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## COMPULSORY LICENSING: A POTENTIAL SOLUTION TO THE ANTITRUST DILEMMA OF TECHNOLOGY STANDARDS SETTING

Shen Peng

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N O R T H W E S T E R N  
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**COMPULSORY LICENSING: A  
POTENTIAL SOLUTION TO THE  
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*Shen Peng*



## COMPULSORY LICENSING: A POTENTIAL SOLUTION TO THE ANTITRUST DILEMMA OF TECHNOLOGY STANDARDS SETTING

*Shen Peng\**

### INTRODUCTION

The Constitution grants patent owners exclusive rights over their inventions to “promote the Progress of Science.”<sup>1</sup> This clause was drafted based on the belief that monetary incentives granted to the first inventor, such as the proceeds from selling and licensing the invention, will foster new ideas and accelerate innovation to the benefit of the public welfare. However, when the first inventor is the sole benefactor of the rewards from the innovation, subsequent innovation may be stifled.

For instance, the first person to invent the idea of a mobile phone but lacking the right to use the underlying technologies essential to a mobile phone must obtain licenses from the patent owners for the phone’s low-voltage battery, keyboard, camera, operating system, and telecommunication technologies.<sup>2</sup> In a free market system, these deals will rarely go smoothly. If a low-voltage battery is the only battery in the market suitable for a future mobile phone, the mobile phone inventor will be forced to license the low-voltage battery from its owner. Bearing this in mind, a battery patent owner who has a lot of market power will naturally demand a very high royalty (similar to the “patent holdup” issue discussed later in this article). Even if the mobile phone inventor successfully secures all necessary patents at a reasonable royalty rate, the accumulative royalties may be too high for a mobile phone product to make economic sense (similar to the “royalty stacking” issue tackled later in this article).

These issues are especially prominent in the context of technology standards. For example, if a particular phone transmitter becomes the industry standard for receiving input and sending output signals, all mobile

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<sup>1</sup> U.S. CONST. art. I, § 8, cl. 8.

<sup>2</sup> The first person to invent may still be able to obtain the mobile phone patent. However, in order to commercialize the mobile phone, the inventor must obtain licenses from the owners of the underlying technologies.

phone companies would be “forced” to license from the transmitter’s patent owner to ensure their phone’s interoperability to compete with other companies. Despite the possibility that other transmitters in the market may work as well as the standard transmitter (standard–essential technology), the standard–essential technology in effect becomes the only transmitter in the market without competition. In other words, the potential substitutes and alternatives to the standard-essential technology are foreclosed due to its incompatibility with products that implement standard-essential technologies. The standard–essential technology, therefore, gives rise to an antitrust issue that inhibits future innovations and harms public welfare.

This paper proposes a solution to antitrust issues arising from technology standard-setting. An overview of the standard-setting process is helpful to understand the issues inherent in the process, including patent holdup, patent ambush, and royalty stacking. These issues have antitrust implications. The paper next examines these issues in light of the Sherman Act and relevant antitrust case law. Two notable solutions to the technology standard antitrust issue and their limitations are briefly mentioned. Finally, we look to copyright law for solutions.

INTRODUCTION .....	485
I. TECHNOLOGY STANDARD-SETTING PROCESS.....	487
A. <i>Technology Standard Comes Into Being</i> .....	487
B. <i>The Standard-Setting Process</i> .....	490
II. ISSUES WITHIN THE CURRENT STANDARD-SETTING FRAMEWORK .....	491
A. <i>Patent Holdup</i> .....	491
B. <i>Royalty Stacking</i> .....	493
C. <i>Low Threshold for Willful Infringement</i> .....	494
III. ANTITRUST IMPLICATIONS OF THE TECHNOLOGY STANDARD-SETTING ISSUES.....	495
IV. CURRENT PROPOSED SOLUTIONS TO THE ANTITRUST ISSUES WITH STANDARD-SETTING.....	497
A. <i>Per Se Legality for Single-Source Royalty Bargaining</i> .....	497
B. <i>Contracts as an Alternative Solution to the Antitrust Issues</i> .....	498
V. COMPULSORY LICENSING AS A SOLUTION TO THE STANDARD-SETTING ISSUES .....	498
A. <i>Compulsory Licensing Under Copyright Law</i> .....	499
B. <i>The Applicability of Compulsory Licensing to Patent Law</i> .....	500
C. <i>Compulsory Licensing as a Solution to the Standard-Setting Issues for Patents</i> .....	502
D. <i>Implementation and Administration</i> .....	503
VI. CONCLUSION.....	504

## I. TECHNOLOGY STANDARD-SETTING PROCESS

### A. *Technology Standard Comes Into Being*

While multiple technology standards may coexist within one area of technology (e.g., Windows and iOS operating systems), a single standard is more efficient than multiple standards in certain technologies (e.g., wireless communication<sup>3</sup> and electricity distribution<sup>4</sup>). Consider the earlier transmitter example. Multiple transmitters create difficulties for telecommunication companies, transmitter manufacturers, and mobile phone companies. Telecommunication companies have to implement different systems to recognize protocols from different transmitters; transmitter manufacturers will make multiple transmitters instead of specializing in one transmitter to achieve economies of scale, and mobile phone companies will need to integrate different systems or separate product lines for different transmitters. Although a product that is compatible with most standards is desirable, it is often technologically infeasible. Therefore, if the best transmitter becomes the industry standard, then manufacturers and providers will enjoy lower costs and customers will have better phones at a lower price. The Sherman Act has similarly recognized that one set of infrastructure is more efficient than multiple in the case of a natural monopoly, such as in the context of railroad<sup>5</sup> and power supply.<sup>6</sup>

In the following sections, I will explain how having a uniform standard allows 1.) network effects to realize its full potential<sup>7</sup>; 2.) downstream manufacturers to specialize;<sup>8</sup> and 3.) competing products to be more interchangeable and interoperable.<sup>9</sup>

#### 1. *Network Effect*

A network effect is a phenomenon where increased numbers of people or participants improve the value of a good or service.<sup>10</sup> In other words, a

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<sup>3</sup> Peter Grindley, David J. Salant & Leonard Waverman, *Standards Wars: The Use of Standard Setting as a Means of Facilitating Cartels: Third Generation Wireless Telecommunications Standard Setting*, 3 INT'L J. COMM. L. & POL'Y 2, 2 (1999).

<sup>4</sup> 2 LAW OF INDEPENDENT POWER § 10:166 (2022).

<sup>5</sup> *United States v. Terminal R. R. Ass'n of St. Louis*, 224 U.S. 383, 383 (1912).

<sup>6</sup> *Alaska Airlines, Inc. v. United Airlines, Inc.*, 948 F.2d 536, 548 (9th Cir. 1991).

