

**UNITED STATES INTERNATIONAL TRADE COMMISSION
Washington, D.C.**

In the Matter of

**CERTAIN 3G MOBILE HANDSETS
AND COMPONENTS THEREOF**

**Inv. No. 337-TA-613
(REMAND)**

**REPLY OF J. GREGORY SIDAK, CHAIRMAN, CRITERION ECONOMICS,
TO THE WRITTEN SUBMISSION OF CHAIRWOMAN EDITH RAMIREZ
OF THE FEDERAL TRADE COMMISSION ON THE PUBLIC INTEREST**

July 20, 2015

The U.S. International Trade Commission (ITC) issued a Notice of Request for Written Submission and Reply to Written Submissions regarding its investigation, *In the Matter of Certain 3G Mobile Handsets and Components Thereof*. I take no position on the outcome of this Investigation. I respectfully submit these reply comments solely to respond to the statement of Chairwoman Edith Ramirez of the Federal Trade Commission, who urges the ITC to adopt a particular interpretation of law that I do not understand to be confined in any way to the facts of the current Investigation. I do not submit these comments on behalf of or at the request of any company or organization, and I have no economic interest in the outcome of this Investigation.

My name is J. Gregory Sidak. I am the founder and chairman of Criterion Economics, L.L.C. in Washington, D.C. I am also a founding co-editor of the *Journal of Competition Law & Economics*, published quarterly by the Oxford University Press since 2005. For more than three decades, I have worked at the intersection of law and economics. I have held academic positions at the American Enterprise Institute for Public Policy Research, Yale, Georgetown, and Tilburg (The Netherlands). As an expert economic consultant, I have served clients in the Americas, Europe, and the Pacific. I have worked extensively in the area of standard-essential patents (SEPs). I have testified as an economic expert on issues regarding fair, reasonable, and nondiscriminatory (FRAND) licensing in legal proceedings, including investigations before the ITC. I have published a number of scholarly articles on the legal and economic implications of the FRAND commitment, and I have presented that research at universities, think tanks, and international academic conferences. I have also served as Judge Richard Posner's court-appointed neutral economic expert on patent damages in the U.S. District Court for the Northern District of Illinois.

I attach three recent articles that amplify the ideas expressed in these comments. The first article, *The Meaning of FRAND, Part I: Royalties*, analyzes the economic methodology to determine a FRAND royalty for SEPs. The second article, *The Meaning of FRAND, Part II: Injunctions*, analyzes how the FRAND commitment affects the SEP holder's right to request and obtain an injunction against an infringer of an SEP. The third article, *The Antitrust Division's Devaluation of Standard-Essential Patents*, evaluates the theoretical conjectures of patent holdup and royalty stacking. In the footnote below, I also include links to these three articles.¹

I.

In her Written Submission, Chairwoman Ramirez says that Investigation No. 337-TA-613 (Remand) raises the important question of “what standard should the ITC use to evaluate evidence concerning patent hold-up” when an SEP holder seeks an exclusion order against an implementer of a FRAND-committed patent.² The Chairwoman proposes that, “as part of its public interest analysis before issuing an exclusion order, the ITC [should] require a SEP holder to prove that the implementer is unwilling or unable to take a FRAND license.”³ The Chairwoman says that the SEP holder “may demonstrate an implementer's unwillingness in a number of ways.”⁴ She suggests that “an implementer may be unwilling if it affirmatively

1. J. Gregory Sidak, *The Meaning of FRAND, Part I: Royalties*, 9 J. COMPETITION L. & ECON. 931 (2013), <https://www.criterioneconomics.com/meaning-of-frand-royalties-for-standard-essential-patents.html>; J. Gregory Sidak, *The Meaning of FRAND, Part II: Injunctions*, 11 J. COMPETITION L. & ECON. 201 (2015), <https://www.criterioneconomics.com/meaning-of-frand-injunctions-for-standard-essential-patents.html>; J. Gregory Sidak, *The Antitrust Division's Devaluation of Standard-Essential Patents*, 104 GEO. L.J. ONLINE 48 (2015), <https://www.criterioneconomics.com/antitrust-divisions-devaluation-of-standard-essential-patents.html>.

2. Written Submission on the Public Interest of Federal Trade Commission Chairwoman Edith Ramirez at 2, In the Matter of Certain 3G Mobile Handsets and Components Thereof, USITC Inv. No. 337-TA-613 (July 10, 2015) [hereinafter Ramirez ITC Submission].

3. *Id.*

4. *Id.* at 6.

demonstrates that it will not negotiate” with the SEP holder⁵ or if the implementer engages in a constructive refusal to negotiate a FRAND license (for example, by insisting on terms that are clearly outside a reasonable interpretation of FRAND).⁶ The Chairwoman argues that imposing the burden of proving the implementer’s unwillingness on the SEP holder would “establish a balanced approach to ITC remedies by ensuring that a SEP holder follows through with its FRAND licensing commitment, while at the same time recognizing that both the SEP holder and the standards implementer have a duty to negotiate in good faith towards a meaningful resolution of FRAND issues.”⁷

II.

Although the Chairwoman correctly recognizes that the SEP holder should have the right to obtain an exclusion order against an unwilling implementer, her proposal that the ITC make the SEP holder bear the burden of proving an implementer’s unwillingness is problematic and misguided.⁸ The Chairwoman’s recommendation would produce the perverse result that an SEP holder that has made a FRAND offer could not obtain an exclusion order against an implementer that has rejected that FRAND offer.

Suppose that the FRAND range for an SEP portfolio is between \$3 and \$15 per infringing device and suppose further that the SEP holder has made an offer within the FRAND range—say, \$14 per infringing device. The exact duties that arise from a contract between an SEP holder and an SSO are determined by the nature of the specific FRAND commitment, and by the intellectual property rights (IPR) policies of the SSO, which may differ depending on the

5. *Id.*

6. *Id.* at 6–7.

7. *Id.* at 2–3.

8. Ramirez ITC Submission, *supra* note 2, at 2.

SSO. For most SSOs, however, a voluntary FRAND commitment means that the SEP holder undertakes a duty to offer to license its SEPs on FRAND terms to anyone seeking to implement the standard. Thus, by making an offer of \$14 per infringing device, the SEP holder has discharged its FRAND obligation as a matter of contract law.

Suppose further that the implementer has refused the \$14 FRAND offer in an attempt to persuade the SEP holder to accept an offer at the lower bound of the FRAND range and that the implementer has made a counteroffer of \$3.01 per infringing device. After a lengthy negotiation, the parties fail to reach an agreement, and the SEP holder initiates a procedure at the ITC, requesting that the ITC issue an exclusion order against the implementer. If the ITC were to adopt the Chairwoman's approach, the SEP holder could not obtain an exclusion order, even though it has fully discharged its FRAND obligation as a matter of contract law. On the facts of this hypothetical example, the SEP holder could neither (1) show that the implementer was unwilling to negotiate a license nor (2) show that the implementer had made an offer "clearly outside a reasonable interpretation of FRAND" (assuming, in this example, that \$3.01 per infringing device is within the FRAND range).⁹ On the basis of the Chairwoman's suggested approach, an SEP holder that had fully discharged its FRAND obligation as a matter of contract law still would have no exclusionary remedy against an infringer that continued to use its SEPs and refused to accept a FRAND offer.

