problem with renewal valuation is that given the relatively low cost of renewal, it becomes difficult to estimate the value of very high-valued patents, which may account for the very large percentage of overall patent value. See Mike Lloyd, *Tell Me Again—Why Should I Spend Money on Filing Patents?*, 45 LES NOUVELLES 37, 38 (2010) (“Valuing patents based on patent renewal data suffers from a major drawback in that the renewal fee becomes the minimum value of the renewed patent. This may systematically understate the value of the retained patents.”).

325. Cf. James F. McDonough III, *The Myth of the Patent Troll: An Alternative View of the Function of Patent Dealers in an Idea Economy*, 56 EMORY L.J. 189, 216 (2006) (“By creating a credible threat of litigation, making patents more liquid, and setting market clearing prices, the patent market becomes more efficient.”).

326. See *supra* Part III (explaining the importance of competition to the innovative process).

in a nonlinear fashion to generate interdependencies so fine that small changes in one parameter may radically shift optimal policy approaches. Moreover, legal systems operate across broad swathes of technologies and across many products and methods within a technological sector.³²⁷ Patent agencies and courts cannot customize the law for each and every case based on a trove of facts. It is simply too expensive, and it is unclear that even with an unlimited budget, institutional competence would be sufficient to do so.

Thus, calls for a broad “independent invention” defense—that is, preferencing the role of competition in the innovation game—appear premature because they all turn on fairly simplistic theoretical models or assumptions about the patent system that simply cannot be borne out by our current knowledge of the innovation process. Here, my aim has been to provide an expanded theoretical lens—namely, viewing patents as hedges—in order to mount a defense of the long-historical baseline that patent infringement captures wholly independent activity.

327. Dan L. Burk & Mark A. Lemley, *Is Patent Law Technology-Specific?*, 17 BERKELEY TECH. L.J. 1155, 1156 (2002) (“Patent law has a general set of legal rules to govern the validity and infringement of patents in a wide variety of technologies.”); Burk & Lemley, *Policy Levers in Patent Law*, *supra* note 50, at 1577 (“This seeming paradox—a monolithic legal incentive for wildly disparate industries—is resolved by the realization that, despite the appearance of uniformity, patent law is actually as varied as the industries it seeks to foster.”).

EVIDENCE OF SYSTEMATIC “PATENT HOLDOUT”

Kirti Gupta[†] & Urška Petrovčič^{††}

ABSTRACT

“Patent holdup” and “patent holdout”—concepts borrowed from the general theory of incomplete contracts and applied to the patent world—are topics that have been long debated in the patent policy arena, particularly in the context of standard-essential patents (SEPs). Although for many years, the policy debate focused exclusively on “patent holdup,” that is, opportunism on the side of patent holders, there is now a broad consensus that “patent holdout,” which refers to opportunism on the side of implementers, may also occur. Yet, whereas commentary on “patent holdup” abounds, both in terms of theory and evidence (or the lack of it), “patent holdout” is not yet well explored in the literature. This article aims to fill this gap, by providing comprehensive examinations of the incentive structure and empirical evidence of “patent holdout.” After analyzing a rich set of court data, we find that concerns about implementers’ opportunism have ample empirical support in court decisions, in alignment with the incentive structure enabled by the patent enforcement regime today. We also find that although courts have made some progress in mitigating opportunistic practices, they have been generally unable to sufficiently address the problem of “patent holdout.” Indeed, empirical evidence shows that in licensing negotiations involving SEPs, “patent holdout” continues to be a real-world issue. Our analysis suggests that to enhance the efficiency of licensing negotiation for SEPs, it is critical to evaluate and ultimately implement at least some measures that address “patent holdout.”

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All views presented in the Article are the authors’ own and not necessarily of any professional affiliation held by the authors.

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I. INTRODUCTION

“Patent holdup” and “patent holdout”—concepts borrowed from the general theory of incomplete contracts and applied to the patent world—are topics that have been long debated in the patent policy arena. “Patent holdup” refers to the opportunistic behavior of a patent holder using the threat of exclusion (that is, injunction) from the market to coerce a potential licensee to accept “unreasonable” royalties or other such licensing terms. Symmetrically, “patent holdout” refers to the opportunistic behavior of an implementer of a patented technology that uses delaying tactics and legal maneuvering to prolong infringement and thereby coerce the patent holder to accept zero or “unreasonable” royalties or other such licensing terms. Although for many years, the policy debate focused exclusively on “patent holdup,” there is now a broad consensus that opportunism may arise both on the side of patent holders and on the side of implementers—a point of bargaining where incomplete contracts break.¹

1. *See, e.g.,* Optis Cellular Tech. LLC v. Apple Retail U.K [2022] EWCA Civ 1411, 7; EUR. COMM’N, COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT,

Whereas commentary on “patent holdup” abounds, both in terms of theory and evidence (or the lack of it), “patent holdout” is not yet well explored in the literature. This Article is one of the first comprehensive examinations of the incentive structure and empirical evidence of “patent holdout,” utilizing a rich set of court data, to determine whether “patent holdout” is observed in practice.² Although we acknowledge that “patent holdout” is not specific to any particular industry, we focus our analysis on technology standards and the so-called standard-essential patents (“SEPs”) that are subject to the holder’s commitment to offer a license on fair, reasonable, and non-discriminatory (“FRAND”) terms. This focus lends itself to a practical approach to gathering empirical data and is a sensible focus because “patent holdup” and “patent holdout” have most often been discussed in the context of SEPs.

We start our analysis with the framework for understanding the incentives that companies may have to engage in “patent holdout” due to the current patent enforcement and institutional structure. We then examine court decisions that have scrutinized the behavior of parties negotiating a license for

THE COUNCIL AND THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE, SETTING OUT THE EU APPROACH TO STANDARD ESSENTIAL PATENTS 2 (2017) (recognizing that opportunistic behavior might arise both on the side of SEP holders and on the side of implementers), <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52017DC0712&from=en>; POLICY DEPARTMENT FOR CITIZENS’ RIGHTS AND CONSTITUTIONAL AFFAIRS, EUROPEAN PARLIAMENT, STANDARD ESSENTIAL PATENTS AND THE INTERNET OF THINGS 25 (2019); Makan Delrahim, Assistant Attorney General, U.S. Dep’t Just., Remarks delivered at the USC Gould School of Law, Los Angeles, California, Take It to the Limit: Respecting Innovation Incentives in the Application of Antitrust Law 3 (Nov. 10, 2017), <https://www.justice.gov/opa/speech/file/1010746/download> (“Too often lost in the debate over the hold-up problem is recognition of a more serious risk: the hold-out problem.”); Andrei Iancu, Under Secretary of Commerce for Intellectual Property and Director of the USPTO, Remarks delivered at the Standard-Essential Patents Strategy Conference (Sept. 10, 2019), <https://www.uspto.gov/about-us/news-updates/remarks-director-iancu-standard-essential-patents-strategy-conference> (“[W]hen it comes to FRAND-encumbered standard essential patents (SEPs), any policy statement should incentivize good faith negotiations and disincentivize threats of either patent hold-up or patent hold-out.”).

2. During the course of our work on this topic, we came across the research paper by Brian Love and Christian Helmers titled “An Empirical Test of Patent Hold-Out Theory: Evidence from Litigation of Standard Essential Patents,” that addresses a similar, although slightly different question related to empirical evidence of patent holdout. Specifically, the authors examine whether “testable predictions from the literature supporting hold-out theory” find support in empirical data. Our understanding is that although in the initial version of the paper found limited supporting evidence for the hold-out theory, the revised version of the paper published in November 2022 found some evidence of patent hold out, thus corroborating, to some extent, the findings of our Article. See Brian J. Love & Christian Helmers, *Patent Hold-Out and Licensing Frictions: Evidence from Litigation of Standard Essential Patents*, INT’L J. OF INDUS. ORG. (forthcoming), <https://ssrn.com/abstract=3950060>.

FRAND-encumbered SEPs. Although our analysis is not exhaustive, we find that concerns about “patent holdout” have ample empirical support in court decisions, in alignment with the incentive structure enabled by the patent enforcement regime today. We also find that although courts have made some progress, they have been generally unable to address the problem of “patent holdout.” Indeed, empirical evidence shows that in the context of SEPs, “patent holdout” continues to be a real-world issue.