<sup>7</sup> Michael L. Katz & Carl Shapiro, *Network Externalities, Competition, and Compatibility*, 75 AM. ECON. REV. 424, 434 (1985).

<sup>8</sup> Mark A. Lemley, *Ten Things to Do About Patent Holdup of Standards (And One Not To)*, 48 B.C. L. REV. 149, 154–55 (2007).

<sup>9</sup> Richard H. Stern, *Who Should Own the Benefits of Standardization and the Value It Creates?*, 19 MINN. J. L. SCI. & TECH. 107, 116 (2018).

<sup>10</sup> Caroline Banton, *Network Effect: What It Is, How It Works, Pros and Cons*, INVESTOPEDIA, <https://www.investopedia.com/terms/n/network-effect.asp> [<https://perma.cc/C89M-8368>].

product or service becomes more valuable every time a new user joins. One salient example of the network effect is social media.<sup>11</sup> A potential user is more likely to have their friends and families on a social media platform with many users, so she is more likely to join the one with a large customer base. The more users a social media platform has, the more valuable it is, and the more potential users will be drawn to it rather than its competitors.

Technology standards implicate network effects.<sup>12</sup> For instance, if one computer operating system is popular with a large customer base, software developers are incentivized to develop software applications compatible with this operating system.<sup>13</sup> Potential personal computer buyers are also more likely to purchase computers implementing this system because they have a wider range of software from which to select. The positive feedback loop is therefore formed between the popularity of a product and the commitment to a particular set of standards (“specialization”). The more popular a standard is, the more manufacturers and providers are incentivized to adopt it to attract more customers, and the more future customers are likely to buy products implementing the standard.

At the end of this positive feedback loop, the standard wins over all potential customers, and all manufacturers and providers specialize in this particular standard. The efficiency of a uniform technology standard has been achieved with a network effect.

## 2. *Specialization of Downstream Manufacturers*

The network effect also allows downstream producers to invest more resources in developing consumer goods for a larger consumer base.<sup>14</sup> Per the operating system example, the software developers, incentivized by market demand, may forego opportunities to develop iOS applications and focus on developing Windows applications. The developers will eventually be better at developing for Windows by specializing in a single standard without distraction.

Specialization translates into the economy of scale<sup>15</sup> in the transmitter example, too. The more committed manufacturers are to a standard, the more

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<sup>11</sup> John M. Yun, *Does Antitrust Have Digital Blind Spots?*, 72 S.C. L. REV. 305, 327 (2021).

<sup>12</sup> Daniel F. Spulber, *Consumer Coordination in the Small and in the Large: Implications for Antitrust in Markets with Network Effects*, J. COMPETITION L. & ECON. 207, 218 (2007).

<sup>13</sup> *United States v. Microsoft Corp.*, 253 F.3d 34, 83 (D.C. Cir. 2001).

<sup>14</sup> Katz, *supra* note 7.

<sup>15</sup> Economies of scale occur when a firm produces more output which results in a lower average cost per product. For the purpose of this paper, it can be simply understood as the more units a company produces, the cheaper one additional unit it is to be made.

specialized they are in producing products implementing that standard. Since the transmitter manufacturers no longer need to make different transmitters, they are able to make the standard-essential transmitter with all their resources. The manufacturers will eventually be better at manufacturing the transmitter, lowering the marginal cost of producing each transmitter.

### 3. *Increased Competition and Interoperability*

A single standard also increases downstream competition and reduces vendor lock-in.<sup>16</sup> If all phones are tied to specific service providers, the switching cost of changing service providers is high. Accordingly, the phone provider who has a large customer base can derive a positional advantage from their customers' loyalty and attachment to a certain phone brand (imagine all iPhone users have to use AT&T, the popularity of iPhone grants AT&T an unfair advantage over other providers). A high switching cost and vendor lock-in imply less competition to the detriment of consumer welfare.

The First Circuit Court of Appeals had this switching cost in mind when it decided *Lotus Dev. Corp. v. Borland Int'l, Inc.*<sup>17</sup> Lotus was the market leader for computer spreadsheet programs. Borland was sued for copying Lotus' command hierarchy to create its own spreadsheet program. The Court of Appeals of the First Circuit found the menu command hierarchy to be a "method of operation" and therefore uncopyrightable.<sup>18</sup> The First Circuit was mindful of the public interest in maintaining low switching costs between products to encourage emerging technologies.<sup>19</sup>

A uniform standard encourages competition among similar products, and interestingly fosters collaboration between different products of the same type. Interoperability increases as future innovations are based on the same platform. For instance, if iOS became the only standard for mobile phone operating systems, customers may enjoy more seamless interaction between an iOS device and an Apple display and encounter fewer issues than they would when using an iOS device and a Samsung display.

Therefore, a uniform standard allows network effect to realize its full potential by pooling all potential users to a single product or technology, allows downstream manufacturers to specialize by reducing the number of alternatives to minimize distraction, and allows competing products to be more interchangeable and interoperable by placing them all at the same platform subjecting to the same standard.

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<sup>16</sup> Lemley, *supra* note 8.

<sup>17</sup> *Lotus Dev. Corp. v. Borland Int'l, Inc.*, 49 F.3d 807, 818 (1st Cir. 1995), *aff'd*, 516 U.S. 233 (1996).

<sup>18</sup> *Id.* at 815.

<sup>19</sup> Michael Risch, *How Can Whelan v. Jaslow and Lotus v. Borland Both Be Right? Reexamining the Economics of Computer Software Reuse*, 17 J. MARSHALL J. COMP. & INFO. L. 511, 540 (1999).

### B. *The Standard-Setting Process*

After a review of a uniform technology standard's benefits, it's also helpful to acknowledge the standard-setting process to understand its implications on the standard-setting issues. Individuals, private organizations, and governmental entities come together to form standard-setting organizations (SSOs).<sup>20</sup> SSOs are usually open to all interested parties, and membership is voluntary. Participants enter the organization on the premise that they will share and disclose the patents they own in order to develop future standards.<sup>21</sup>

A new standard is chosen based on either consensus or the approval of a supermajority of all participants.<sup>22</sup> Since modern technologies “stand on the shoulder of many giants,”<sup>23</sup> a new standard may easily encompass thousands of patents. Patents used to create the new standards are the “standard-essential patents” (SEPs). A standard-essential patent is a patent that claims an invention that must be used to comply with a technical standard.<sup>24</sup> In other words, if a standard cannot be implemented without using a particular patented technology, the particular patent is essential to this standard.

When a new standard is proposed, members are encouraged to disclose their relevant patents. After the new standard is set, the SEP owners are able to collect royalties and license the SEPs to the implementers. However, discussions about royalties *ex ante* constitute price-fixing, and price-fixing is per se illegal under the antitrust law.<sup>25</sup> To work around this, many SSOs have their participants agree to FRAND licensing; that is, SEP holders agree to license at a rate that is “Fair, Reasonable, And Non-Discriminatory.”<sup>26</sup> The FRAND license is a commitment that licensors shall “not exercise any

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<sup>20</sup> J. Gregory Sidak, *The Meaning of Frand, Part I: Royalties*, 9 J. COMPETITION L. & ECON. 931 (2013).