The Chairwoman further says that "if, during the course of the Section 337 investigation, a FRAND range is determined," the ITC should delay the effective date of an exclusion order and provide the parties an opportunity to agree on the FRAND license terms.¹⁰ The Chairwoman reasons that, in such a case, both parties would face "respective risks that the exclusion order will

9. Ramirez ITC Submission, *supra* note 3, at 7.

10. *Id.*

(1) go into effect if the respondent refuses to make a FRAND offer; or (2) be vacated if the ITC finds that complainant refuses to accept a FRAND offer.”¹¹ This language deserves the ITC’s careful parsing. The suggestion that the ITC should examine whether the *implementer* has made a FRAND offer and whether the SEP holder has accepted that offer (rather than examining whether the implementer has rejected the SEP holder’s FRAND offer) is either a typographical error by Chairwoman Ramirez or a breathtaking deviation from the contractual obligation that an SEP currently accepts pursuant to its FRAND commitment. Focusing the analysis, as Chairwoman Ramirez would, on whether the SEP holder has rejected the *implementer’s* offer would grant the implementer the right to obtain a FRAND rate at the lower bound of the FRAND range. Chairwoman Ramirez would thereby achieve a massive wealth transfer from SEP holders to implementers. In the above example of the Chairwoman’s rule in operation, the SEP holder would be compelled to accept a FRAND royalty only one penny above the FRAND floor—that is, \$3.01.

In its economic effect, Chairwoman Ramirez’s outcome would bear no resemblance to the SEP holder’s original contractual commitment to license its SEPs on FRAND terms to anyone implementing the standard. As I explained in detail in *The Meaning of FRAND, Part II: Injunctions*, by making a FRAND offer, the SEP holder discharges its FRAND obligation as a matter of contract law.¹² Thereafter, the SEP holder has no duty to accept an offer at the lower bound of the FRAND range. Chairwoman Ramirez’s proposal would subject the FRAND obligation to a fundamental transformation.

11. *Id.* at 7–8.

12. Sidak, *The Meaning of FRAND, Part II: Injunctions*, supra note 1, at 240–44.

III.

Although European public law obviously does not control the ITC in addressing the issue that Chairwoman Ramirez raises, it is worth noting as a prudential matter (since FRAND disputes are contractual disputes that are typically global in scope) that, on July 16, 2015, the Court of Justice of the European Union (CJEU) ruled in *Huawei Technologies Co. v. ZTE Corp.* on a similar question—whether an SEP holder has the right to request an injunction against an implementer.¹³ The CJEU addressed the question from the perspective of EU competition law and found that an SEP holder does not abuse its dominant position by requesting a remedy against the implementer if (1) the SEP holder has made a written offer to the implementer, and (2) the implementer continues to use the SEPs, has not promptly replied to the offer, or has engaged in delaying tactics.¹⁴ The CJEU emphasized the general principles that a patent holder—including a holder of a FRAND-committed SEP—“may not be deprived of the right to have recourse to legal proceedings to ensure effective enforcement of his exclusive rights, and that, in principle, the user of those rights, if he is not the proprietor, is required to obtain a licence prior to any use.”¹⁵ The CJEU found that a FRAND commitment does not alter those basic principles.

The CJEU recognized the important principle that an infringer cannot use SEPs, refuse to pay, and yet hope to avoid an exclusionary remedy sought by the SEP holder. At the very least, the Chairwoman’s recommendation conflicts with the reasoning in the CJEU’s recent decision in *Huawei Technologies Co. v. ZTE Corp.*

13. Case C-170/13, *Huawei Tech. Co. v. ZTE Corp.* (July 17, 2015), at 44, <http://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1437080250973&uri=CELEX:62013CJ0170>.

14. *Id.* at 71.

15. *Id.* at 58.

IV.

The Chairwoman reasons that imposing the burden of proof on the SEP holder would mitigate the risk that an SEP holder will use the threat of an exclusion order as a tool to hold up the implementer. Implicit in the Chairwoman's suggestion is a presumption that an SEP holder would attempt to hold up the implementer.

However, the Chairwoman's presumption that patent holdup routinely occurs in the real world has no support in economic theory or empirical fact. Economists Carl Shapiro and Joseph Farrell of Berkeley and lawyer Mark Lemley of Stanford proposed the patent-holdup and royalty-stacking conjectures in two articles from 2007.¹⁶ The Lemley-Shapiro article was funded by companies that remain major proponents of policies that would devalue SEPs.¹⁷ As of 2015, many scholars in economics and law have exposed the flawed logic of the patent-holdup and royalty-stacking conjectures. Scholars have shown that the patent-holdup conjecture fails to account for economic circumstances that restrict the SEP holder's incentive and ability to demand exploitative licensing terms. Legal and economic scholars have also empirically analyzed sectors that use SEPs the most and have found no evidence of patent holdup. In 2013, Commissioner Joshua Wright of the FTC emphasized that, "[d]espite the amount of attention patent hold-up has drawn from policymakers and academics, there have been relatively few instances of litigated patent hold-up among the thousands of standards adopted."¹⁸ Alexander Galetovic, Stephen Haber, and Ross Levin have found that, "over long periods[,] SEP industries tend to show better performance than most other industries," and that innovation appears to grow

16. Mark A. Lemley & Carl Shapiro, *Patent Holdup and Royalty Stacking*, 85 TEX. L. REV. 1991 (2007); Joseph Farrell, John Hayes, Carl Shapiro & Theresa Sullivan, *Standard Setting, Patents, and Hold-Up*, 74 ANTITRUST L.J. 603 (2007).

17. Lemley & Shapiro, *Patent Holdup and Royalty Stacking*, *supra* note 16, at 1991 n.* (disclosing funding from Apple, Cisco, Intel, Micron Technology, Microsoft, and SAP).

18. Joshua D. Wright, Comm'r, Fed. Trade Comm'n, Remarks at the Center for the Protection of Intellectual Property Inaugural Academic Conference: The Commercial Function of Patents in Today's Innovation Economy 20 (Sept. 12, 2013).

fastest in SEP-reliant industries.¹⁹ Those empirical findings are inconsistent with the predictions of the patent-holdup and royalty-stacking conjectures. There consequently exists no valid economic justification in the scholarly literature to introduce into the ITC’s procedure the presumption that the SEP holder will routinely engage in opportunistic licensing behavior.

Furthermore, if one assumes that patent holdup might occur, one should consider that the symmetric risk of reverse holdup might also occur. Commissioner Wright has said that “weakening the availability of injunctive relief for infringement—including infringement of F/RAND-encumbered SEPs—may increase the probability of ‘reverse holdup’ and weaken any incentives implementers have to engage in good faith negotiations with the patent holder.”²⁰ Former Chief Judge Randall Rader made a similar observation in *Apple, Inc. v. Motorola, Inc.* that “‘hold out,’” a different term used to refer to reverse holdup, “is equally as likely and disruptive as a ‘hold up.’”²¹ Chairwoman Ramirez herself acknowledges in her Submission the risk of reverse patent holdup.²² Nonetheless, she does not counsel the ITC to consider that reverse holdup might arise; instead, she posits that the SEP holder should bear the burden of proving the implementer’s opportunism.

The Chairwoman thus suggests that the ITC adopt an asymmetric approach to the risk of patent holdup and the risk of reverse holdup. She proposes that the ITC should (1) assume the existence of patent holdup but (2) require the SEP holder to provide evidence of reverse holdup. This asymmetric treatment of the patent-holdup conjecture and the reverse-holdup conjecture has no basis in economic theory. The ITC should not make it a principle of law.

19. Alexander Galetovic, Stephen Haber & Ross Levine, *Patent Holdup: Do Patent Holders Hold Up Innovation?*, 11 J. COMPETITION L. & ECON. (forthcoming 2015).

20. Wright, *supra* note 18, at 29.

21. *Apple Inc. v. Motorola, Inc.*, 757 F.3d 1286, 1333 (Fed. Cir. 2014) (Rader, J., dissenting in part).

22. Ramirez ITC Submission, *supra* note 2, at 8.

V.