Our findings have important implications for current policy discussions. Starting in 2021, government agencies across multiple jurisdictions have announced initiatives to evaluate the introduction of policy measures aimed at improving the efficiency of licensing negotiations for SEPs.³ By 2023, some agencies have even presented concrete regulatory proposals aiming at enhancing the efficiency of licensing negotiations over SEPs.⁴ Although virtually all agencies recognize the need for a balanced approach that mitigates the risk of opportunism by both patent holders and implementers, little attention has yet been given to measures that could be adopted to address the “patent holdout” problem. Our analysis suggests that to enhance the efficiency of licensing negotiation for SEPs, it is critical to evaluate and ultimately implement at least some measures that address “patent holdout.”

II. PATENT HOLDOUT: AN ECONOMIC ANALYSIS

The concepts of “patent holdup” and “patent holdout” are based on the idea of “holdup” developed by the Nobel laureate economist Oliver

3. *See, e.g.*, EUR. COMM’N, INTELLECTUAL PROPERTY – NEW FRAMEWORK FOR STANDARD-ESSENTIAL PATENTS (2022), https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/13109-Intellectual-property-new-framework-for-standard-essential-patents_en [hereinafter EUR. COMM’N, SEP FRAMEWORK]; *Public Comments Welcome on Draft Policy Statement on Licensing Negotiations and Remedies for Standards-Essential Patents Subject to F/RAND Commitments*, U.S. DEP’T JUST. OFF. PUB. AFFS. (Dec. 6, 2021), <https://www.justice.gov/opa/pr/public-comments-welcome-draft-policy-statement-licensing-negotiations-and-remedies-standards>; *Consultation Outcome: Standard Essential Patents and Innovation: Executive Summary and Next Steps*, GOV.UK (July 5, 2023), <https://www.gov.uk/government/consultations/standard-essential-patents-and-innovation-call-for-views/outcome/standard-essential-patents-and-innovation-executive-summary-and-next-steps>; JAPAN PATENT OFFICE, GUIDE TO LICENSING NEGOTIATIONS INVOLVING STANDARD ESSENTIAL PATENTS (2022), <https://www.jpo.go.jp/e/system/laws/rule/guideline/patent/document/rev-seps-tebiki/guide-seps-en.pdf>.

4. *See, e.g.*, EUR. COMM’N, COM(2023)232 - PROPOSAL FOR A REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL ON STANDARD ESSENTIAL PATENTS AND AMENDING REGULATION (EU) 2017/1001 (2023), https://single-market-economy.ec.europa.eu/publications/com2023232-proposal-regulation-standard-essential-patents_en.

Williamson in the theory of incomplete contracts.⁵ In very broad terms, “holdup” refers to the opportunistic appropriation of another firm’s quasi-rents that, for the sake of simplicity, can be described as a firm’s income. Such appropriation can occur if the parties negotiate the terms of a transaction after one of the parties has made a sunk investment, that is, an investment that cannot be recovered if the parties walk away from the transaction.⁶

In the context of patents, one party is the owner of a patented invention (“innovator”) and the other is the manufacturer of a product, service, or process that uses the invention (“implementer”). For example, after an implementer has sunk costs in integrating the patented technology into its products, the innovator can raise the royalty, thus “holding up” the implementer and extracting some of the implementer’s profit from the use of that invention.⁷ Symmetrically, after an innovator has sunk costs in research and development (R&D), created a new invention, and patented it, an implementer can refuse to pay, or significantly reduce the royalties paid, for a license to the patented technology, thus “holding out” on the innovator.⁸ The concern is that when anticipating “holdup” or “holdout,” the prospective inventor or implementor would invest less than a socially optimal amount in their respective innovative activities.⁹

5. See STEVEN TADELIS & OLIVER E. WILLIAMSON, TRANSACTION COST ECONOMICS, IN THE HANDBOOK OF ORGANIZATIONAL ECONOMICS 159 (Robert Gibbons & John Roberts eds., 2012).

6. The economic rationale is simple. A firm will enter a given business only if it expects that doing so will be profitable – that is, if a firm expects to earn a positive economic rent. In economic terms, this can be described as $ER < R - c - i$, where ER is expected economic rent, R is the expected revenue, C is the operating cost (c), and i is the firm’s investment. However, as Williamson explains, there is a “fundamental transformation” in the firm’s incentives after it has made a sunk investment (*id.* at 16). At that point, a firm that has made a sunk investment will choose to remain in the market as long as its quasi rents (QR) are positive—that is $QR < R - c$. Therefore, if the parties negotiate the terms of a transaction after one of them has made a sunk investment, the other firm might act opportunistically an appropriate part, or all, of the other firm’s quasi rent.

7. See Mark A. Lemley & Carl Shapiro, *Patent Holdup and Royalty Stacking*, 85 TEX. L. REV. 1991, 1993 (2007).

8. See Richard Epstein & Noroozi Kayvan, *Why Incentives for Patent Holdout Threaten to Dismantle FRAND, and Why It Matters*, 32 BERKELEY TECH. L.J. 1381, 1384 (2017); Gregor Langus, Lipatov Vilen & Neven Damien, *Standard-Essential Patents: Who Is Really Holding Up (and When)?*, 9 J. COMPETITION L. & ECON. 253, 255-56 (2013); ANNE LAYNE-FARRAR, WHY PATENT HOLDOUT IS NOT JUST A FANCY NAME FOR PLAIN OLD PATENT INFRINGEMENT 1-4 (2016).

9. See Joseph Farrell, John Hayes, Carl Shapiro & Theresa Sullivan, *Standard Setting, Patents and Hold-up*, 74 ANTITRUST L.J. 603, 647 (2007) (stating “[a]nticipation of hold-up encourages a range of inefficient forms of self protection, such as postponing or minimizing investment, or ensuring that standards use only antique technology”); Carl Shapiro, *Patent Reform:*

Whereas the “patent holdup” theory has been widely discussed in the economic literature, both on theoretical and empirical grounds, “patent holdout” has received less attention. That is why we focus our analysis on the phenomenon of “patent holdout.” Indeed, inefficiencies from “patent holdout” may be equally or more detrimental than inefficiencies from “patent holdup,” so it is appropriate to determine whether “patent holdout” is a real-world phenomenon.

As a first step, we examine the incentives of a rational implementer in negotiating a license for SEPs with a patent holder. When deciding whether to execute a license, a rational implementer will do a cost/benefit analysis of: (1) entering into a license agreement; or (2) infringing the SEPs, delaying or refusing to execute a license, and potentially entering a legal dispute with the patent holder. In simple terms, the implementer will compare (1) its expected cost under a license with (2) the expected cost of infringement and potential litigation, and opt for the scenario that minimizes its cost.¹⁰

Whereas the expected cost under a license is defined (or definable) by the terms specified in the license offer, the expected costs of infringement will depend on the legal consequences. If an implementer infringes a patent, refuses the execution of a license, and therefore risks an injunction that removes its product from the marketplace temporarily, then the expected cost of infringement can be high. In the worst-case scenario, the implementer will have to pay ex post a FRAND royalty that it would have had to pay in the first place if the license was executed, and the only cost from infringement would be the cost of litigation. Indeed, in the best-case scenario, an infringer that refuses to execute a license may end up paying zero royalties and incur no cost of litigation if the patent holder does not challenge the infringer in court.

Thus, in a world where injunctions are unlikely to be granted or are avoided by agreeing ex post to the payment of a FRAND royalty, a rational implementer is more likely to be strictly better off by infringing and delaying royalty payments—and thus holding out—as long as their cost of litigation is lower than the royalty payments. In other words, “patent holdout” becomes a rational business decision for implementers.

Aligning Reward and Contribution, in 8 INNOVATION POLICY AND THE ECONOMY 111 (Adam Jaffe, Josh Lerner & Scott Stern eds., 2008).

10. The implementer will compare the expected profit in case of a license with the expected profit in the case of infringement. For ease of exposition, we focus exclusively on the costs (i.e., expected payments) due by the implementer.

III. EMPIRICAL EVIDENCE OF “PATENT HOLDOUT”

In the next step of our analysis, we examine whether our theoretical framework on “patent holdout” has empirical support. Although our analysis is not exhaustive, we find multiple cases in which courts around the world have found that implementers engage in “patent holdout” when negotiating a license for SEPs, which thus provides support to our theoretical predictions.