<sup>21</sup> *Id.*

<sup>22</sup> *Id.*

<sup>23</sup> Suzanne Scotchmer, *Standing on the Shoulders of Giants: Cumulative Research and the Patent Law*, 5 J. Econ. Persp., Winter 1991, at 29, 29 (“Most innovators stand on the shoulders of giants, and never more so than in the current evolution of high technologies [such as molecular biology, pharmaceuticals, computer text editing, and computer spreadsheets], where almost all technical progress builds on a foundation provided by earlier innovators.”).

<sup>24</sup> See Janice M. Mueller, *Potential Antitrust Liability Based on a Patent Owner's Manipulation of Industry Standard Setting*, STATE ANTITRUST ENF'T ABA COMM. NEWSL. (ABA Sect. on Antitrust Law, Chicago, Ill.), Fall 2003, at 10–25.

<sup>25</sup> See 1 WILLIAM C. HOLMES, *Price-fixing*, INTELLECTUAL PROPERTY AND ANTITRUST LAW § 5:4.

<sup>26</sup> See King Fung Tsang & Jyh-an Lee, *Unfriendly Choice of Law in FRAND*, 59 VA. J. INT'L L. 220, 225 (2019).



market power resulting from its patents' incorporation into that standard."<sup>27</sup> Issues arise, as we shall see later, from the inherently vague language of the FRAND requirement, which differs from a contract in which terms are specified in detail. In one interpretation of the FRAND requirement, *Microsoft Corp. v. Motorola, Inc* the Ninth Circuit held that the FRAND royalty rate describes a royalty range that would restore competitive price setting and balance the interest of adopters and implementers.<sup>28</sup>

## II. ISSUES WITHIN THE CURRENT STANDARD-SETTING FRAMEWORK

The three most pertinent issues with the current standard-setting framework are patent holdup, including:

(1) patent ambush, where standard-setting organizations deliberately withhold patents during the voluntary disclosure period and demand a high royalty rate once the standard being set includes their technology, and supra FRAND royalties, a royalty rate doesn't reflect the principle of being "fair, reasonable, and non-discriminatory";

(2) royalty stacking, where the royalty rates of multiple underlying technologies of an invention accumulate and exceed the value of the invention itself, making commercializing of such a product impossible; and

(3) low threshold for willful infringement where the deterrence against potential violating parties under the current regime is inadequate.

The following subsections address each of these issues.

### A. Patent Holdup

Patent holdup is the most critical issue with technology standards. In a holdup scenario, "standard-essential patent owners may leverage their position and power to exclude competition in standardized markets in which compatibility, interconnection, and network effects play essential roles."<sup>29</sup> The SEP holders "lock-in"<sup>30</sup> implementers to the standard to extract royalties exceeding the value of the patented technology, and to exploit implementer switching costs<sup>31</sup> to move away from the standard. For instance, in the mobile phone example, the low-voltage battery patent owner, knowing the

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<sup>27</sup> Complaint at 12, *FTC v. Qualcomm, Inc.*, No. 5:17-cv-00220, 2017 WL 2774406 (N.D. Cal. Jan. 17, 2017).

<sup>28</sup> *Microsoft Corp. v. Motorola, Inc.*, 696 F.3d 872, 875 (9th Cir. 2012).

<sup>29</sup> Benjamin Hendricks, Brian P. Quinn, *The Hold-Up Tug-of-War-Paradigm Shifts in the Application of Antitrust to Industry Standards*, 28 COMPETITION: J. ANTI., UCL & PRIVACY SEC. CAL. L. ASSOC. 35, 36 (2018).

<sup>30</sup> *See id.* at 36.

<sup>31</sup> *See Joseph Farrell & Garth Saloner, Installed Base and Compatibility: Innovation, Product Preannouncements, and Predation*, 76 AM. ECON. REV. 940, 940 (1986).

technology is the only battery suitable for a mobile phone, has formidable market power. The battery patent owner can exercise this power by charging the phone inventor at a very high rate. As another example, Dell only makes laptops that are compatible with Windows. The switching cost for Dell to adopt a new operating system is exceedingly high; Dell would have to design new production lines and secure new contractors to manufacture hardware compatible with a new standard.

The holdup issue mostly arises in two scenarios, patent ambush and supra FRAND royalties, both of which are anticompetitive unilateral conduct by SEP holders that may lead to antitrust violations.<sup>32</sup>

### 1. Patent Ambush

*Ex ante*, participants of a standard-setting organization deliberately withhold information on relevant patents and avoid disclosing their intellectual property rights.<sup>33</sup> Once a standard is set, the patent ambush emerges, where SEP owners may collect royalties from the implementation of patents they did not disclose.<sup>34</sup> For example, when a smartphone standard-setting organization asks its members to voluntarily disclose their patents relevant to the making of a smartphone, Company A intentionally does not disclose its touch screen technology patent. The SSO then sets a standard in requiring new smartphones to have a touch screen, not anticipating that this requirement will incur any extra costs to smartphone companies (“implementers”). Company A then presents its patent and collects royalties of its touch screen patent from all implementers who adopt the new standard.

### 2. Supra FRAND royalties

*Ex post*, SEP holders may not conform to the FRAND licensing terms, the vague language of which creates the opportunity for SEP holders to escape liability. The patent owners may exert their market power and abuse the process by charging a higher than reasonable licensing rate, increasing the barrier to entry and marginalizing their competitors.<sup>35</sup> A supra FRAND licensing rate has further implications on downstream innovations.<sup>36</sup> The

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<sup>32</sup> See D. Bruce Hoffman, *Rhetoric vs. Reality: An Assessment of Trends in Civil Non-Merger Antitrust Enforcement Comparing the Bush and Obama Administrations*, 22 COMPETITION 105, 117 (2013).

<sup>33</sup> See Robert A. Skitol, *Concerted Buying Power: Its Potential for Addressing the Patent Holdup Problem in Standard Setting*, 72 ANTITRUST L.J. 727, 731 (2005).

<sup>34</sup> See *id.*

<sup>35</sup> 2 JAY DRATLER, JR., LICENSING OF INTELLECTUAL PROPERTY § 5.02.