The Chairwoman's proposal that the ITC presume the existence of patent holdup would contradict what the Federal Circuit has said concerning FRAND-committed patents. In *Ericsson, Inc. v. D-Link Systems, Inc.*, the Federal Circuit clarified that a jury may be instructed that a theoretical conjecture of patent holdup can affect the computation of a FRAND royalty only when empirical evidence supports that conjecture.²³ That is, the Federal Circuit said that abstract theorizing about the risk of patent holdup does not suffice. The Federal Circuit's standard for instructing the jury about patent holdup comports with the general principle that abstract theories can assist the finder of fact only when they relate to the specific facts of the case. When there is no evidence that an abstract theory applies to the specific facts of the case, that theory cannot assist the finder of fact in answering the questions it must address. Given the choice of Chairwoman Ramirez's proposal and the Federal Circuit's decision in *Ericsson, Inc. v. D-Link Systems, Inc.*, the ITC should endorse the Federal Circuit's logic that empirical evidence must support an allegation of patent holdup before such an allegation can have any legal consequence for the scope of remedies available to an SEP holder for patent infringement.

The Chairwoman's proposal also contradicts Ambassador Michael Froman's recommendations to the ITC in 2013.²⁴ The Ambassador expressed concern over patent holdup *and* reverse patent holdup, but he did not imply that either was more likely to arise in practice. Rather, Ambassador Froman emphasized that the ITC's decision whether to issue an exclusion order should depend on the specific circumstances of the case, and he instructed the ITC to "seek

23. *Ericsson, Inc. v. D-Link Sys., Inc.*, 773 F.3d 1201, 1234 (Fed. Cir. 2014).

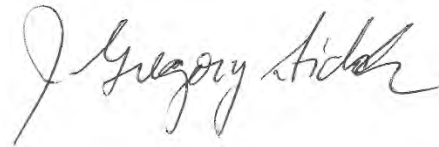
24. Letter from Michael B.G. Froman, Exec. Office of the President, to the Honorable Irving A. Williamson, Chairman, U.S. Int'l Trade Comm'n (Aug. 3, 2013).

proactively to have the parties develop a comprehensive factual record related to these issues . . . including . . . the presence or absence of patent hold-up or reverse hold-up.”²⁵

* * *

For the foregoing reasons, the Commission should reject the recommendations contained in Chairwoman Ramirez’s comments.

Sincerely,

A handwritten signature in black ink that reads "J. Gregory Sidak". The signature is written in a cursive style with a large initial "J" and a long, sweeping underline.

J. Gregory Sidak

Attachments

I certify that I have obtained consent to file on behalf of Mr. J. Gregory Sidak.

/s/ J. Gunnar Sidak
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25. *Id.* at 3.

CERTIFICATE OF SERVICE

I, J. Gregory Sidak, certify that on July 20, 2015, copies of the foregoing REPLY OF J. GREGORY SIDAK, CHAIRMAN, CRITERION ECONOMICS, TO THE WRITTEN SUBMISSION OF CHAIRWOMAN EDITH RAMIREZ OF THE FEDERAL TRADE COMMISSION ON THE PUBLIC INTEREST were delivered, pursuant to Commission regulations, to the following interested parties as indicated:

<p>The Honorable Lisa Barton Secretary to the Commission U.S. International Trade Commission 500 E Street, S.W., Room 112A Washington, D.C. 20436</p>	<p>Via EDIS and 8 Copies Via Hand Delivery</p>
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July 20, 2015

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THE MEANING OF FRAND, PART I: ROYALTIES

*J. Gregory Sidak**

ABSTRACT

What does it mean for a patent holder to commit to a standard-setting organization (SSO) to license its standard-essential patents (SEPs) on fair, reasonable, and non-discriminatory (FRAND) terms? When is a royalty FRAND? Drawing from both legal theory and economic theory, I propose an interpretation of FRAND that distinguishes and reconciles the conflicting definitions of FRAND and provides courts a practical approach to identifying FRAND royalties. A proper understanding of a FRAND royalty requires recognizing the combinatorial value of standard-essential patents. That recognition reveals the fallacy in attempting to apply the “*ex ante* incremental value” rule to the determination of a FRAND royalty. FRAND royalties divide the aggregate royalties generated by the standard among the holders of patents essential to the standard. Such a division should maximize the surplus resulting from the standard’s creation. It must also satisfy an individual-rationality constraint for the patent holder and the licensee, thereby encouraging continued participation in the setting and implementation of open standards, as opposed to greater reliance on proprietary standards.

JEL: D21; D23; K11; K12; O31; O34

I. INTRODUCTION

What does it mean for a patent holder to commit to a standard-setting organization (SSO) to license its standard-essential patents (SEPs) on fair, reasonable, and nondiscriminatory (FRAND) terms? When is a royalty FRAND? Drawing from both legal theory and economic theory, I propose an interpretation of FRAND that would be acceptable—owing to its fairness and efficiency—to someone in the original position, cloaked in a Rawlsian veil of ignorance that prevents him from knowing whether he will ultimately be a net

* Chairman, Criterion Economics, LLC; Ronald Coase Professor of Law and Economics, Tilburg Institute of Law and Economics (TILEC), Tilburg University. Email: jgsidak@criterioneconomics.com. For their valuable comments, I thank conference participants at the Konkurrensverket in Stockholm, the Toulouse School of Economics, the Directorate General for Competition in Brussels, the Federal Trade Commission in Washington, D.C., and Ofcom and the Office of Fair Trading in London, as well as the following persons, with whom I discussed drafts of this article: William Adkinson, Peter Alexiadis, Dirk Arts, Antonio Bavasso, Richard Binns, Deborah Bould, Karel Bourgeois, Roger Brooks, Paul Brown, Benno Buehler, Phillippe Chappatte, John Colahan, William Corbett, Tim Cowen, Jacques Cremer, Riccardo

infringer or net licensor of SEPs.¹ Courts and other tribunals could feasibly administer this interpretation of FRAND in the many disputes concerning smartphones and other technologically complex products that read upon hundreds or thousands of patents.

In Part II of this article, I explain how an economist measures, in the simplest case, a reasonable royalty for infringement of a patent that is not essential to any standard. This simple case uses a model of bilateral bargaining—the hypothetical negotiation between a willing licensor and a willing licensee at the time of first infringement of the patent in suit. The size of the bargaining range depends in part on the incremental value that the patent in suit creates for the infringer relative to the value created by the next-best noninfringing substitute available to the infringer. Importantly, I clarify that the incremental value of a patent must include the infringer’s cost of acquiring the next-best alternative.

In Part III, I explain the FRAND requirements in the intellectual property rights (IPR) policies of the SSOs most involved in setting standards for mobile devices and networks. I next explain why it is erroneous to apply the simple bilateral bargaining model to the complex, multilateral case of FRAND licensing of SEPs. Understanding a FRAND obligation requires understanding the economic significance of the combinatorial value of standard-essential patents. This understanding in turn reveals the fallacy in attempting to apply the “incremental value” rule to determine a FRAND royalty for the infringement of an SEP. If a patent is indeed essential to making downstream products that read on a standard, then it logically follows that the patent does not have a substitute, including the notional noninfringing substitute that courts attempt under existing law to identify for purposes of determining a reasonable royalty for infringement. All standard-essential patents must be used in fixed proportion. By definition, therefore, they are nonsubstitutable. So it makes no sense to engage in an exercise that requires hypothesizing that there exists for a nonsubstitutable patent a noninfringing

Croce, Peter Culham, Nicola Dagg, Richard Dickinson, Maurits Dolmans, Götz Drauz, Michael Engel, Huw Evans, Nicholas Fox, Tim Frazer, Mark Friend, David Gabathuler, Mark Gardner, Thomas Graf, Michael Grenfell, Patrick Gorman, Alejandro Guerrero, Kirti Gupta, Dietmar Harhoff, Oliver Heinisch, Michele Herman, Susan Hinchliffe, Roy Hoffinger, Christophe Humpe, Edward Kling, Michael Knapper, David Leichtman, Mark Lemley, Timothy Lindsay, Guy Lougher, Martin Mandorff, Philip Mansfield, Donald McCombie, Douglas Melamed, James Modrall, Andrew Moir, Soojin Nam, Charles Pommies, Miguel Rato, Terry Ridout, Paula Riedel, Pat Roach, Juan Rodriguez, David Salant, Jürgen Schindler, Benjamin Schröer, Mark Seidman, Omar Shah, Daniel Spulber, Russell Steinthal, David Swain, Anna Vernet, Justin Watts, David Wilson, Gunnar Wolf, and Tony Woodgate. I have been an expert economic witness to Ericsson and other companies involved in litigation over FRAND royalties. However, the views expressed here are solely my own, and this article has not been commissioned by any company or organization.