A. METHODOLOGY

We perform our empirical analysis by examining the main SEPs court decisions around the globe.¹¹ We focus our analysis on cases involving FRAND-committed SEPs across five jurisdictions: (1) the United States, (2) Germany, (3) the Netherlands, (4) the United Kingdom, and (5) India. We have chosen these jurisdictions because of the prominent role they have played, and continue to play, in SEP-related litigation. Due to concerns related to selection bias in published court decisions, we exclude China from our analysis, despite that being an important jurisdiction for SEP enforcement.¹²

We examine court decisions¹³ issued over an entire decade, from 2012 to 2022. We identify all cases involving allegations of SEP infringement in the five jurisdictions where a court decision was issued between January 2012 to August 2022. Among those decisions, we identify through review of the court documents those in which the court issued a decision on the merits of the case and explicitly determined that the implementer (1) engaged in “patent holdout”, (2) was an unwilling licensee, or (3) negotiated in bad faith. We also considered by reviewing the court findings the cases in which the court found that the implementer (4) delayed the negotiation, (5) made unsubstantiated arguments that the SEP holder’s offered license terms were not FRAND, or (6) refused to execute a license on terms that the court found to be FRAND. Finally, for the United States, we also include cases in which courts found that the implementer (7) engaged in willful infringement, as captured by the court documents.¹⁴ To make sure our analysis is reliable, we only consider cases where the original document was available.

11. We use the Darts-IP—a searchable global database on IP litigation—complemented with the database made available by the 4iP Council that summarizes the main SEP court decisions in Europe.

12. We note that it might be desirable to include China in future updates of our Article, provided that the analysis incorporates a mechanism to account for the possible selection bias.

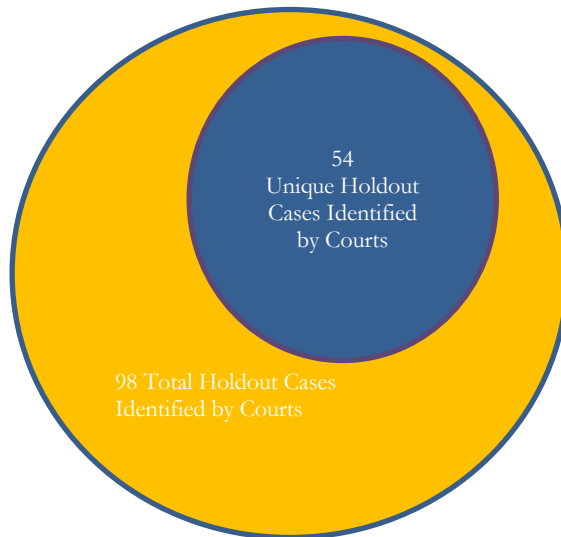
13. For the United States, we also consider decisions adopted by the International Trade Commission.

14. Although for the purpose of this Article we have limited our analysis to the above-identified categories, we acknowledge that there are other conducts that might be considered examples of “patent holdout.”

B. FINDINGS

Based on our analysis, we find that “patent holdout” is far from a rare phenomenon in SEP disputes. We find that there have been at least fifty-four cases over the past decade in which courts found that the implementer engaged in “patent holdout” when negotiating a license for SEPs. This number does not include parallel cases—litigation between the same parties in front of courts in different jurisdictions, or litigation between the same parties within the same jurisdiction but at different appellate levels, or at the same level but involving different patents. In other words, we have identified fifty-eight unique cases of “patent holdout,” but the number of cases in which courts have found that the implementer engaged in “patent holdout” is actually higher, as Figure 1 shows.

Figure 1: Unique Holdout v. Total Holdout Cases Identified by Courts¹⁵



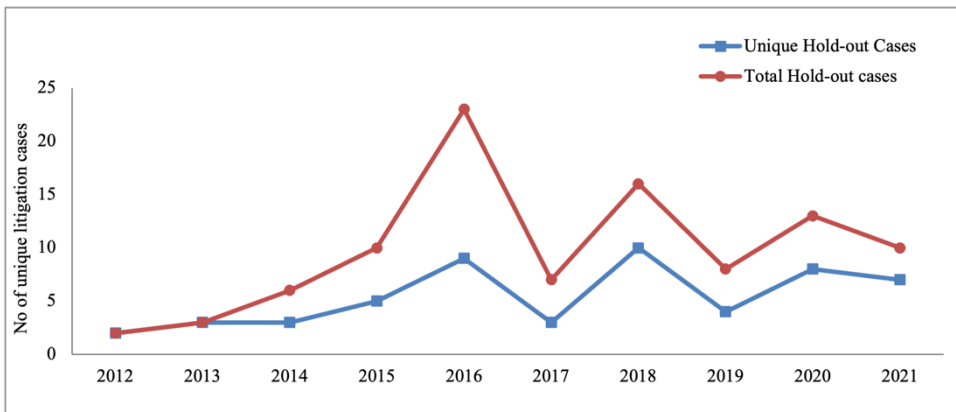
Of course, the identified cases of “patent holdout” do not represent the total volume of “patent holdout” that occurs in the real world. We limit our analysis to adjudicated cases—litigation where a court issued a decision on the merits of the case. It is, however, possible that some implementers engaged in “patent holdout” when negotiating a license for SEPs but the parties settled

15. Sources: analysis of the following databases Darts-IP; 4IP Council (last visited Oct. 30, 2022).

their dispute before the court issued a final decision in the case. Those cases of “patent holdout” are unaccounted for in our analysis, as settled cases are not captured in the litigation databases.

We examined how the courts’ findings of “patent holdout” change over time and found that “patent holdout” continues to be a real-world phenomenon. We have examined historical data and found there have been several spikes in terms of both unique and total “patent holdout” findings by courts, including in 2016, 2018, and 2020, as shown in Figure 2.¹⁶

Figure 2: Courts’ Holdout Findings from 2012 to 2021¹⁷



Although some progress has been made, considering that the number of annual “patent holdout” findings has gradually decreased, several unique “patent holdout” findings are fairly recent. More specifically, over thirty percent of the identified court decisions have been issued from 2020 onwards, thus showing that “patent holdout” continues to occur in practice.

In analyzing the identified cases, we also found that almost half of the “patent holdout” findings involve repeat behavior—cases where a given implementer has been found to have engaged in “patent holdout” toward multiple SEP holders. At the top of the list of companies that have been repeatedly found to have engaged in “patent holdout” include Huawei (with seven unique cases in which courts found that the company engaged in “patent holdout”), followed by TCL (with five unique “holdout” findings). Other implementers

16. We have excluded from the figure data for 2022, given that at the time when we completed our research, data for that year were still incomplete, including only decisions up to August 2022.

¹⁷ Sources: Darts-IP; 4IP Council.

that have been found to have engaged in “patent holdout” on multiple occasions include HTC, ZTE, , Daimler, Mas Electronics, and Apple as shown in Table 1.

Table 1: Companies that Have Been Repeatedly Found to Have Engaged in “Patent Holdout”¹⁸

| Company | Number of Unique Holdout Findings |
|----------------|-----------------------------------|
| Huawei | 7 |
| TCL | 5 |
| ZTE | 4 |
| HTC | 3 |
| Daimler | 3 |
| Mas Electronik | 3 |
| Apple | 2 |

In sum, the data obtained from the analysis of courts’ decisions across five jurisdictions comports with our theoretical assessment, which predicts that refusing a FRAND license offer and engaging in “holdout” might be a rational business strategy for an implementer.

C. “PATENT HOLDOUT” STRATEGIES

In reviewing the identified cases, we observed that implementers used a variety of strategies to engage in “patent holdout,” such as: (1) refusing to initiate license negotiations by not responding to a notification of infringement; (2) failing to constructively negotiate licensing terms, for example, by using delaying tactics such as repeated requests for information that the patent holder has already provided; (3) refusing to execute a license unless patents are found valid and infringed, thus challenging the validity and infringement of a large bundle of patents and creating years of delay in the licensing negotiation; (4) arguing that the offered terms are not FRAND; and (5) refusing to accept a license on terms that the court determined to be FRAND. To provide a better understanding of how “patent holdout” takes place in practice, we briefly describe the most notable examples below.