<sup>36</sup> Carl Shapiro, *Setting Compatibility Standards: Cooperation or Collusion*, in EXPANDING THE BOUNDARIES OF INTELLECTUAL PROPERTY: INNOVATION POLICY FOR THE KNOWLEDGE SOCIETY 81, 91 (Rochelle Cooper Dreyfuss et al., eds. 2001).

unreasonable licensing rate imposes costs on downstream producers, which chills downstream innovation and passes extra costs to end consumers.<sup>37</sup>

An intuitive solution to the *ex post* patent holdup problem is to have participants agree on a royalty rate prior to the standard-setting.<sup>38</sup> In other words, an organization might be able to eliminate the *ex post* uncertainty of SEP holders not conforming to the FRAND licensing terms with *ex ante* negotiations. However, the discussion of royalty rates increases the risk of constituting the antitrust violation of price fixing.<sup>39</sup> Many SSOs, with their primary goal of setting new standards without delay, would prefer to avoid the antitrust risk and leave the royalty rate discussion to private parties *ex post*.

### B. Royalty Stacking

A technology standard can potentially consist of thousands of patents, and the royalty rate of each patent accumulates and can easily exceed the end product itself. For example, the European 3G telecom standard contained almost 6,000 essential patents. The cumulative royalty rate of these patents reached 130% of the potential cost of a 3G product.<sup>40</sup> The royalty stacking problem has its root in “Cournot complements” - a market where  $n$  firms sell  $m$  different products that are useless unless they are used together; in other words, the  $m$  goods are perfect complements.<sup>41</sup> For example, Standard A requires the use of 100 patents. One unlicensed patent will render the rest of the 99 licensed patents useless to an implementer because the implementer cannot make products under Standard A with that one patent unlicensed. If we rely on the market to produce a price, the resulting integrated product price will be inefficiently high.<sup>42</sup>

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<sup>37</sup> *Id.*

<sup>38</sup> Mark A. Lemley, *Ten Things to Do About Patent Holdup of Standards (And One Not To)*, 48 B.C. L. REV. 149, 161–62 (2007).

<sup>39</sup> *Rambus v. Micron & Hynix: A New Technology Doomed by Market Collusion or Deficiencies? A Roundtable Views from Trial Counsel Bart Williams, Bill Price and Ken Nissly Moderated by Cheryl Lee Johnson and Ken O’rourke: Edit*, 22 Competition: J. Anti. & Unfair Comp. L. Sec. St. B. Cal. 19, 21 (2013). (Rambus alleged that these four memory manufacturers conspired to (a) restrict the production and sale of RDRAM, (b) fix, raise, and maintain the price of RDRAM, and (c) lower the price of DDR (defendants’ competing technology) in order to prevent RDRAM from becoming the worldwide standard for computer memory.”)

<sup>40</sup> *Alaska Airlines, Inc. v. United Airlines, Inc.*, 948 F.2d 536, 548 (9th Cir. 1991).

<sup>41</sup> See generally Rabah Amir & Adriana Gama, *On Oligopoly with Perfect Complements and Cournot Oligopoly* (Working Paper, 2013), <https://citeseerx.ist.psu.edu/document?repid=rep1&type=pdf&doi=84ecfed7888f26d3b3020b6094a6255c48aa9323> [<https://perma.cc/N385-8W6G>].

<sup>42</sup> See *Alaska Airlines*, 948 F.2d at 548.

The patent ambush exacerbates the royalty stacking issue. A downstream implementer needs the licenses to the unanticipated SEPs in addition to the disclosed ones, increasing the total cost of implementation. For example, a 3G telecom implementer anticipating the need to license 6,000 patents will have to license 6,300 patents because the additional 300 patents were not disclosed before a particular standard was set.

### C. *Low Threshold for Willful Infringement*

The excessive charge for licensing SEPs is especially problematic in light of the low burden of proof for willful infringement. An alleged infringer risks paying treble damages and injunctive relief.<sup>43</sup> A risk-averse licensee would, in theory, be willing to pay anything less than the cost of litigation and damages multiplied by the probability of a court finding the licensee liable for infringement. Considering the high monetary damages and the high probability of being found liable due to the low threshold for willful infringement, a risk-averse licensee will be willing to pay more than the commercial value of a SEP. Standardization “eliminates alternatives” to other patented technology.<sup>44</sup> Knowing that licensees lack alternatives, patent holders are well positioned to extract the consumer surplus (the difference between the highest price a consumer is willing to pay and the actual price they do pay for the good) with their leverage power as SEP holders.<sup>45</sup> The SEP holders can therefore charge supra-competitive royalties, which capture not only the value of patents but also the value of standardization itself.<sup>46</sup>

This calculation has factored into the risk of injunctions, which is the greatest threat to technically sophisticated products. For instance, Intel’s microprocessor technology entails numerous integrated circuit patents. Since Intel needs licenses from each and every integrated circuit patent to continue its manufacture and sale of microprocessors, an injunction for one single patent will render all the other patents “useless.”<sup>47</sup> A workaround for this patent might take months to develop, by which point the technology may already have become outdated. Therefore, licensees are more likely to pay beyond the true worth of a patent license.

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<sup>43</sup> See *Mya Saray, LLC v. Al-Amir*, 831 F. Supp. 2d 922, 941 (E.D. Va. 2011).

<sup>44</sup> *Broadcom v. Qualcomm, Inc.*, 501 F.3d 297, 317 (3rd Cir. 2007).

<sup>45</sup> *Hendricks & Quinn*, *supra* note 29, at 36.

<sup>46</sup> Complaint, *FTC v. Qualcomm, Inc.*, No. 5:17-cv-00220, 2017 WL 2774406 (N.D. Cal. Jan. 17, 2017).

<sup>47</sup> *Alaska Airlines*, 948 F.2d at 548.

### III. ANTITRUST IMPLICATIONS OF THE TECHNOLOGY STANDARD-SETTING ISSUES

15 U.S.C. § 2 (Sherman Act § 2) states:

Every person who shall monopolize, or attempt to monopolize, or combine or conspire with any other person or persons, to monopolize any part of the trade or commerce among the several States, or with foreign nations, shall be deemed guilty of a felony, and, on conviction thereof, shall be punished by fine not exceeding \$100,000,000 if a corporation, or, if any other person, \$1,000,000, or by imprisonment not exceeding 10 years, or by both said punishments, in the discretion of the court.<sup>48</sup>

15 U.S.C. § 45 is relevant in some cases as well. Section 45 is applicable to conduct where “the act or practice causes or is likely to cause substantial injury to consumers which is not reasonably avoidable by consumers themselves and not outweighed by countervailing benefits to consumers or to competition.”<sup>49</sup>

Courts have been receptive to patent holdup antitrust claims “if the SEP-holder (1) possesses market power and (2) abuses that market power by leveraging control over access to the standard to exclude rivals or extract supra FRAND royalties.”<sup>50</sup> The guiding principle of modern antitrust law is that competition is generally desirable to achieve economic efficiency.<sup>51</sup> Therefore, the focus of the antitrust law is not outlawing monopoly per se, but penalizing a party exerting its illegitimate anticompetitive market power to discourage competition.<sup>52</sup> Market power is evident from “the ability to set price above marginal cost.”<sup>53</sup> However, this definition is rarely helpful in cases of technology standard-setting due to the minimal marginal costs of intangible goods such as patents.