¹ See JOHN RAWLS, *A THEORY OF JUSTICE* 12 (Belknap 1971); see also KEN BINMORE, *NATURAL JUSTICE* 15 (Oxford Univ. Press 2005); WILLIAM J. BAUMOL, *SUPERFAIRNESS: APPLICATIONS AND THEORY* 9 (MIT Press 1986) (“Superfairness analysis . . . derives from . . . the games of fair division. Everyone knows the procedure that can be used to assure that two people will divide a cake fairly: one of them cuts the cake into two parts and the other then chooses.”).

substitute. It is therefore necessary to confine the incremental value method for calculating damages to infringement of standard-*inessential* patents, known among patent law practitioners as implementation patents.

In Part IV, I explain the problems with applying the incremental value approach to measuring a FRAND royalty for SEPs, which bases the FRAND royalty on the incremental value of the patent above the value of substitute patents, which competed with the patent in suit for adoption into the standard. First, I question whether it is intellectually rigorous or even practical to apply the *Georgia-Pacific* factors² to the FRAND context. Second, a main judgment in Judge Robart's April 2013 ruling in *Microsoft v. Motorola*³ was that the FRAND royalty should not include any value accreting to the patent from its adoption into the standard. Thus, Judge Robart adopts the *ex ante* incremental value approach. I explain why the *ex ante* incremental value approach for calculating FRAND royalties is inconsistent with Judge Robart's other premise, that FRAND royalties should encourage participation into the standard, because it fails to compensate patent holders for additional risk associated with participating in the setting of open standards. Third, I explain how Judge Holderman's October 2013 decision in *Innovatio IP Ventures*⁴ addresses some of the flaws of Judge Robart's opinion.

In Part V, I provide an economic framework for calculating FRAND royalties that reconciles the many disparate views on the meaning of FRAND. A FRAND royalty satisfies the *individual-rationality constraint*, under which both the SEP holder and the implementer are better off with the license than without it. A royalty is FRAND if it (1) ensures the SEP holder's continued participation in standard setting, (2) does not deny the implementer access to the standard, (3) is consistent with a reasonable aggregate royalty burden for all SEPs on the implementer's standard-compliant product, and (4) approximates the royalty rates of similarly situated licenses. The SEP holder and the implementer each must expect to profit more by participating in the SSO than by forgoing such participation. The individual-rationality constraint provides a bargaining range for a FRAND royalty. The lower bound is the SEP holder's minimum willingness to accept, equal to the SEP holder's opportunity cost of choosing to monetize its inventions by participating in the setting of an open standard and licensing its SEPs to all comers on FRAND terms. The upper bound is the licensee's maximum willingness to pay for the patents as SEPs. I also explain why setting a FRAND royalty as the *ex ante* incremental value of the SEP is unworkable in practice.

In Part VI, I explain how the FRAND commitment resembles an ancillary restraint in antitrust law, without which joint venturers could not bring a new

² *Georgia-Pacific Corp. v. U.S. Plywood Corp.*, 318 F. Supp. 1116, 1120 (S.D.N.Y. 1970).

³ *Microsoft Corp. v. Motorola Inc.*, No. C10-1823JLR, 2013 WL 2111217 (W.D. Wash. Apr. 25, 2013) (Robart, J.).

⁴ Memorandum Opinion, Findings, Conclusions, and Order, *Innovatio IP Ventures, LLC Patent Litigation*, No. 11-cv-09308 (N.D. Ill. Oct. 3, 2013) (No. MDL 2303) [hereinafter RAND Opinion in *Innovatio*].

product into being. The challenge lies in dividing the producer surplus among SEP owners. The law of fiduciary duty and the principles of equity can guide courts in preventing opportunistic behavior that would jeopardize the value created by the production of downstream products resulting from the aggregation and exploitation of the SEPs. Put differently, the existence of fiduciary duties and the availability of equitable remedies reduce the likelihood that royalty stacking will occur.

In Part VII, I adapt the FRAND model to the considerably more complex case in which bargaining takes place with respect to portfolios of SEPs, and one must determine the FRAND royalty for a single SEP. I examine five alternative methods for dividing the joint surplus among SEP holders based on (1) heuristic use of the Lorenz curve, a tool that economists have used for measuring the distribution of income inequality of nations, (2) the Shapley value from game theory, (3) bargaining theory and the ultimatum game, (4) patent counting, and (5) patent pools. These methods will require further refinement before they are implementable.

A sequel to this article will examine the meaning of FRAND as it pertains to the patent holder's right to seek an injunction against infringers and to the duty of members of an SSO to negotiate a FRAND royalty in good faith.⁵

II. THE SIMPLE CASE OF A REASONABLE ROYALTY FOR INFRINGEMENT OF A NON-STANDARD-ESSENTIAL PATENT

In the simplest case, patent infringement is a form of involuntary exchange, whereby the infringer acquires use of the patent without the consent of the patent holder. Reasonable-royalty damages are based on the notion that, had the transaction between the patent holder and the infringer been *voluntary*, the infringer would have paid the patent holder a royalty for the use of the patent. Calculating reasonable-royalty damages entails estimating the royalty that the patent holder would have collected from the infringer, starting at the time of first infringement.⁶

⁵ See J. Gregory Sidak, *The Meaning of FRAND, Part II: Injunctions* (forthcoming 2014) (on file with author).

⁶ One district court judge in the Eastern District of Texas, for example, uses the following jury instruction on reasonable royalties:

A reasonable royalty is the amount of money a willing patent holder and a willing prospective licensee would have agreed upon at the time of the infringement for a license to make the invention. It is the royalty that would have resulted from an arms-length negotiation between a willing licensor and a willing licensee, assuming that both all parties are presumed to know that the patent is infringed and valid. The reasonable royalty you determine must be a royalty that would have resulted from the hypothetical negotiation, and not simply a royalty either party would have preferred. Evidence of things that happened after the infringement first began may be considered in evaluating the reasonable royalty only to the extent that the evidence aids in assessing what royalty would have resulted from a hypothetical negotiation.

A. The Bargaining Range in the Hypothetical Negotiation

An economic approach to analyzing the hypothetical negotiation is to determine the bounds of the bargaining range. Those bounds are the minimum royalty that the patent holder would accept (while still being better off than without issuing a license) and the maximum royalty the infringer would be willing to pay (while still being better off than without being issued a license). Because the hypothetical voluntary transaction necessarily makes both parties better off, a negotiated royalty must fall between these upper and lower bounds, which define the bargaining range. Testifying expert economists have widely accepted this approach.⁷ Figure 1 depicts the bargaining range.