1. *Refusal to Initiate License Negotiations*

One type of “patent holdout” is when the implementer refuses to start a negotiation with the SEP holder. We have found several examples that fall into this category. In *Philips v. Wiko*, the Hague Court of Appeal found that Wiko,

¹⁸ Sources: Darts-IP; 4IP Council.(last visited October 2022).

a wholly-owned subsidiary of the Chinese mobile phone manufacturer Tinno Mobil, did not respond to the patent holder’s notification about infringement for almost two years and replied to the patent holder only once sued in court.¹⁹ In *Sisvel v. Haier*, the German Federal Court of Justice found that Haier, a Chinese multinational home appliances and consumer electronics company, did not reply to the SEP holder’s notification about infringement for over a year.²⁰ As the German Federal Court of Justice observed, the implementer’s failure to reply to the infringement notification within a few months typically indicates that the implementer is not interested in executing a license and is instead engaging in “patent holdout.”²¹

In other cases, we found that the implementer replied to the notification about infringement but embraced strategies that prevented the parties from initiating a negotiation. For example, when the Indian electronic company Intex refused to sign a non-disclosure agreement (NDA) with Ericsson, a Swedish telecommunications company, this effectively precluded the parties from initiating a negotiation over the license terms for several years.²² Intex signed the NDA five years after the first notification about infringement, and even then, the parties did not reach an agreement on the license terms. Ericsson sued the company for patent infringement in court. The court ultimately found that Intex negotiated in bad faith and was an unwilling licensee.²³

2. *Failure to Constructively Negotiate the License Terms*

We found several cases in which the implementer entered into a negotiation with the SEP holder but then engaged in practices that unreasonably delayed the process and hence the execution of a license. In *Koninklijke Philips N.V. v. Asustek Computers Inc.*, the Hague Court of Appeal found that during the negotiation, Asus, a Taiwanese multinational electronics company and implementer of a standard, was not represented by technical experts that were essential for negotiating the license terms, continued to evade substantive discussions of the terms, and refrained from making any counteroffer.²⁴ Asus also never responded to the SEP holder’s proposed licensing terms or commented

19. *Koninklijke Philips N.V. v. Wiko SAS*, Court of Appeal in the Hague, July 2, 2019, 200.219.487/01, ¶¶ 2.1–2.4 (Neth.); *see also* *Koninklijke Philips N.V. v. Wiko SAS*, Karlsruhe [KA] Oct. 30, 2019, 6 U 183/16, ¶ 32 (Ger.).

20. Bundesgerichtshof [BGH] [Federal Court of Justice] May 5, 2020, KZR 36/17, ¶ 92 (Ger.) [hereinafter *Sisvel v. Haier*, KZR 36/17].

21. *Id.*

22. *Telefonaktiebolaget LM Ericsson v. Intex Technologies (India) Ltd.*, CS(OS) No. 1045 / 2014, High Ct. of Delhi (Mar. 13, 2015), ¶ 13.3.

23. *Id.* at ¶¶ 136, 148.

24. *Koninklijke Philips N.V. v. Asustek Computers Inc.*, Court of Appeal of the Hague, May 7, 2019, No. 200.221.250/01, ¶¶ 4.172–4.179 (Neth.).

on its negotiating position.²⁵ The court found that Asus’s licensing behavior showed that the company had not been willing to execute a license agreement with the SEP holder and was instead engaging in “patent holdout.”²⁶

In *Philips v. TCL*, the Düsseldorf regional court found that TCT Mobile, a company that is part of the Chinese electronics company TCL Technology, did not respond to the SEP holder’s license for over three years and responded only once sued in court, stating that it was willing to execute a license, but did not engage in any constructive discussion.²⁷ TCL eventually made a counteroffer to Philips, but the court found that that offer was clearly not FRAND because, among other things, TCL failed to cover infringing tablets and feature phones, and did not provide any compensation for past infringement but merely for prospective sales.²⁸ The court found that these deficiencies showed not only that the counteroffer was a non-starter for a negotiation but also confirmed that TCL was an unwilling licensee.²⁹

Similarly, in *HEVC (Dolby) v. MAS Elektronik*, the Regional Court in Düsseldorf found that MAS, a German consumer electronics company, was using strategic tactics to delay the negotiation of a license agreement for the use of SEPs.³⁰ Specifically, the court found that the e-mail correspondence between the parties showed that MAS refrained from making any constructive comments and repeatedly raised questions already answered by the SEP holder.³¹

3. *Refusal to Execute a License Unless the Patents Are Found Valid and Infringed*

There are also several cases in which the implementer refused to execute a license unless the SEPs at issue were found to be valid and infringed—a negotiating position that several courts have found to be indicative of unwillingness to execute a license. In *Conversant Wireless Licensing v. Huawei*, the Düsseldorf district court found inappropriate the implementer’s refusal to execute a license until infringement proceedings against two other mobile phone manufacturers in the United States would be decided in favor of Conversant.³² The court reasoned that although an implementer has clearly a right to challenge

25. *Id.*

26. *Id.* ¶ 4.174.

27. *Philips v. TCL*, Düsseldorf [DUS] [Higher Regional Court] May 12, 2022, I-2 U 13/21, ¶¶ 301–03 (Ger.).

28. *Id.* at 342–44.

29. *Id.* at 348.

30. *HEVC (Dolby) v. MAS Elektronik*, LG Düsseldorf [DUS] [Landgericht Regional Court] May 7, 2020, 4c O 44/18 (Ger.).

31. *Id.* at 774–77.

32. *Conversant Wireless v. Huawei Technologies*, LG Düsseldorf [DUS] [Landgericht Regional Court] Aug. 27, 2020, 4b O 30/18, ¶¶ 239–41 (Ger.).

the validity and infringement of SEPs in court, it would be inappropriate to make this a condition for the execution of a license, particularly considering that a license agreement could include an “adjustment mechanism” that takes into account the outcome of legal disputes that challenge the validity of individual SEPs.³³

Similarly, in *Sisvel v. Haier*, the implementer said it was willing to execute a FRAND license only for the patents that a court would determine to be valid and infringed.³⁴ In *St. Lawrence v. Vodafone*, HTC, a manufacturer of infringing devices that intervened in support of the Defendant, said that it would be willing to execute a license but only after a court made a finding about infringement.³⁵ On both occasions, the court found the implementer’s position to be unreasonable.³⁶

4. *Unsupported Assertions that the SEP Holder’s Offer is Not FRAND*

A special type of delay tactic includes cases where the implementer negotiates a license but makes unsupported assertions that the offered license terms are not FRAND. Although there might be a genuine disagreement between the two parties as to whether the offered terms are FRAND, evidence that the implementer is making baseless allegations about the violation of the FRAND commitment or raising arguments that have been previously rejected by courts typically suggests that the implementer has no intention of executing a license agreement and is instead engaging in “patent holdout.”

There are several cases in which courts have found that the implementer could not offer any support for its allegation that the SEP holder’s offer was not FRAND. In *Tagivan (MPEG-LA) v. Huawei*, the parties negotiated a license for over six years but never reached an agreement as Huawei, the implementer, kept arguing that the offered terms were not FRAND.³⁷ The District Court of Düsseldorf ultimately rejected Huawei’s argument, reasoning that the approximately 2,000 standard licensing agreements concluded by the MPEG-LA pool provided a “strong indication” that the underlying licensing terms are fair and reasonable, and Huawei did not present any persuasive facts that would support the opposite conclusion.³⁸

³³. *Id.* ¶ 241.

³⁴. *Sisvel v. Haier*, KZR 36/17, ¶ 96.

³⁵. *Saint Lawrence v. Vodafone*, LG Düsseldorf [DUS] [Landgericht Regional Court] Mar. 31, 2016, 4a O 73/14, ¶ 398 (Ger.).

³⁶. *Id.*; *Sisvel v. Haier*, KZR 36/17, ¶ 96.

³⁷. *Tagivan (MPEG-LA) v. Huawei*, LG Düsseldorf [DUS] [Landgericht Regional Court], Nov. 9, 2018, 4a O 17/17 (Ger.).

³⁸. *Id.* ¶ 501; *see also id.* ¶¶ 503–6.