Case law provides more guidance in what constitutes an antitrust violation in the context of technology standard-setting. In *Research in Motion Ltd. v. Motorola, Inc.*, Motorola was accused of refusing to enter into a negotiation of a reasonable licensing rate of its technology.<sup>54</sup> The Northern District Court of Texas found Motorola, as a market leader, used its SEPs as

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<sup>48</sup> 15 U.S.C.A. § 2 (West).

<sup>49</sup> 15 U.S.C.A. § 45 (West).

<sup>50</sup> Hendricks & Quinn, *supra* note 29, at 38 (2018).

<sup>51</sup> See Mark A. Lemley, *A New Balance Between IP and Antitrust*, 13 SW. J. L. & TRADE AM. 237, 241 (2007).

<sup>52</sup> *Id.* at 247.

<sup>53</sup> Aminta Raffalovich & Steven Schwartz, *Antitrust Analysis of Frand Licensing Post-Ftc v. Qualcomm*, 31 COMPETITION: J. ANTITRUST & UNFAIR COMPETITION L. SECTION CAL. L. ASSOC. 138, 139 (2021).

<sup>54</sup> *Research in Motion Ltd. v. Motorola, Inc.*, 644 F. Supp. 2d 788, 791 (N.D. Tex. 2008).

“gatekeeper[s]” to suppress competition against rivals.<sup>55</sup> Comparable conduct to foreclose a rival’s innovation was also found to have been carried out by defendants in *Am. Soc. of Mech. Engineers, Inc. v. Hydrolevel Corp.*, 456 U.S. 556 (1982) and *Allied Tube & Conduit Corp. v. Indian Head, Inc.*, 486 U.S. 492 (1988). Similarly, in *Rambus Inc. v. FTC*, the D.C. Circuit held that a supra FRAND licensing fee was not sufficient to create antitrust liability because the exclusion of a rival is required.<sup>56</sup> The D.C. Circuit set a higher threshold for actionable conduct under the Sherman Act by requiring the Rambus to show that “if Rambus had disclosed all the information allegedly required of it,” its competitor, JEDEC, “would have standardized an alternative technology.”<sup>57</sup> In other words, an alternative standard would have come into existence but for the holdup. In addition to the SEP holders’ collusion to foreclose a rival, deceptive and manipulative conduct is also actionable under modern antitrust law. In *United States v. Microsoft Corp.*, Microsoft induced software engineers to write Java applications that are only compatible with Microsoft products on the false promise that Microsoft would cooperate with its rivals to ensure interoperability.<sup>58</sup> Because Microsoft could not offer a pro-competitive justification, the D.C. Circuit found Microsoft’s conduct anticompetitive and constituted a violation of antitrust law.<sup>59</sup> Similarly, in *Broadcom v. Qualcomm*, Qualcomm was alleged to have used its power over the CDMA (Code Division Multiple Access, a telecommunication technology) standard while engaging in the following conduct: providing cell phone manufacturers “discounts on the excessive royalties” on the condition that they purchase Qualcomm chipsets exclusively; incentivizing cell phone manufacturers’ use of Qualcomm’s chipsets by providing them with millions of dollars of marketing funds and other incentives; and threatening cell phone manufacturers with 2G and 3G CDMA chipset supply and pricing to coerce them into Qualcomm’s UMTS chipsets.<sup>60</sup> The District Court of New Jersey found Qualcomm’s conduct to have no legitimate business justification.<sup>61</sup> The Federal Court of Appeals for the Third Circuit later ruled the “carrot and stick” techniques employed by Qualcomm constitute actionable anticompetitive conduct.<sup>62</sup> Accordingly, Qualcomm’s activity violated section 2 of the Sherman Act.<sup>63</sup>

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<sup>55</sup> *Id.* at 794.

<sup>56</sup> *Rambus Inc. v. FTC*, 522 F.3d 456, 463–64 (D.C. Cir. 2008).

<sup>57</sup> *Id.*

<sup>58</sup> *United States v. Microsoft Corp.*, 253 F.3d 34, 76 (D.C. Cir. 2001).

<sup>59</sup> *Id.*

<sup>60</sup> *Broadcom Corp. v. Qualcomm Inc.*, 501 F.3d 297, 304 (3d Cir. 2007).

<sup>61</sup> *See id.*

<sup>62</sup> 501 F.3d 297, 314 (3d Cir. 2007).

<sup>63</sup> *Id.* at 318.

In addition to sanctions of antitrust violations, courts also tilt the balance towards interoperability to foster competition. In the previously mentioned *Lotus Dev. Corp. v. Borland Int'l, Inc.*,<sup>64</sup> the First Circuit, in ruling the menu command hierarchies uncopyrightable, found other spreadsheet programs may use the same menu command post-*Lotus* without infringement. The First Circuit attempted to level the ground for software competitors. The recent decision in *Google LLC v. Oracle Am., Inc.* is similarly pro-interoperability.<sup>65</sup> The Supreme Court, by finding Google's copying of Oracle's application programming interface (API) constituted fair use, decided the API was a "building block" for other software to build on freely. The Supreme Court pushed the fair use doctrine further to make way for new technologies and reduce switching costs for newly emerging innovations.

#### IV. CURRENT PROPOSED SOLUTIONS TO THE ANTITRUST ISSUES WITH STANDARD-SETTING

##### A. *Per Se* Legality for Single-Source Royalty Bargaining

Argument has been made for an exemption for single-source royalty bargaining from antitrust scrutiny, where there is only one SEP in a standard and the adoption of such a standard involves only one SEP royalty negotiation.<sup>66</sup> This exemption is not unprecedented in case law. In *United States v. General Electric Co.*,<sup>67</sup> the Supreme Court allowed patent holders to set a minimum resale price, immunizing them from the price-fixing liability. The Supreme Court justified its ruling by reasoning that antitrust law must not undermine a patent owner's right to control the invention's price.<sup>68</sup> The ruling is consistent with the European Commission's allowance of *ex ante* royalty rates negotiation within SSOs.<sup>69</sup> Though *United States v. General Electric Co.* has never been explicitly overruled, it has limited applications to contemporary technologies. The single-source royalty discussion in the opinion is less relevant in the modern era considering

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<sup>64</sup> *Lotus Dev. Corp. v. Borland Int'l, Inc.*, 49 F.3d 807, 818 (1st Cir. 1995), *aff'd*, 516 U.S. 233 (1996).

<sup>65</sup> *Google LLC v. Oracle Am., Inc.*, 141 S. Ct. 1183, 209 L. Ed. 2d 311 (2021).