1. The Upper Bound of the Royalty Range and Clarification of the Patent's Incremental Value

The maximum lump-sum royalty that the infringer would have been willing to pay equals the incremental profits that it would expect to earn by licensing the infringed patent rather than using the next-best noninfringing substitute over the infringement period. Important considerations are whether there exist any noninfringing substitutes or “design-arounds” and what the costs of implementing and using those design-arounds are in relation to using the patented technology. For example, a design-around may exist, but it could require from the would-be infringer a fixed cost to implement, could require greater ongoing marginal costs of production compared with what the would-be infringer could achieve with the patented technology, and could lead to a lower quality product (and thus lower sales at a lower price) compared with what the would-be infringer could achieve with the patented technology. To license the patent, the would-be infringer would be willing to pay a royalty up to the increase in profits resulting from the cost savings, the increased sales, and the increased price associated with using the licensed patent as opposed to using the next-best noninfringing substitute.

When the expected profits from using the next-best noninfringing substitute are close to the expected profits from using the patented input, the incremental profitability of licensing the patented input over using the next-best noninfringing substitute is small. The infringer's maximum willingness to pay would therefore be low. The maximum royalty would also be low.

Final Jury Instructions at 24–25, *Ericsson Inc. v. D-Link Sys., Inc.*, No. 6:10-cv-00473 (E.D. Tex. June 12, 2013), ECF No. 504 (Davis, J.). “The framework which you should use in determining a reasonable royalty is a hypothetical negotiation between *normally prudent business people*.” *Id.* at 28 (emphasis added).

⁷ See, e.g., FED. TRADE COMM'N, *THE EVOLVING IP MARKETPLACE: ALIGNING PATENT NOTICE AND REMEDIES WITH COMPETITION* 166–67 (Mar. 2011); Jerry A. Hausman, Gregory K. Leonard & J. Gregory Sidak, *Patent Damages and Real Options: How Judicial Characterization of Noninfringing Alternatives Reduces Incentives to Innovate*, 22 *BERKELEY TECH. L.J.* 825, 831–33 (2007).

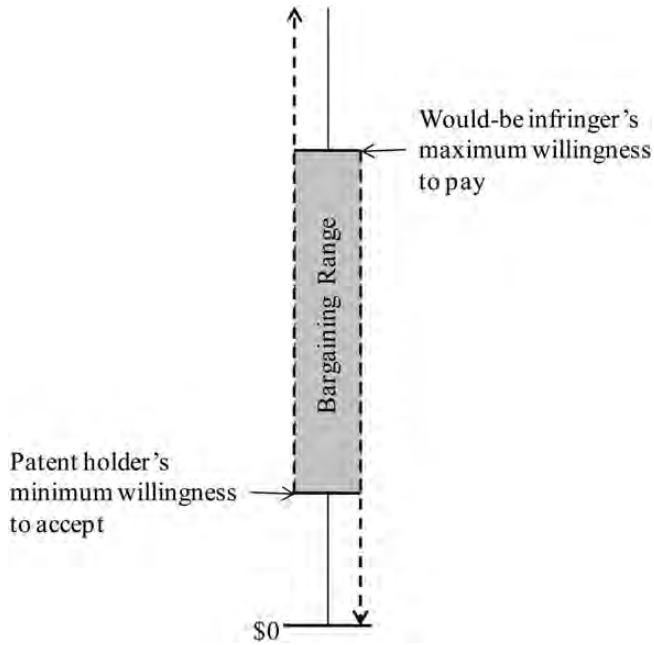


Figure 1. Reasonable-royalty bargaining range

The incremental value of a patent (implementation or standard-essential) to a licensee is the increase in the licensee's profits that results from using the patented technology rather than the next most profitable alternative to the patented technology. That is, the incremental value of a patent to the licensee is equal to the increase in profits from licensing, not including the cost of the license. Too often, the focus of incremental value analysis is on revenues, not profits. Calculating incremental value based on revenue does not include the potential licensing costs of the next-best alternative to the patented technology. That oversight can lead to two different mistakes of economic reasoning. First, it can lead to an understatement of the incremental value of the patent. Second, it may identify an incorrect next-best alternative.

The incremental value of patent *A* is equal to the profit generated using patent *A* minus the profit generated using technology *B*. Technology *B* may be a patented technology that the licensee already licenses, one that the licensee does not currently license, or a non-patented technology in the public domain. In any of the three cases, to measure a licensee's willingness to pay for the patent accurately, the profit generated using *A* must be compared with the profit from using *B*, including the costs of acquiring the rights to technology *B*. In some cases, it might be possible for the alleged infringer to acquire the rights to technology *B* at zero additional expense. But one cannot generalize this condition, and it is fallacious economic reasoning simply to assume that the

next-best alternative is free. The cost of acquiring *B* is a fact-specific inquiry that courts must determine on a case-by-case basis.

It is crucial that the costs of licensing the next-best alternative are included in the incremental value analysis to ensure that the next-best alternative is actually a lawful option for the licensee to use. If the next-best alternative is itself a patented technology, then failing to include the cost of licensing implicitly means that the analysis compares using patent *A* to *infringing* patent *B*. However, the set of alternatives must be limited to *lawful* alternatives; otherwise, the next-best alternative may turn out to be infringement or misappropriation in a broad range of situations.

The failure to include the licensee's cost of acquiring the lawful right to use the next-best alternative can lead to misidentification of the next-best alternative. Suppose that, relative to using a non-patented alternative, the use of patent *A* leads to increased revenue of \$300, patent *B* leads to increased revenue of \$200, and patent *C* leads to increased revenue of \$100. If one neglects to include the licensee's costs of acquiring the lawful right to practice patent *B* or patent *C*, then patent *B* is the next-best alternative to patent *A*, because patent *B* results in higher increased revenue than does patent *C*. The licensee will be willing to pay up to \$100 to license patent *A* (equal to $\$300 - \200 , the difference between the expected revenue using technology *A* and technology *B*).

However, suppose the licensing cost of patent *B* is \$150, whereas the licensing cost of patent *C* is only \$25. The licensee would be willing to pay at most the additional revenue generated by the substitute patent—and the cost of licensing the patent. Thus, the actual incremental value of *A* relative to *B* is \$250 (equal to $\$300 - (\$200 - \$150)$, the difference between increased revenue from using patent *A* and increased revenue under technology *B* *minus* the cost of licensing technology *B*). The actual incremental value of patent *A* relative to *C* is \$225 (equal to $\$300 - (\$100 - \$25)$, the difference between the increased revenue from using patent *A* and the increased revenue under technology *C* *minus* the cost of licensing technology *C*).

Patent *C* is thus the next-best alternative to patent *A*, because, *net of its acquisition costs*, patent *C* would offer the licensee higher per-unit profits than patent *B* if the licensee were forced to resort to an alternative to avoid infringing patent *A*. The incremental value of patent *A* determines the maximum amount that a potential licensee will be willing to pay for a license to patent *A*. Including the costs of licensing patents *B* and *C*, a potential licensee will be willing to pay up to \$225 for a license to patent *A*. Table 1 shows the numerical example.

Neglecting to consider the acquisition costs of the alternatives (patents *B* and *C*) both understated the incremental value of patent *A* and misidentified the next-best alternative to patent *A*. The incremental value of a patent is an important concept in determining royalties because it will determine the maximum value that a potential licensee is willing to pay for a patent. If one neglects to include the costs of acquiring the lawful rights to use the next-best

Table 1. Example of the identification of the next-best alternative and the incremental value of a patent

	Patent A	Patent B	Patent C
Added revenues	\$300	\$200	\$100
Acquisition cost		\$150	\$25
Added profit (added revenues – acquisition cost)		\$50	\$75
Incremental value of A relative to alternatives (added revenue from A – added profit from the alternative)		\$250	\$225

alternative in the calculation of the incremental value, then the analysis could understate or overstate the prospective licensee's actual willingness to pay.