There are other similar cases. For example, although courts have repeatedly confirmed that a FRAND offer may be global in scope,³⁹ we found that implementers continue arguing an offer for a worldwide license violates a FRAND commitment. In *Optis Wireless v. Apple*, the parties negotiated the license terms but failed to reach an agreement because Apple kept arguing that the offered terms were not FRAND.⁴⁰ The court ultimately rejected Apple's argument, emphasizing that a SEP holder does not need to make individual license offers for SEPs in each country to comply with its FRAND obligation,⁴¹ and the jury subsequently found that Apple's infringement of the SEPs in the suit was willful.⁴²

In *Philips v. Wiko*, Wiko alleged that Philips' offer was not FRAND, but the court found that the implementer could not provide any support for its assertion.⁴³ Likewise, in the investigation 337-TA-613 in front of the U.S. International Trade Commission (ITC), the administrative law judge (ALJ) Theodore Essex criticized the implementers for providing no support for the allegation that the SEP holder's offer was not FRAND.⁴⁴

5. Refusal to Accept Court-Determined FRAND License Terms

Finally, in some cases, implementers engage in "patent holdout" by refusing to execute a license agreement on terms that a court or an arbitration body found to be FRAND.

The U.K. Supreme Court first confirmed this principle in *Unwired Planet v. Huawei*.⁴⁵ The Court found Huawei was infringing Unwired Planet's SEPs and unwilling to enter into a license on terms that the Court found to be FRAND. Huawei argued that despite its refusal to accept a FRAND license, the Court should not issue an injunction and should instead award damages for the

39. *Unwired Planet Int'l v. Huawei Technologies Ltd.*, [2020] UKSC 37, ¶ 15; *Sisvel v. Haier*, KZR 36/17, ¶ 78.

40. *Optis Wireless Tech., LLC v. Apple Inc.*, No. 2:19-CV-00066-JRG, 2020 WL 999463, at *3 (E.D. Tex., Mar. 2, 2020).

41. *Id.* at *12.

42. The jury awarded PanOptis \$ 506 million in damages. The court subsequently granted a new trial on the damages award, but not on the issue of willfulness. *See Optis Wireless Tech., LLC v. Apple Inc.*, No. 2:19-CV-00066-JRG, 2021 WL 2349343, at *9 (E.D. Tex. Apr. 14, 2021).

43. *Philips v. Wiko*, Court of Appeal of the Hague, July 2, 2019, C/09/511922/HA ZA 16-623, ¶¶ 4.25–41 (Neth.).

44. ITC Inv. No 337-TA-613, *In the Matter of Certain 3G Mobile Handsets and Components thereof – Initial Determination on Remand*, 53 (Apr. 27, 2015).

45. *Unwired Planet International Ltd v. Huawei Technologies Co. Ltd.*, [2020] UKSC 37, ¶ 159.

infringement of Unwired Planet’s U.K. SEPs.⁴⁶ In rejecting that argument, the Court emphasized that doing so would encourage “patent holdout”:

[I]f the patent-holder were confined to a monetary remedy, implementers who were infringing the patents would have an incentive to continue infringing until, patent by patent, and country by country, they were compelled to pay royalties. It would not make economic sense for them to enter voluntarily into FRAND licences.⁴⁷

The principle that an implementer unwilling to accept a court-determined FRAND rate is engaging in patent holdout was reaffirmed in several subsequent decisions. In 2019, in *TQ Delta v. ZyXEL Communications*, the U.K. High Court of Justice found that the implementer’s refusal to accept court-determined FRAND license terms was evidence of a “patent holdout.”⁴⁸ In 2013, the SEP holder notified ZyXEL, a Taiwanese manufacturer of networking devices, about the infringement. The parties failed to reach an agreement and TQ Delta then initiated proceedings both in the United States and in the United Kingdom.⁴⁹ By the time the U.K. court issued its judgment in 2019—six years after the notification about infringement—ZyXEL did not pay anything for the use of TQ Delta’s SEPs, nor for the use of any other SEPs, although it continued to infringe them.⁵⁰ ZyXEL repeatedly changed its position as to whether it would accept the FRAND license terms determined by the U.K. court.⁵¹ In 2017, when asked whether it would take a license on whatever terms the court determined to be FRAND, ZyXEL’s solicitor said that the company “will need to consider whether to enter that license” and added that “[t]hat decision will depend upon the terms that the Court has decided are RAND.”⁵² The U.K. court concluded that ZyXEL’s negotiating behavior and its unwillingness to accept court-determined FRAND license terms clearly showed that the implementer was engaging in a “holdout.”⁵³

Similarly, in the 2022 decision in *Optis Cellular v. Apple*, Apple contended that an implementer should be able to avoid an injunction, even if it fails to commit to take a license upon terms determined to be FRAND by the court.⁵⁴ The England and Wales Court of Appeal rejected Apple’s argument, reasoning

46. *Id.*

47. *Id.* ¶ 167.

48. *TQ Delta v. Zyxel Communications*, [2019] EWHC 745 (Pat), ¶ 12.

49. *Id.*

50. *Id.* ¶ 12.

51. *Id.* ¶ 8.

52. *Id.* ¶ 10.

53. *Id.* ¶ 12.

54. *Optis Cellular Tech. LLC v. Apple Retail U.K.*, [2022] EWCA Civ 1411 (England and Wales Court of Appeal), at 65.

that it “would tend to promote holdout by implementers.”⁵⁵ More specifically, the court said that “[i]f the implementer wants to avoid the normal consequences of having been found to infringe, it can commit to taking a Court-Determined Licence. If the implementer does not want to commit to taking a Court-Determined Licence, then it should be restrained from infringing. . . . Otherwise . . . hold out by implementers would be promoted.”⁵⁶ The court ultimately concluded that “Apple’s behaviour in declining to commit to take a Court-Determined Licence once they had been found to infringe EP744, and their pursuit of their appeal, could well be argued to constitute a form of hold out.”⁵⁷

By now, there is a general agreement that a willing licensee is a licensee that is willing to accept court-determined FRAND terms whatever those terms are. Conversely, an implementer that is not willing to accept court-determined FRAND terms is an unwilling licensee.

IV. POLICY IMPLICATIONS OF THE EMPIRICAL FINDINGS

Our empirical findings about “patent holdout” have important implications for the current policy debate. First, our analysis debunks the suggestion made by some implementers that the risk of “patent holdout” is minimal and should be ignored by policymakers.⁵⁸ Our analysis shows that “patent holdout” is not merely a theoretical concern but a problem that patent holders face in practice when negotiating a license for their SEPs, as confirmed by courts’ findings across many major jurisdictions.

Second, our findings are relevant to the agencies’ effort to “promote an efficient and sustainable SEP licensing ecosystem, where the interests of both SEP holders and implementers are considered.”⁵⁹ Empirical evidence suggests that at least some inefficiencies in the licensing of SEPs are attributable to “holdout” strategies that some implementers continue to adopt and that courts are unable to address. This indicates a need for measures that discourage implementers’ opportunism and, as a result, promote more efficient licensing

55. *Id.* at ¶ 67.

56. *Id.* at ¶ 76.

57. *Id.* at ¶ 115.

58. *See, e.g.,* APPLE INC., RESPONSE TO EUROPEAN COMMISSION CALL FOR EVIDENCE ON INTELLECTUAL PROPERTY – NEW FRAMEWORK FOR STANDARD-ESSENTIAL PATENTS 9 (2022) (“[T]here are very few examples of conduct that consistently indicate unwillingness or dilatory conduct.”); Brief of Amicus Curiae Apple, Inc. in Support of Appellant at 24, *Continental Automotive Systems, Inc. v. Avanci, LLC, et al.*, No. 20-11032 (5th Cir. Feb. 16, 2021).

59. EUR. COMM’N, SEP FRAMEWORK, *supra* note 3, at 4.

negotiations. Yet, among the many policy actions currently on the table, none of the proposals seek to address either directly or indirectly the problem of “holdout.” Rather, there is a concern that at least some of the discussed measures, if not designed carefully, could encourage further opportunism by implementers and therefore decrease, rather than increase, efficiencies in SEP licensing. We thus encourage policymakers to consider how to mitigate the risk of “holdout” or at the very least ensure that any newly adopted policy does not encourage further holdout behavior.