<sup>66</sup> Patrick D. Curran, *Standard-Setting Organizations: Patents, Price Fixing, and Per Se Legality*, 70 U. CHI. L. REV. 983, 1000 (2003).

<sup>67</sup> *United States v. Gen. Elec. Co.*, 272 U.S. 476, 479 (1926).

<sup>68</sup> *Id.* at 494.

<sup>69</sup> *Commission Notice on Guidelines on the Application of Article 81 of the EC Treaty to Technology Transfer Agreements*, at ¶ 225, 2004 O.J. (C 101) 2.

horizontal price fixing<sup>70</sup> and modern technology standards that entail potentially thousands of patents.

Two major limitations also curtail the viability of the solution. First, the price negotiation under the new regime will lead to “undue delays in the standard-setting process,” contrary to the primary aim of many SSOs. Second, “incentives to innovate and develop improved proprietary technologies” would likely diminish due to the difficulty in obtaining the license from the patent owner of the technology to be improved upon.<sup>71</sup>

### B. *Contracts as an Alternative Solution to the Antitrust Issues*

Makan Delrahim, assistant Attorney General for Antitrust, has claimed that patent holdup is not an antitrust problem, and that “antitrust law should not be used as a tool to police FRAND commitments that patent-holders make to standard-setting organizations.”<sup>72</sup> Delrahim believes the holdup problem reflects “basic commercial realities,” and that contract law is better positioned to address the holdup issue.<sup>73</sup> If contract law were the governing rule for standard-setting, it could potentially reduce the *ex post* uncertainty of conforming issues with *ex ante* negotiation because the FRAND commitment is contractual in nature.<sup>74</sup> However, contract law is inadequate in imposing contractual obligations against parties potentially facing antitrust liabilities because of the inherent vagueness of the FRAND terms and the little case law to illuminate the meaning of FRAND licensing in practice.<sup>75</sup>

## V. COMPULSORY LICENSING AS A SOLUTION TO THE STANDARD-SETTING ISSUES

Whereas the current regime in patent law gives rise to multiple issues in the standard-setting process, and current solutions in patent law are inadequate to satisfactorily address those problems - compulsory licensing under copyright law might point to a potential solution for the standard-setting issues in the realm of patent law.

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<sup>70</sup> See *United States v United States Gypsum Co.*, 333 U.S. 364, 399–400 (1948).

<sup>71</sup> Curran, *supra* note 66, 1005.

<sup>72</sup> See Makan Delrahim, *The “New Madison” Approach to Antitrust and Intellectual Property Law*, Remarks as Prepared for Delivery at the University of Pennsylvania Law School at 5 (Mar. 16, 2018), <https://www.justice.gov/opa/speech/file/1044316/download> [<https://perma.cc/L2FD-H7NF>].

<sup>73</sup> *Id.*

<sup>74</sup> Jonathan Hillel, *Standards × Patents ÷ Antitrust = ∞: The Inadequacy of Antitrust to Address Patent Ambush*, 9 DUKE L. & TECH. REV. 1, 17, 20, (2010).

<sup>75</sup> Herbert Hovenkamp, *Frاند and Antitrust*, 105 CORNELL L. REV. 1683, 1695 (2020).



### A. Compulsory Licensing Under Copyright Law

Ever since Congress overturned the Supreme Court’s ruling in *White-Smith Publishing Co. v. Apollo Co.*,<sup>76</sup> where the Supreme Court held piano rolls are not readable to humans and therefore uncopyrightable, the Copyright Act of 1909 extended copyright protection to all “mechanical” reproductions of songs, “whether read by people or machines.”<sup>77</sup> Congress has also mandated that all musical compositions be subject to a compulsory license allowing anyone to copy the composition without asking permission<sup>78</sup> as long as users pay the licensee a statutory fee. According to Kal Raustiala and Christopher Sprigman, the compulsory licensing statute stemmed out of Congress’s concern over the potential monopoly of the player piano roll market by dominant manufacturer Aeolian Co.<sup>79</sup> To address the issue, Congress enacted the compulsory license regime and “allowed anyone to make a mechanical reproduction of someone else’s song.”<sup>80</sup>

The compulsory license rate started at two cents per copy and has been adjusted over time. The rate is set by the Copyright Royalty Board, a three Copyright Royalty Judge panel appointed by the Librarian of Congress.<sup>81</sup> One way of obtaining a §115 compulsory license is through Notices of Intention (NOI), the formal §115 process of notifying the Copyright Office of the intent to use a copyrighted work.<sup>82</sup> Most licensees would instead directly contact the Harry Fox Agency, a private firm and dealmaker between copyright owners and potential licensees.<sup>83</sup> Licenses granted through Harry Fox Agency do not need to adhere to §115 statutory payment and accounting rules.<sup>84</sup> Paradoxically, licenses obtained from Harry Fox often have a substantially lower rate than the statutory rate.<sup>85</sup>

Section 115(c)(1)(F) specifies that the Copyright Royalty Board “shall establish rates and terms that most clearly represent the rates and terms that would have been negotiated in the marketplace between a willing buyer and

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<sup>76</sup> *White-Smith Music Pub. Co. v. Apollo Co.*, 209 U.S. 1 (1908).

<sup>77</sup> *Id.*

<sup>78</sup> Kal Raustiala & Christopher Jon Sprigman, *Scale of Justice: How a Terrible Supreme Court Decision About Player Pianos Made the Cover Song What It Is Today*, SLATE (May 12, 2014, 10:00 AM), <https://slate.com/technology/2014/05/white-smith-music-case-a-terrible-1908-supreme-court-decision-on-player-pianos.html> [<https://perma.cc/3CEL-TFM5>].

<sup>79</sup> JEANNE C. FROMER & CHRISTOPHER JON SPRIGMAN, *COPYRIGHT LAW CASES AND MATERIALS* 368–69 (3d ed. 2021).

<sup>80</sup> Raustiala & Sprigman, *supra* note 78.

<sup>81</sup> Fromer & Sprigman, *supra* note 79, at 367.

<sup>82</sup> *Id.*

<sup>83</sup> *Id.*

<sup>84</sup> *Id.* at 368.