2. *The Lower Bound of the Royalty Range*

The minimum royalty that the patent holder would be willing to accept to grant a license for the patent in suit is a function of the losses (in terms of forgone royalties) that it would sustain by licensing rather than not licensing the patent. In other words, the licensor's willingness to accept depends on its opportunity cost of licensing the patent to the would-be infringer at the time of the hypothetical negotiation. For example, even if the patent owner does not compete with the infringer, and therefore would not lose profits due to lost sales in the downstream market, the patent owner might nonetheless lose other licensing opportunities by licensing to the infringer. In those circumstances, the patent owner would demand a royalty that at least replaced the profits that the lost licensing opportunities would have generated.

3. *The Negative Bargaining Range*

Suppose instead that the patent holder would not have willingly licensed its patented technology because doing so would cause its expected lost profits to exceed the would-be infringer's maximum willingness to pay for the license. This is the case of the negative bargaining range: there is no royalty to which both the patent holder and would-be infringer would have agreed at the time of first infringement. Figure 2 illustrates a negative bargaining range.

The outcome of a voluntary negotiation before infringement would be that no exchange occurs. In this scenario, the court should require the infringer to pay an amount equal to the patent holder's minimum willingness to accept in the hypothetical negotiation. One district court judge in the Eastern District of Texas, for example, gives the following jury instruction:

An infringer's net profit margin is not the ceiling by which a reasonable royalty is capped. The infringer's selling price can be raised, if necessary, to accommodate a higher royalty rate. Requiring the infringer to do so, may be the only way to adequately compensate the patentee for the use of its technology.⁸

⁸ See *supra* note 6. See also Memorandum Opinion & Order at 39, *Ericsson Inc. v. D-Link Sys., Inc.*, No. 6:10-CV-473 (E.D. Tex. Aug. 6, 2013) (citing *Douglas Dynamics, LLC v. Buyers*

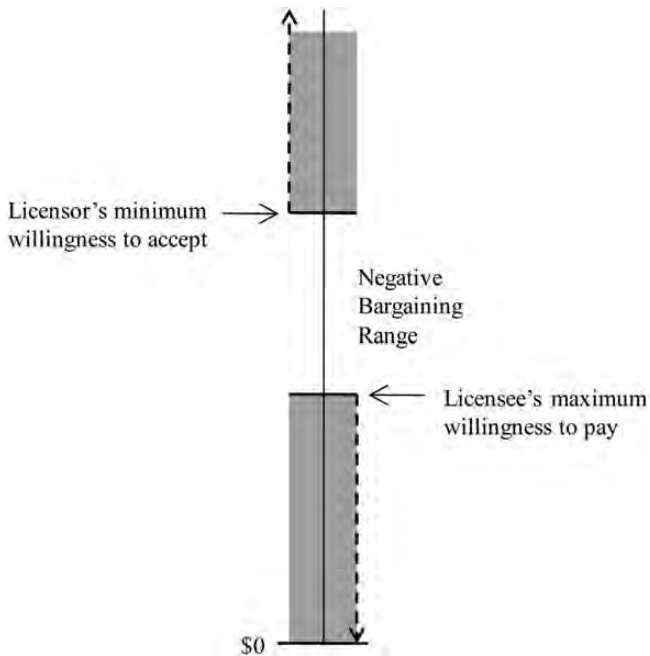


Figure 2. Negative bargaining range in a hypothetical, voluntary negotiation

Even though the amount would exceed the infringer's hypothetical maximum willingness to pay, that amount would be necessary to fully compensate the patent holder for its injury from patent infringement, as section 284 of the Patent Act requires.⁹

B. The Point Royalty Within the Bargaining Range

The precise point royalty within the bargaining range should be informed by the relative bargaining power of the infringer and patent holder. If the patent holder had greater bargaining power in the hypothetical negotiation, it would secure a royalty above the midpoint of the bargaining range. Conversely, if the would-be infringer had more bargaining power, it would secure a royalty below the midpoint. The midpoint of the bargaining range is the natural starting point for one practical reason. One needs to start somewhere within the bargaining range, and the midpoint provides a straightforward reference point for making qualitative adjustments to determine the final point royalty. The

Prods. Co., 2013 WL 2158423, at *7 (Fed. Cir. May 21, 2013); *Rite-Hite Corp. v. Kelley Co.*, 56 F.3d 1538, 1555 (Fed. Cir. 1995) (en banc) (Davis, J.).

⁹ 35 U.S.C. § 284.

justification for using the midpoint in the bargaining range as the starting point for selecting the point estimate of the reasonable royalty is strictly computational tractability. In particular, the use of the midpoint is not based in any way on the Nash bargaining solution, which at least two courts have deemed to be an inadmissible method for an expert witness to use to calculate the reasonable royalty in the hypothetical negotiation.¹⁰

In *Georgia-Pacific Corp. v. U.S. Plywood Corp.*, the U.S. District Court for the Southern District of New York identified fifteen factors comprising “a comprehensive list of evidentiary facts relevant . . . to the determination of the amount of a reasonable royalty for a patent license.”¹¹ The Federal Circuit has subsequently endorsed the framework, stating: “A reasonable royalty can be calculated from . . . a hypothetical negotiation between the patentee and infringer based on the factors in *Georgia-Pacific*[.]”¹² The fifteen factors are:

- (1) The royalties received by the patentee for the licensing of the patent in suit, proving or tending to prove an established royalty.
- (2) The rates paid by the licensee for the use of other patents comparable to the patent in suit.
- (3) The nature and scope of the license, as exclusive or non-exclusive; or as restricted or non-restricted in terms of territory or with respect to whom the manufactured product may be sold.
- (4) The licensor’s established policy and marketing program to maintain his patent monopoly by not licensing others to use the invention or by granting licenses under special conditions designed to preserve that monopoly.
- (5) The commercial relationship between the licensor and licensee, such as, whether they are competitors in the same territory in the same line of business; or whether they are inventor and promoter.
- (6) The effect of selling the patented specialty in promoting sales of other products of the licensee; the existing value of the invention to the licensor as a generator of sales of his non-patented items; and the extent of such derivative or convoyed sales.
- (7) The duration of the patent and the term of the license.
- (8) The established profitability of the product made under the patent; its commercial success; and its current popularity.
- (9) The utility and advantages of the patent property over the old modes or devices, if any, that had been used for working out similar results.

¹⁰ See *Oracle Am., Inc. v. Google Inc.*, 798 F. Supp. 2d 1111, 1119 (N.D. Cal. 2011) (“a patent plaintiff would love the Nash bargaining solution because it awards fully half of the surplus to the patent owner, which in most cases will amount to *half* of the infringer’s profit, which will be many times the amount of real-world royalty rates”) (emphasis in original); *Suffolk Tech. LLC v. AOL Inc.*, No. 1:12-cv-625 (E.D. Va. Apr. 12, 2013) (excluding the testimony of the damages expert for Suffolk, who used the Nash bargaining solution).

¹¹ *Georgia-Pacific Corp. v. U.S. Plywood Corp.*, 318 F. Supp. 1116, 1120 (S.D.N.Y. 1970), *modified and aff’d*, 446 F.2d 295 (2d Cir. 1971).

¹² *Wordtech Sys., Inc. v. Integrated Networks Solutions, Inc.*, 609 F.3d 1308, 1319 (Fed. Cir. 2010) (citing *Lucent Tech., Inc. v. Gateway, Inc.*, 580 F.3d 1301, 1324 (Fed. Cir. 2009); *Minks v. Polaris Indus., Inc.*, 546 F.3d 1364, 1372 (Fed. Cir. 2008)).