Indeed, patent holdout has detrimental effects on innovation, the economy, and consumers.⁶⁰ By hindering a patent holder’s ability to be compensated for the use of its technologies in a timely manner, patent holdout undermines the inventor’s ability and incentives to continue making risky investments in R&D.⁶¹ Although patent holdout negatively affects all patent holders, it is particularly harmful to small and medium-sized enterprises (SMEs) that generally lack the financial resources to protect their patented technologies in parallel litigation across multiple jurisdictions, facing widespread infringement.⁶² In other words, when patent infringement is common, participation in innovative markets is limited to large integrated companies that

60. Damien Geradin, *Reverse Hold-Up: The (Often Ignored) Risks Faced by Innovators in Standardized Areas* 7–8 (Paper prepared for the Swedish Competition Authority on the Pros and Cons of Standard-Setting, 2010); Epstein & Noroozi, *supra* note 8, at 1384; Makan Delrahim, Assistant Att’y Gen., Antitrust Div., U.S. Dep’t Just., Keynote Address at University of Pennsylvania Law School, The “New Madison” Approach to Antitrust and Intellectual Property Law 8 (Mar. 16, 2018), <https://www.justice.gov/opa/speech/file/1044316/download>; Andrei Iancu, *Patent ‘Holdouts’ Are Sapping U.S. Innovation*, NEWSWEEK (Oct. 18, 2021), <https://www.newsweek.com/patent-holdouts-are-sapping-us-innovation-opinion-1639417>.

61. YANN MÉNIÈRE, FAIR, REASONABLE AND NON-DISCRIMINATORY (FRAND) LICENSING TERMS – RESEARCH ANALYSIS OF A CONTROVERSIAL CONCEPT 15 (2015) (“[P]atent “hold out” can induce royalty losses for SEP holders, and significantly reduce their incentives to invest in the development of standards.”); David J. Kappos, *The Antitrust Assault on Intellectual Property*, 31 HARV. J.L. & TECH. 665, 681 (2018) (“[C]ompanies that have substantially invested in research, development and innovation are deprived of a fair return on that investment, which makes future investment less likely or makes innovator companies reluctant to contribute cutting-edge technology to standards.”).

62. *See, e.g.*, *Unwired Planet Int’l Ltd v. Huawei Techs. Co.* [2017] EWHC (Pat) 2988 [1] (Eng.), ¶ 404 (finding that because of “the difficulties Unwired Planet had encountered in trying to license the portfolio and the cost of litigation,” the company was “on the verge of insolvency”); Fractus Comments on the Proposed Draft Policy Statement on Licensing Negotiations and Remedies for Standards-Essential Patents Subject to Voluntary F/RAND Commitments 2 (Feb. 4, 2022) (describing the challenges that the company faced when “an increasing number of clients opportunistically used Fractus’ patents on their smartphone models without paying royalties”).

can monetize their investment in R&D through means other than patent protection.⁶³

Finally, evidence of “holdout” is also relevant for the broader geopolitical discussion on technology standards. By hindering a patent holder’s ability to be compensated for the use of its technologies in a timely manner, “patent holdout” undermines the inventor’s ability and incentives to continue making risky investments in R&D and bring new inventions to the market. This seems to be particularly relevant now as most major nations have recognized the strategic importance of technology standards and have adopted, or are in the process of adopting, national strategies that seek to strengthen the country’s role in developing global technological standards.⁶⁴ Encouraging investment in risky R&D is critical for any country that aims to be a strong player in the development of global technological standards, and “holdout” undermines the “most critical tool”⁶⁵ that governments in market-based economies have to encourage these types of investments.

V. CONCLUSION

The policy debate on SEPs has gradually recognized that “patent holdup” and “patent holdout” are symmetrical problems and that both the patent holder and the implementer might act opportunistically when negotiating a license for SEPs. Yet, the academic discussion has primarily focused on “patent holdup” leaving the “patent holdout” phenomenon largely unexplored. This Article fills this gap by providing one of the first comprehensive empirical analysis of “patent holdout” behavior as identified in the courts’ documents. We examined an expansive data set that spans across five jurisdictions and covers an entire decade of SEPs litigation to determine whether concerns of “holdout” find support in the real world. We find that they do, which is unsurprising given the current incentive system where rejecting a FRAND offer and engaging in “holdout” is often a rational business decision. These results are particularly relevant for the current policy discussion as some government

63. *See generally* JONATHAN BARNETT, *INNOVATORS, FIRMS, AND MARKETS* (2021) (explaining that large and more integrated firms have the ability to earn returns on innovation without recourse to IP, whereas other type of firms, in particular younger, smaller, and less integrated firms do not).

64. *See, e.g.*, Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, *An EU Strategy on Standardisation Setting Global Standards in Support of a Resilient, Green and Digital EU Single Market 1* (Feb. 2, 2022); The Central Committee of the Communist Party of China and the State Council Issued the “National Standardization Development Outline” (Oct. 10, 2021), http://www.gov.cn/zhengce/2021-10/10/content_5641727.htm.

65. EUR. COMM’N, *SEP FRAMEWORK*, *supra* note 3, at 1.

agencies seek to adopt policies that would “promote an efficient and sustainable SEP licensing ecosystem” but have so far devoted little attention to developing measures that could address the problem of “patent holdout.”

APPENDIX I: TOTAL AND UNIQUE HOLDOUT CASES

| S.No of Unique case | Case Number | Plaintiff | Defendant | Year | Court |
|---------------------|------------------|-------------------------------|---|------|------------------------------------|
| 1 | 15 U 39/ 21 | Via Licensing | TCT Mobile Europe TCT Mobile Europe | 2021 | OLG Düsseldorf |
| 2 | 2:15-cv-00073 | Audio MPEG, Inc | Hewlett-Packard Company Dell | 2015 | Virginia Eastern District Court |
| 3 | 21 O 11384/19 | Conversant Wireless Licensing | Daimler | 2020 | LG München |
| 3 | 4b O 48/18 | Conversant Wireless Licensing | Huawei Technologies Huawei Technologies Deutschland Huawei Technologies Duesseldorf | 2020 | LG Düsseldorf |
| 4 | 4b O 30/18 | Conversant Wireless Licensing | Huawei Technologies Anonymous | 2020 | LG Düsseldorf |
| 5 | [2020] UKSC 37-2 | Conversant Wireless Licensing | Huawei Technologies Huawei Technologies (UK) ZTE ZTE (UK) | 2020 | Eng & Wales Court of Appeal Appeal |
| 5 | HP-2017-000048 | Conversant Wireless Licensing | Huawei Technologies Huawei Technologies (UK) ZTE ZTE (UK) | 2018 | Patents Court |
| 6 | 2:14-cv-00912 | Core Wireless Licensing | LG Electronics Mobilecomm USA LG Electronics LG Electronics USA | 2015 | Texas Eastern District Court |

| S.No of Unique case | Case Number | Plaintiff | Defendant | Year | Court |
|---------------------|---------------------|----------------------|--|------|------------------------------|
| 7 | 4c O 44/18 | Dolby International | MAS Elektronik | 2020 | LG Düsseldorf |
| 8 | 4b O 23/20 | Dolby International | TCT Mobile Germany TCT Mobile Europe | 2021 | LG Düsseldorf |
| 9 | CS(OS) 2501/2015 | Ericsson | Best It World India | 2015 | Delhi High Court |
| 10 | CS(OS) 442/2013 | Ericsson | Intex Technologies India Micromax Informatics Mercury Electronics Yu Televentures | 2015 | Delhi High Court |
| 11 | 4c O 56/18 | GE Video Compression | Mas Elektronik | 2020 | LG Düsseldorf |
| 12 | 7 O 14276/20 | InterDigital | Xiaomi | 2021 | Munich |
| 13 | 6 U 104 | IP Bridge | HTC Germany | 2020 | Karlsruhe |
| 14 | 4b O 5/17 | IP Bridge | ZTE Deutschland | 2018 | LG Düsseldorf |
| 14 | 7 O 13016/21 | IP Bridge 1 | ZTE | 2022 | LG München First instance |
| 15 | 6 U 149/20 | IP Bridge | Tct Mobile Germany | 2022 | Karlsruhe |
| 16 | 4b O 4/17 | IP Bridge 1 | Huawei Technologies Deutschland | 2018 | LG Düsseldorf |