<sup>85</sup> *Id.*

a willing seller.”<sup>86</sup> The liability rule entails a quasi-free market licensing approach.<sup>87</sup> In contrast, the compulsory licensing setting used to weigh heavily on policy considerations, leaning towards the public benefit of information dissemination than securing the copyright owner’s benefits.<sup>88</sup> Potential licensees have therefore witnessed a price increase from an access-friendly royalty rate to a quasi-free market licensing rate. William Landes and Judge Richard Posner have noted the tension as an “access versus incentives” tradeoff — “charging a price for a public good reduces access to it (a social cost), making it artificially scarce. . . . but increases the incentive to create it in the first place, which is possibly offsetting social benefit.”<sup>89</sup>

Compulsory licensing is an effective tool in addressing market failure due to transaction costs. It does so by allowing licensees to forgo time-consuming and costly negotiations with each and every individual copyright owner.<sup>90</sup> One might see fair use as an extreme instance of compulsory licensing. Fair use “can be conceived of as a ‘zero-price’ compulsory license”<sup>91</sup> and grants almost unlimited access of the copyrighted work to the public while conferring little benefit to copyright owners other than public recognition. Inevitably, some copyright owners charge supra competitive licensing rates in bad faith, and contacting multiple parties can be difficult, making transaction costs prohibitive.<sup>92</sup>

### B. *The Applicability of Compulsory Licensing to Patent Law*

It is natural to relate compulsory licensing as a potential solution to standard-setting in patent law. A record label company assembling multiple hit songs into one album faces the same issues of royalty stacking and being charged supra competitive royalty rates. The hit songs are arguably less “essential” to an album than a SEP is to a technology standard, but the market demand makes the hit songs hard to circumvent for a popular album. Having such issues in mind, Congress made an exception to the “monopoly” of music copyrights by compulsory licensing the copyrighted works. Many

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<sup>86</sup> *Id.* at 373.

<sup>87</sup> See Richard A. Posner, *Transaction Costs and Antitrust Concerns in the Licensing of Intellectual Property*, 4 J. MARSHALL REV. INTELL. PROP. L. 325, 328 (2005).

<sup>88</sup> See *SoundExchange, Inc. v. Copyright Royalty Bd.*, 904 F.3d 41, 56 (D.C. Cir. 2018).

<sup>89</sup> See WILLIAM M. LANDES & RICHARD A. POSNER, *THE ECONOMIC STRUCTURE OF INTELLECTUAL PROPERTY LAW* 20–21 (2003); Jacob Victor, *Reconceptualizing Compulsory Copyright Licenses*, 72 STAN. L. REV. 915, 926.

<sup>90</sup> Kristelia A. García, *Penalty Default Licenses: A Case for Uncertainty*, 89 N.Y.U. L. REV. 1117, 1127 (2014).

<sup>91</sup> Victor, *supra* note 89, at 930.

<sup>92</sup> Mark A. Lemley & Philip J. Weiser, *Should Property or Liability Rules Govern Information?*, 85 TEX. L. REV. 783, 786–87 (2007).

similarities between copyright and patent justify the adoption of compulsory licensing to patent law.

Article I, Section 8, Clause 8, of the United States Constitution grants Congress the power “[t]o promote the Progress of Science and useful Arts, by securing for limited Times to Authors and Inventors the exclusive Right to their respective Writings and Discoveries,”<sup>93</sup> with “Science,” “Inventors,” and “Discoveries” referring to patent and “useful Arts,” “Authors” and “Writings” referring to copyright. Both laws are granted under the same clause and confer upon inventors and authors rights with limited scope and duration.<sup>94</sup> Both inventors and authors receive a limited monopoly to make use of their rights and to assign or license those rights to a third party.<sup>95</sup>

Congress and courts have also adopted similar exemptions in the two intellectual property schemes: fair use for copyright and royalty-free licensing for patent. Fair use is a limitation to the exclusive right of copyright; Congress exempts those who use copyrighted work from licensing fees if they meet the fair use requirements.<sup>96</sup> Similarly, Courts have allowed royalty-free patent licensing as the counterpart to the fair use of copyright. The U.S. District Court of New Jersey “ordered royalty-free patent licensing when General Electric achieved its dominant position in the industry and maintained it in great measure by its extension of patent control.”<sup>97</sup> In *Matter of Eli Lilly and Co*, the Federal Trade Commission “entered a consent decree requiring royalty-free licensing of certain patents for a period of five years.”<sup>98</sup>

Arguments that compulsory licensing should not apply to patent law are foreseeable. Whereas the threshold for patent-eligible matters is more demanding than for the copyright,<sup>99</sup> the patent law confers stronger

<sup>93</sup> U.S. CONST. art. I, § 8, cl. 8.

<sup>94</sup> “New and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof” are eligible patent subject matter with a protection up to twenty years. 35 U.S.C. § 101. Copyright affords protection to “(1) literary works; (2) musical works, including any accompanying words; (3) dramatic works, including any accompanying music; (4) pantomimes and choreographic works; (5) pictorial, graphic, and sculptural works; (6) motion pictures and other audiovisual works; (7) sound recordings; and (8) architectural works” for up to seventy-five years. 17 U.S.C. § 102.

<sup>95</sup> Alice Haemmerli, *Why Doctrine Matters: Patent and Copyright Licensing and the Meaning of Ownership in Federal Context*, 30 COLUM. J.L. & ARTS 1 (2006).

<sup>96</sup> Congress considers the following four factors in deciding whether a use of a copyrighted work constitutes fair use: “(1) the purpose and character of the use, including whether such use is of a commercial nature or is for nonprofit educational purposes; (2) the nature of the copyrighted work; (3) the amount and substantiality of the portion used in relation to the copyrighted work as a whole; and (4) the effect of the use upon the potential market for or value of the copyrighted work.” 17 U.S.C. § 107.

<sup>97</sup> See *United States v. Gen. Elec. Co.*, 115 F. Supp. 835, 843–46 (D.N.J. 1953).

<sup>98</sup> See also *Matter of Eli Lilly and Co.*, 95 F.T.C. 538 (1980).

<sup>99</sup> The USPTO will approve patent applications only if they meet both the novelty and non-obviousness requirement. 35 U.S.C. § 102, 103. In contrast, a work only needs to be original, not

protection of intellectual property rights.<sup>100</sup> Considering the shorter duration of patent right protection and the fast pace of technology development, arguably fewer exceptions should be made to patent law. Congress has always been reluctant in “adopting a system of compulsory licensing of patents,” though few formal explanations have been offered.<sup>101</sup> It could be due to the difficulty in evaluating the commercial value of innovation, especially for unprecedented technologies with high potential.

### *C. Compulsory Licensing as a Solution to the Standard-Setting Issues for Patents*

Despite the legislative inertia, the advantages of compulsory licensing to setting technology standards merits the adoption of a compulsory licensing system. Compulsory licensing naturally does away with the patent ambush issue because the SEP holders will have less control over the price and process. Because SEPs will be licensed at a fixed rate by an independent party, the SEP owners have a reduced incentive to deliberately withhold information or only to disclose it after a new standard is set. The third party may consider licensing a particular SEP at a price lower than the market rate to punish the intentional concealment. A third party’s intervention also reduces SEP holders’ leverage power. Downstream manufacturers and competitors will accordingly benefit from fewer surprises because of the reduced number of patent ambushes. SEP implementors will find it easier to budget accordingly. Competitors are also less likely to be excluded from the market or face prohibitively high royalty rates from a patent ambush.