- (10) The nature of the patented invention; the character of the commercial embodiment of it as owned and produced by the licensor; and the benefits to those who have used the invention.
- (11) The extent to which the infringer has made use of the invention; and any evidence probative of the value of that use.
- (12) The portion of the profit or of the selling price that may be customary in the particular business or in comparable businesses to allow for the use of the invention or analogous inventions.
- (13) The portion of the realizable profit that should be credited to the invention as distinguished from non-patented elements, the manufacturing process, business risks, or significant features or improvements added by the infringer.
- (14) The opinion testimony of qualified experts.
- (15) The amount that a licensor (such as the patentee) and a licensee (such as the infringer) would have agreed upon (at the time the infringement began) if both had been reasonably and voluntarily trying to reach an agreement; that is, the amount which a prudent licensee—who desired, as a business proposition, to obtain a license to manufacture and sell a particular article embodying the patented invention—would have been willing to pay as a royalty and yet be able to make a reasonable profit and which amount would have been acceptable by a prudent patentee who was willing to grant a license.

As applied in patent-infringement cases, the finder of fact first evaluates each relevant *Georgia-Pacific* factor individually and then performs a balancing test.¹³ Determination of a reasonable royalty is a question of fact; consequently, evaluation of the patent holder's application of the *Georgia-Pacific* factors is a question for the jury, when there is one.¹⁴

In *Georgia-Pacific*, the court stated, after enunciating the fifteen factors, that “there is no formula by which these factors can be rated precisely in the order of their relative importance or by which their economic significance can be automatically transduced into their pecuniary equivalent.”¹⁵ In the decades since the emergence of the *Georgia-Pacific* factors, the Federal Circuit has not provided guidance on the relative weight of each factor. To the contrary, the Federal Circuit has noted, in a statement less helpful than candid, that “this analysis necessarily involves an element of approximation and uncertainty[.]”¹⁶ Thus, the *Georgia-Pacific* balancing test remains undefined and left to the discretion of the finder of fact, until the Federal Circuit finds a suitable opportunity to disambiguate that test in a manner that eliminates its potential for unpredictable

¹³ See, e.g., *Lucent*, 580 F.3d at 1325–36.

¹⁴ See, e.g., *Unisplay, S.A. v. Am. Elec. Sign Co., Inc.*, 69 F.3d 512, 517 (Fed. Cir. 1995).

¹⁵ *Georgia-Pacific*, 318 F. Supp. at 1120–21.

¹⁶ *Unisplay*, 69 F.3d at 517. Jurists have observed in general that multifactor tests that lack weights invite inconsistent outcomes. See, e.g., *Menard, Inc. v. Comm’r of Internal Revenue*, 560 F.3d 620, 622–23 (7th Cir. 2009) (Posner, J.) (“Multifactor tests with no weight assigned to any factor are bad enough from the standpoint of providing an objective basis for a judicial decision; multifactor tests when none of the facts is concrete are worse.” (internal citations omitted)); Antonin G. Scalia, *The Rule of Law as a Law of Rules*, 56 U. CHI. L. REV. 1175, 1179–80 (1989).

and arbitrary results. However, in *Whitserve, LLC v. Computer Packages, Inc.*, the Federal Circuit in 2012 did say that it “do[es] not require that witnesses use any or all of the *Georgia-Pacific* factors when testifying about damages in patent cases.”¹⁷ Damage experts should “concentrate on *fully* analyzing the *applicable* factors, not cursorily reciting all fifteen.”¹⁸ Thus, damage experts need to consider only the factors that are probative to the determination of the point royalty.

A given *Georgia-Pacific* factor (or any relevant qualitative factor) can shift the point value of the reasonable royalty toward the upper or lower bound, or it can have no effect on the royalty estimate whatsoever. When a factor suggests that the patent holder would have more bargaining power than the would-be infringer in the hypothetical negotiation, the factor supports a royalty above the midpoint. When a factor suggests that the would-be infringer would have more bargaining power, the factor supports a royalty below the midpoint. If a given factor was already implicated in the expert’s calculation of the reasonable-royalty range, then that factor does not have any additional effect on the point estimate.

In applying the relevant *Georgia-Pacific* factors to determine the point royalty, it is not sufficient simply to conclude that a factor should shift the point royalty “upward” or “downward” (or not at all). The Federal Circuit stressed in *Whitserve* that, in considering the relevant factors, the damage expert must provide “some explanation of both why and generally to what extent the particular factor impacts the royalty calculation.”¹⁹ The determination of how a factor affects the point royalty must be tied to the facts of the case.

Once one determines the incremental effect of each relevant *Georgia-Pacific* factor on the relative bargaining power of the parties, one can determine the net effect of all the factors. It is likely that some factors should receive more weight and some should receive less weight—and some no weight at all. (Unfortunately, as noted above, *Georgia-Pacific* gives no guidance on the relative weighting for the fifteen factors.) It is the responsibility of the damage expert to consider all the relevant facts and apply them rigorously and reliably to the bargaining range to derive a point royalty.

Without further direction from the courts as to the proper weight that qualitative factors should receive in the calculation of the hypothetical reasonable royalty, one could start by identifying the relevant factors and then determine whether each factor supports a point royalty above or below the midpoint of the bargaining range. Assuming (for convenience rather than realism) that each factor should receive equal weight, one could divide the upper and lower bounds of the bargaining range into equal parts or “bands.” One could sum the number of factors supporting a royalty above the midpoint and the number of factors supporting a royalty below the midpoint. The difference between

¹⁷ *Whitserve, LLC v. Computer Packages, Inc.*, 694 F.3d 10, 31 (Fed. Cir. 2012).

¹⁸ *Id.* (emphasis in original).

¹⁹ *Id.* at 31.

those two figures would determine how many “bands” above or below the midpoint the point royalty should be.

Suppose, for example, that the bargaining range were \$100 and there were five relevant qualitative factors. The upper and lower half of the bargaining range would each be divided into five slices (equal to \$10 each). (If all five of the factors support a royalty above (below) the midpoint, then the royalty would equal the upper (lower) bound of the bargaining range. The net effect of the factors cannot cause the royalty to exceed the bargaining range.) Suppose that four of the factors supported a royalty above the midpoint and one factor supported a royalty below the midpoint. Then, the net effect of the factors is to support a royalty above the midpoint by three slices, so the royalty would be \$80. The assumption of equal weights is arbitrary but not capricious. It is objective and can serve as a useful starting point until such time that the Federal Circuit gives the damage experts or the jury (or both) explicit instruction on a different weighting to use.

C. The Assumptions of Validity and Infringement in the Hypothetical Negotiation

The hypothetical negotiation presumes that the patent is valid and infringed.²⁰ This assumption is understandable in light of the general principle that patents are presumed valid, and overcoming this presumption requires clear and convincing evidence.²¹ However, the presumption of validity and infringement contradicts—indeed, rejects—the theoretical argument of Mark Lemley and Carl Shapiro that the value of a patent is merely “probabilistic” in the sense that, until the patent is litigated, neither the licensor nor the licensee knows whether a court would actually find the patent to be both valid and infringed.²² One may dispute the correctness of assuming, for purposes of determining a reasonable royalty, that the patent in suit is valid and infringed and instead argue, as Lemley and Shapiro do, that parties to a licensing negotiation occurring before litigation would value a patent at its expected value and thus discount the royalty for the probability that a court would not find the patent to be valid and infringed. For the time being, however, the assumptions of validity and infringement are what the Federal Circuit requires when one purports to apply a hypothetical-negotiation analysis to a given dispute.

The difference between the Federal Circuit’s assumption of infringement and validity and the Lemley-Shapiro assumption of probabilistic valuation of

²⁰ See *Lucent Tech., Inc. v. Gateway, Inc.*, 580 F.3d 1301, 1324–25 (Fed. Cir. 2009); *Rite-Hite Corp. v. Kelley Co.*, 56 F.3d 1538, 1554 n.13 (Fed. Cir. 1995) (en banc).

²¹ See *Ariad Pharm., Inc. v. Eli Lilly & Co.*, 598 F.3d 1336, 1354 (Fed. Cir. 2010) (en banc).