| S.No of Unique case | Case Number | Plaintiff | Defendant | Year | Court |
|---------------------|----------------|------------------------------------|--|------|--|
| 16 | 7 O 36/21 | IP Bridge I | Anonymous Huawei Technologies | 2021 | LG München |
| 16 | 4c O 3/17 | IP Bridge 1 | Huawei Technologies Deutschland | 2018 | LG Düsseldorf |
| 17 | 1:17-cv-00090 | Koninklijke KPN | Sierra Wireless Sierra Wireless America | 2019 | Delaware District Court |
| 18 | 200.221.250/01 | Koninklijke Philips N.V. | ASUSTeK Computer Asus Europe Asus Holland | 2019 | Gerechtshof 's Gravenhage - Appeal Court of the Hague |
| 19 | 4c O 69/18 | Koninklijke Philips | Mas Elektronik | 2021 | LG Düsseldorf |
| 20 | 7 O 23/14 | Koninklijke Philips Electronics | Acer Computer | 2014 | Mannheim |
| 20 | 6 U 57/16 | Koninklijke Philips N.V. | Acer Computer | 2016 | OLG Karlsruhe |
| 21 | HA ZA 16-139 | Koninklijke Philips Electronics | Archos | 2017 | Rechtbank Den Haag - Court of the Hague |
| 22 | 2 U 13/21 | Koninklijke Philips Electronics | TCT | 2022 | OLG Düsseldorf |
| 23 | HA ZA 16-623 | Koninklijke Philips Electronics | Wiko | 2017 | Rechtbank Den Haag - Court of the Hague |
| 23 | 200.219.487/01 | Koninklijke Philips Electronics | Wiko | 2019 | Gerechtshof 's Gravenhage - Appeal Court of the Hague |

| S.No of Unique case | Case Number | Plaintiff | Defendant | Year | Court |
|---------------------|--------------------|---------------------------------|---|------|---------------------------|
| 23 | 7 O 44/16 | Koninklijke Philips Electronics | Wiko Germany | 2016 | Mannheim |
| 23 | 7 O 18/17 | Koninklijke Philips Electronics | Wiko Germany | 2018 | Mannheim |
| 23 | 19/04503 | Koninklijke Philips N.V. | Wiko | 2022 | Hoge Raad Der Nederlanden |
| 23 | 6 U 183/16 | Koninklijke Philips N.V. | Wiko Germany | 2019 | OLG Karlsruhe |
| 23 | 7 O 43/16 | Koninklijke Philips Electronics | Wiko Germany | 2016 | Mannheim |
| 24 | 4b O 84/19 | LG Electronics | TCL Communication Technology Holdings TCT Mobile Europe Tct Mobile Germany TCL Communication | 2021 | LG Düsseldorf |
| 24 | 2 O 131/19 | LG Electronics | TCL | 2021 | Mannheim |
| 25 | CS(OS) 764/2015 | LM Ericsson | Lava International | 2016 | Delhi High Court |
| 26 | 4c O 12/17 | Mitsubishi Electric Lighting | Huawei Technologies Deutschland | 2019 | LG Düsseldorf |
| 27 | 6 U 130/20 | Nokia | Daimler Continental Huawei Technologies Deutschland Robert Bosch | 2021 | OLG Karlsruhe |

| S.No of Unique case | Case Number | Plaintiff | Defendant | Year | Court |
|---------------------|---------------|--|---|------|------------------------------|
| | | | Tomtom Valeo Peiker Bury | | |
| 27 | 21 O 3891/19 | Nokia Technologies | Daimler | 2020 | LG München |
| 27 | 2 O 34/19 | Nokia | Daimler Continental Huawei Technologies Deutschland Robert Bosch Tomtom Valeo Peiker Bury | 2020 | Mannheim |
| 28 | 21 O 13026/19 | Nokia Technologies | Lenovo | 2020 | LG München |
| 29 | 7 O 99/15 | NTT Docomo | HTC Germany | 2016 | Mannheim |
| 29 | 7 O 100/15 | NTT Docomo | HTC Germany | 2016 | Mannheim |
| 29 | 7 O 66/15 | NTT DoCoMo | HTC Germany | 2016 | Mannheim |
| 30 | 2:19-cv-00066 | Optis Cellular Technology Panoptis Patent Management Unwired Planet Optis Wireless Technology Unwired Planet International | Apple | 2020 | Texas Eastern District Court |

| S.No of Unique case | Case Number | Plaintiff | Defendant | Year | Court |
|---------------------|---------------|--|---|------|------------------------------|
| 31 | 2:17-cv-00123 | Optis Wireless Technology Panoptis Patent Management Optis Cellular Technology | Huawei Technologies Huawei Device USA Huawei Device Huawei Device (shenzhen) | 2018 | Texas Eastern District Court |
| 32 | 4b O 15/17 | Panasonic Intellectual Property Corporation of America | Huawei Technologies Deutschland | 2018 | LG Düsseldorf |
| 33 | 4b O 16/17 | Panasonic Intellectual Property Corporation of America | ZTE Deutschland | 2018 | LG Düsseldorf |
| 34 | 7 O 96/14 | Pioneer | Acer Computer | 2016 | Mannheim |
| 34 | 6 U 55/16 | Pioneer | Acer Computer | 2016 | OLG Karlsruhe |
| 35 | 6 U 44/15 | Saint Lawrence Communications | Telekom Deutschland | 2015 | OLG Karlsruhe |
| 35 | 2 O 106/14 | Saint Lawrence Communications | Telekom Deutschland | 2015 | Mannheim |
| 35 | 2 O 103/14 | Saint Lawrence Communications | Telekom Deutschland | 2015 | Mannheim |
| 36 | 4a O 126/14 | Saint Lawrence Communications | Vodafone HTC - High Tech Computer | 2016 | LG Düsseldorf |
| 36 | 15 U 35/16 | Saint Lawrence Communications | Vodafone HTC - High Tech Computer | 2016 | OLG Düsseldorf |

| S.No of Unique case | Case Number | Plaintiff | Defendant | Year | Court |
|---------------------|---------------|---|--|------|--|
| 36 | 15 U 36/16 | Saint Lawrence Communications | Vodafone HTC - High Tech Computer | 2016 | OLG Düsseldorf |
| 36 | 4a O 73/14 | Saint Lawrence Communications | Vodafone HTC - High Tech Computer | 2016 | LG Düsseldorf |
| 37 | 2:15-cv-00349 | Saint Lawrence Communications | ZTE (TX) ZTE USA Motorola Mobility ZTE | 2016 | Texas Eastern District Court |
| 37 | 2:15-cv-00351 | Saint Lawrence Communications | ZTE (TX) ZTE USA Motorola Mobility ZTE | 2016 | Texas Eastern District Court |
| 38 | 6:12-cv-00855 | Science Applications International Virnetx Leidos | Cisco Systems Aastra Usa Aastra Technologies NEC Corporation of America NEC Apple | 2014 | Texas Eastern District Court |
| 38 | 2013-01489 | Science Applications International Virnetx Leidos | Cisco Systems Aastra Usa Aastra Technologies NEC Corporation of America NEC Apple | 2014 | U.S. Court of Appeals, Federal Circuit |
| 38 | 2019-01050 | Science Applications International Virnetx Leidos | Cisco Systems Aastra Usa Aastra Technologies NEC Corporation of America NEC Apple | 2019 | U.S. Court of Appeals, Federal Circuit |