An independent third party setting royalty rates eliminates the need for direct negotiation between SEP holders and licensees that gives rise to unfair licensing terms. The patent holders will not be able to exert their market power without limits and charge licensees supra FRAND licensing rates. Thanks to the impartial third party, the royalty rates will mirror the real

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necessarily novel, to be copyrightable. 17 U.S.C. § 102. According to the nondiscrimination principle, a judge should not deny a work’s copyrightability because of its low aesthetic merit; the court does and should determine whether the variation of a patent from prior arts is obvious to be invalid. *See* *Bleistein v. Donaldson Lithographing Co.*, 188 U.S. 239, 252 (1903); 35 U.S.C. § 103 (“Yet if they command the interest of any public, they have a commercial value,—it would be bold to say that they have not an aesthetic and educational value—and the taste of any public is not to be treated with contempt.”).

<sup>100</sup> An invention can infringe on a patent under the “doctrine of equivalents.” *See* *Graver Tank & Mfg. Co. v. Linde Air Prod. Co.*, 339 U.S. 605, 606 (1950). However, mere similarities are insufficient to constitute copyright infringement as long as the alleged infringing work is independently created. *Kwan Software Eng’g, Inc. v. Foray Techs., LLC*, No. C 12-03762, 2014 LEXIS 17376, at \*12 (N.D. Cal. Feb. 11, 2014).

<sup>101</sup> *Hartford-Empire Co. v. United States*, 323 U.S. 386, 417 (1945). Congress “has also rejected the proposal that a patentee found guilty of violation of the antitrust laws should be compelled, as a penalty, to license all his future inventions at reasonable royalties.” *Id.*

market value of a license. In addition to solving the supra FRAND royalty issue, the transaction cost involved in the negotiations is significantly reduced, lowering the barrier of entry, fostering competition within markets, and encouraging accumulative innovations.

A new balance between a reasonable royalty rate and the licensees' benefits will be restored and the potential of a royalty stacking issue will be curtailed. The price setting process is transferred from multiple individual SEP owners to a central planner. Solving the previously mentioned Cournot complements problem, the central planner mitigates the effect of each SEP owner extracting supra competition royalties where royalties stack to a value exceeding the end product itself.

SEP holders are also less likely to use their SEPs and the threat of willful infringement treble damages as leverage against competitors to extract supra competition royalty rates. The patent compulsory licensing system serves as a legislative workaround of the low burden of proof for willful patent infringement. The potential plaintiffs, namely the SEP holders, are less likely to bring suits or threaten to litigate as a means to increase the royalties. This is due to both the elimination of negotiations between SEP holders and licensees, which gives rise to litigation threats, and the reduced return from lawsuits.

However, the impartial third party should also be mindful of not taking too much power from the SEP holders, which will reduce the incentives to innovate and discourage participation in SSOs. In conclusion, all issues mentioned in Section III within the current standard-setting framework are substantially ameliorated.

#### *D. Implementation and Administration*

All previous discussion naturally leads to the inquiry of the identity of the impartial third party. Just as the compulsory copyright license rate is set by the Copyright Royalty Board, a government agency is reasonably desirable to assume the role for setting patent royalties.

The United States Patent and Trademark Office (USPTO) fulfills the role of "promot[ing] the Progress of Science and useful Arts."<sup>102</sup> About 75% of all USPTO employees are patent examiners with the rest being trademark examiners and supporting staff.<sup>103</sup> Though the USPTO claims "advising the president of the United States, the secretary of commerce, and U.S. government agencies on intellectual property (IP) policy, protection, and

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<sup>102</sup> U.S. CONST. art. I, § 8, cl. 8.

<sup>103</sup> PERFORMANCE & ACCOUNTABILITY REPORT FY 17, U.S. PAT & TRADEMARK OFF., <https://www.uspto.gov/sites/default/files/documents/USPTOFY17PAR.pdf> [<http://perma.cc/432R-LGL4>].

enforcement” as its role<sup>104</sup>, the majority of its function revolves around technicalities. The USPTO mostly examines applications, grants patents and communicates with inventors on their applications. As an unchallenged expert on science and engineering, USPTO seems unfit for business coordination and commercializing technologies. President Obama proposed combining USPTO and the National Institute of Standards and Technology (NIST) into one technology and innovation office.<sup>105</sup> The proposal did not go through.

The American National Standards Institute (ANSI) is a private non-profit institution that “oversees the development of voluntary consensus standards for products, services, processes, systems, and personnel in the United States.”<sup>106</sup> It is an “umbrella organization for the U.S. standards community and coordinates the work of myriad organizations to bring together professionals and experts for the development of American National Standards.”<sup>107</sup> Though influential and well-suited for the role of compulsory licensing, ANSI lacks binding force as a private entity.

A voluntary consensus reached by all SSO participants to compulsory licensing is unlikely, so a governmental intervention is needed. Therefore, a collaboration between USPTO and ANSI could be a viable solution for compulsory royalty rate setting. USPTO could also help insulate ANSI, a private entity, from the influence of big corporations and ensure the impartialness of the compulsory licensing system.

## VI. CONCLUSION

To cure market failures, the government should intervene in private technology standard-setting. USPTO and ANSI should oversee the standard-setting process collaboratively. Having a government agency set the price instead of private entities circumvents the potential issue of price fixing under the antitrust law. The standard essential patents may be licensed to other companies and the implementers under the compulsory licensing regime, mirroring a similar system under the copyright law. Under a compulsory licensing system, the issues of patent holdup, patent ambush, and royalty stacking are all substantially curtailed. SEP holders will have less

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<sup>104</sup> *About Us*, U.S. PAT & TRADEMARK OFF., <https://www.uspto.gov/about-us> [<https://perma.cc/FYL8-58AN>].

<sup>105</sup> *United States Department of Commerce*, WIKIPEDIA, [https://en.wikipedia.org/wiki/United\\_States\\_Department\\_of\\_Commerce](https://en.wikipedia.org/wiki/United_States_Department_of_Commerce) [<https://perma.cc/R9X5-89MZ>].

<sup>106</sup> *American National Standards Institute*, WIKIPEDIA, [https://en.wikipedia.org/wiki/American\\_National\\_Standards\\_Institute](https://en.wikipedia.org/wiki/American_National_Standards_Institute) [<https://perma.cc/Q9X7-ZZR9>].

<sup>107</sup> The American National Standards Institute, *Nanotechnology Standards: A Foundation for Innovation*, 2 *Nanotechnology L. & Bus.* 269, 269–70 (2005).

leverage power over licensing negotiations, so the level of competition will increase. In conclusion, technology standard-setting under the compulsory licensing system will encourage more competition and invite more future innovation.