| S.No of Unique case | Case Number | Plaintiff | Defendant | Year | Court |
|---------------------|---------------|---|--|------|------------------------------|
| 38 | 6:10-cv-00417 | Science Applications International Virnetx Leidos | Cisco Systems Aastra Usa Aastra Technologies NEC Corporation of America NEC Apple | 2013 | Texas Eastern District Court |
| 39 | 7 O 8818/19 | Sharp | Daimler | 2020 | LG München |
| 40 | 15 U 65/15 | Sisvel International S.A. | Haier | 2016 | OLG Düsseldorf |
| 40 | 4a O 144/14 | Sisvel International S.A. | Haier Europe Trading Haier Deutschland | 2015 | LG Düsseldorf |
| 40 | 15 U 66/15 | Sisvel International S.A. | Haier Europe Trading Haier Deutschland | 2016 | OLG Düsseldorf |
| 40 | K ZR 35/17 | Sisvel International S.A. | Haier Europe Trading Haier Deutschland | 2018 | Bundesgerichtshof |
| 40 | K ZR 36/17 | Sisvel International S.A. | Haier Europe Trading Haier Deutschland | 2020 | Bundesgerichtshof |
| 40 | 4a O 93/14 | Sisvel International S.A. | Haier Europe Trading Haier Deutschland | 2015 | LG Düsseldorf |
| 41 | 6 U 103/19 | Sisvel International S.A. | Wiko Germany Anonymous | 2020 | OLG Karlsruhe |
| 41 | 7 O 115/16 | Sisvel International S.A. | Wiko Germany Anonymous | 2019 | Mannheim |

| S.No of Unique case | Case Number | Plaintiff | Defendant | Year | Court |
|---------------------|--|---|---|------|-----------------------------------|
| 42 | 1:19-cv-01140 | Sisvel International 3g Licensing | Anydata | 2021 | Delaware District Court |
| 43 | 2:12-cv-02319 | Smart Modular Technologies | Netlist | 2012 | California Eastern District Court |
| 44 | 7 O 24/14 | Sony | Acer Computer | 2014 | Mannheim |
| 45 | 7 O 26/14 | Sony | Asus Computer | 2016 | Mannheim |
| 46 | 4a O 63/17 | Tagivan II | Huawei Technologies Deutschland | 2018 | LG Düsseldorf |
| 46 | 4a O 17/17 | Tagivan II | Huawei Technologies Deutschland | 2018 | LG Düsseldorf |
| 47 | HP-2017-000045 | TQ Delta LLC | Zyxel Communications UK Zyxel Communication | 2017 | Patents Court |
| 48 | A3/2017/1784, [2018] EWCA Civ 2344 | Unwired Planet | Huawei | 2018 | UK Court of Appeal |
| 48 | 4b O 49/14 | Unwired Planet International Ericsson | Huawei Technologies Deutschland Huawei Technologies | 2016 | LG Düsseldorf |
| 48 | 4b O 51/14 | Unwired Planet International Ericsson | Huawei Technologies Duesseldorf Huawei Technologies Deutschland Huawei Technologies | 2016 | LG Düsseldorf |

| S.No of Unique case | Case Number | Plaintiff | Defendant | Year | Court |
|---------------------|----------------|--|--|------|------------------------------|
| 48 | 4b O 52/14 | Unwired Planet International Ericsson | Huawei Technologies Duesseldorf Huawei Technologies Deutschland Huawei Technologies | 2016 | LG Düsseldorf |
| 49 | 4b O 122/14 | Unwired Planet International Ericsson | Samsung Electronics Samsung Electronics | 2016 | LG Düsseldorf |
| 50 | HP-2014-000005 | Unwired Planet International Unwired Planet | Google Ireland Google Commerce Samsung Electronics UK Google Huawei Technologies Samsung Electronics Huawei Technologies (UK) LM Ericsson | 2014 | Patents Court |
| 51 | 7 O 14091/19 | VoiceAge EVS | HMD Global | 2022 | LG München |
| 51 | 7 O 15350/19 | VoiceAge EVS | HMD Global | 2021 | LG München |
| 52 | 6 U 162/13 | Vringo Germany | ZTE Deutschland ZTE | 2014 | OLG Karlsruhe |
| 52 | 2 O 41/13 | Vringo Germany | ZTE Deutschland ZTE | 2013 | Mannheim |
| 53 | 21 O 8879/21 | Nokia | Oppo | 2022 | LG München First instance |

| S.No of Unique case | Case Number | Plaintiff | Defendant | Year | Court |
|---------------------|---------------------|--|--|------|--|
| 53 | [2022] EWCA Civ 947 | Nokia | Oppo | 2022 | UK Court of Appeal |
| 53 | 21 O 11522/21 | Nokia Technologies | Oneplus Technology | 2022 | LG München |
| 53 | 21 O 8890/21 | Nokia Technologies Nokia Solutions and Networks | Reflection Investment | 2022 | LG München First instance |
| 54 | 2:22-cv-00078 | G Communications | Samsung Electronics America Samsung Electronics | 2022 | Texas Eastern District Court First instance |

APPENDIX II: REPEATED HOLDOUT

| Case Number | Plaintiff | Defendant | Year | Court |
|---------------------------------------|--|---|------|------------------------------|
| 4b O 48/18 | Conversant Wireless Licensing | Huawei Technologies Huawei Technologies Deutschland Huawei Technologies Duesseldorf | 2020 | LG Düsseldorf |
| 4c O 3/17 | IP Bridge 1 | Huawei Technologies Deutschland | 2018 | LG Düsseldorf |
| 4c O 12/17 | Mitsubishi Electric Lighting | Huawei Technologies Deutschland | 2019 | LG Düsseldorf |
| 2:17-cv-00123 | Optis Wireless Technology Panoptis Patent Management Optis Cellular Technology | Huawei Technologies Huawei Device USA Huawei Device Huawei Device (shenzhen) | 2019 | Texas Eastern District Court |
| 4b O 15/17 | Panasonic Intellectual Property Corporation of America | Huawei Technologies Deutschland | 2018 | LG Düsseldorf |
| 4a O 17/17 | Tagivan II | Huawei Technologies Deutschland | 2018 | LG Düsseldorf |
| A3/2017/1784, [2018] EWCA Civ 2344 | Unwired Planet | Huawei | 2018 | UK Court of Appeal |
| HP-2017-000048 | Conversant Wireless Licensing | Huawei ZTE | 2018 | UK Patents Court |
| 4b O 16/17 | Panasonic Intellectual Property Corporation of America | ZTE Deutschland | 2018 | LG Düsseldorf |
| 6 U 162/13 | Vringo Germany | ZTE Deutschland | 2014 | OLG Karlsruhe |
| 4b O 5/17 | IP Bridge | ZTE Deutschland | 2018 | LG Düsseldorf |
| 15 U 39/21 | Via Licensing | TCT Mobile Europe | 2021 | OLG Düsseldorf |
| 4b O 23/20 | Dolby International | TCT Mobile Germany | 2021 | LG Düsseldorf |

| Case Number | Plaintiff | Defendant | Year | Court |
|---------------|--|--|------|------------------------------|
| | | TCT Mobile Europe | | |
| 6 U 149/20 | IP Bridge | TCT Mobile Germany | 2022 | Karlsruhe |
| 2 U 13/21 | Koninklijke Philips Electronics | TCT | 2022 | OLG Düsseldorf |
| 2 O 131/19 | LG Electronics | TCL | 2021 | Mannheim |
| 6 U 104/18 | IP Bridge | HTC Germany | 2020 | Karlsruhe |
| 7 O 66/15 | NTT DoCoMo | HTC Germany | 2016 | Mannheim |
| 4a O 73/14 | Saint Lawrence Communications | Vodafone HTC - High Tech Computer | 2016 | LG Düsseldorf |
| 2:19-cv-00066 | Optis Cellular Technology Panoptis Patent Management Unwired Planet Optis Wireless Technology Unwired Planet International | Apple | 2020 | Texas Eastern District Court |
| 6:10-cv-00417 | Science Applications International Virnetx Leidos | Cisco Systems Aastra Usa Aastra Technologies NEC Corporation of America NEC Apple | 2013 | Texas Eastern District Court |
| 21 O 11384/19 | Conversant Wireless Licensing | Daimler | 2020 | LG München |
| 2 O 34/19 | Nokia | Daimler Continental Huawei Technologies Deutschland Robert Bosch Tomtom Valeo Peiker Bury | 2020 | Mannheim |
| 7 O 8818/19 | Sharp | Daimler | 2020 | LG München |

| Case Number | Plaintiff | Defendant | Year | Court |
|-------------|----------------------|----------------|------|---------------|
| 4c O 44/18 | Dolby International | MAS Elektronik | 2020 | LG Düsseldorf |
| 4c O 56/18 | GE Video Compression | Mas Elektronik | 2020 | LG Düsseldorf |
| 4c O 69/18 | Koninklijke Philips | Mas Elektronik | 2021 | LG Düsseldorf |