²² See, e.g., Mark A. Lemley & Carl Shapiro, *Probabilistic Patents*, 19 J. ECON. PERSP. 75 (2005).

patents significantly affects the calculation of reasonable royalties. Because the hypothetical negotiation assumes that the patent in suit is valid and infringed, the royalty derived from the hypothetical-negotiation analysis (including assessment of the *Georgia-Pacific* factors) *must* exceed the royalty that would have resulted from real-world negotiations outside the context of litigation, where Lemley and Shapiro argue that the bid and ask are discounted for uncertainty.

The assumption of validity and infringement means that, holding all other factors constant, the royalty from the hypothetical negotiation for an asserted patent should exceed the royalty for the same patent in a real-world license negotiated with a third-party licensee similarly situated to the infringer. Consequently, observed royalties for similarly situated licensees should be less than the royalty that emerges from the hypothetical-negotiation analysis. If a court were to interpret the hypothetical negotiation as producing the same (probability-adjusted) royalty level as a real-world, non-hypothetical negotiation, then the court would create a free option for the infringer: Infringe the patent and, if eventually found liable, pay the same royalty as if you had negotiated a license before litigation commenced.²³ Thus, to preserve the patent holder's and the licensee's proper incentives to engage in licensing, the reasonable royalty emerging from the hypothetical negotiation must exceed the real-world royalty.

Judge Holderman emphasized this point in *Innovatio*.²⁴ He refused to adjust the license rate for SEPs whose essentiality was questionable before the court's adjudication. Judge Holderman recognized that, at the time of the hypothetical negotiation, the parties did not know whether the patents were truly essential. He also acknowledged that such adjustment "may seem reasonable," given that "[t]he hypothetical negotiation tries . . . to recreate the *ex ante* licensing negotiation scenario and to describe the resulting agreement."²⁵ Judge Holderman nonetheless explained that, at the time a court is evaluating damages in a patent infringement suit, it has determined whether the patent is valid and infringed, "foreclosing the hypothetical negotiator from benefiting from any uncertainty as to future court rulings."²⁶ The licensee "cannot leave the hypothetical negotiation on the ground that it will contest essentiality in court."²⁷ Judge Holderman thus concluded that "it would be inappropriate to adjust the RAND rate based upon pre-litigation uncertainty."²⁸

²³ For a related argument about how damages for patent infringement can give infringers a free option, see Hausman, Leonard & Sidak, *supra* note 7 (describing how *Grain Processing v. Am. Maize-Prods. Co.*, 185 F.3d 1341 (Fed. Cir. 1999), created a "free option" for infringers to use potentially infringing technology and later claim that it would have used a noninfringing technology had it known that the patent was valid and infringed).

²⁴ RAND Opinion in *Innovatio*, *supra* note 4.

²⁵ *Id.* at 12.

²⁶ *Id.* (citing *LaserDynamics, Inc. v. Quanta Computer, Inc.*, 694 F.3d 51, 76 (Fed. Cir. 2012)).

²⁷ *Id.* at 13.

²⁸ *Id.*

D. The Proud List and the Double Hypothetical Implicit in the Royalty Negotiation When Patents Are Instead Typically Licensed by Portfolio

There is an additional layer of unreality to the already hypothetical negotiation of the *Georgia-Pacific* analysis. A fundamental problem of the hypothetical negotiation is that the negotiation generally occurs over a bundle of patents rather than a single patent or a select few individual patents. The parties have no desire to negotiate a license for an individual patent, and therefore they have no need to value a single patent. Yet, when negotiations fail and litigation commences, the practical limitations of a trial require that only a subset of patents be litigated (with respect to claims construction, validity, infringement, defenses, and so forth). A patent holder does not assert every possibly infringed patent that it may have in its portfolio but instead typically limits the litigation to its “proud list”—patents that can best be shown to be infringed and that affect the largest part of the other party’s revenue stream.²⁹ (The patent holder’s ability to identify its strongest patents for litigation purposes confirms that, at least to some degree, it is possible to rank one’s patents ordinally by value, a point whose significance will become clear later in Part VII). This phenomenon of trial by proud list is not, however, explicitly recognized anywhere in the *Georgia-Pacific* factors.

The hypothetical negotiation is therefore doubly hypothetical. It presumes not only that a hypothetical transaction between two willing parties would occur at a given price at a given point in time, but also that a hypothetical transaction between those same parties at that same point in time would occur *with respect to only a single patent (or only a subset of patents) in the patent holder’s portfolio*. Like the courts applying *Georgia Pacific* before him, Judge Robart does not spot this problem when adapting the *Georgia-Pacific* analysis for SEPs in *Microsoft v. Motorola*.³⁰

One way of reconciling this analytical leap in the application of *Georgia Pacific* to both patent portfolios and SEPs is to reason that, when the patent holder litigates only his proud list, each of his remaining patents contributes to the portfolio’s value at a decreasing marginal rate. Hence, the royalty for the proud list is not much less than the license for the entire portfolio containing the proud list, such that the double hypothetical described here does not necessarily cause the *Georgia-Pacific* factors to produce a dramatically insufficient royalty. Courts could address this analytical leap by first evaluating the license fee that parties would negotiate for the entire patent portfolio and then adjust the value downward to limit the royalty damages to the patents asserted in the litigation. This question is a factual one that will allow different answers in

²⁹ See, e.g., David J. Teece & Peter C. Grindley, *Managing Intellectual Capital: Licensing and Cross-Licensing in Semiconductors and Electronics*, 39 CAL. MGMT. REV. 1 (1997), reprinted in DAVID J. TEECE, *ESSAYS IN TECHNOLOGY MANAGEMENT AND POLICY: SELECTED PAPERS OF DAVID J. TEECE* 204, 216–17 (World Scientific 2003).

³⁰ *Microsoft Corp. v. Motorola Inc.*, No. C10-1823JLR, 2013 WL 2111217 (W.D. Wash. Apr. 25, 2013) (Robart, J.).

different cases. It may not always be appropriate to assume that the value of the asserted patents is close to the value of the portfolio—for example, when there is only one asserted patent from a portfolio of hundreds of patents.

III. THE ECONOMIC MEANING OF A PATENT'S ESSENTIALITY

Before the creation of a standard, all patents are implementation patents. However, when a standard is created and a patent holder declares its patents to be essential to the standard, the patent is a standard-essential patent and is subject to the FRAND commitment. This status of essentiality changes the fundamental approach to measuring a royalty for the SEP.

A. Standard-Essential Patents

In this part, I provide background on standard-setting organizations, focusing on mobile network standards. I summarize the FRAND-related provisions of the IPR policies of two main telecommunications SSOs.

1. *Standard-Setting Organizations and Telecommunications Standards*

A standard-setting organization is “an entity that is primarily engaged in activities such as developing, coordinating, promulgating, revising, amending, re-issuing, interpreting, or otherwise maintaining hundreds of thousands of standards applicable to a wide base of users outside the standards developing organization.”³¹ SSOs develop “agreements containing technical specifications or other criteria,” promote “efficient resource allocation and production by facilitating interoperability among complementary products,” and, generally, participate in the advancement of the standard and associated technology within industries.³² Two important SSOs are the European Telecommunications Standards Institute (ETSI) and the Institute of Electrical and Electronic Engineers (IEEE). ETSI develops globally applicable standards for information and communications technologies, including mobile communications technologies.³³ These standardized technologies include, among others, Adaptive Multi-Rate audio code (AMR), Global Systems for Mobile Communications (GSM), General Packet Radio Service (GPRS), Enhanced Data Rates for Global Evolution (EDGE), Wideband Code Division Multiple Access

³¹ *Standard Setting Organization [SSO] Law & Legal Definition*, U.S. LEGAL, <http://definitions.uslegal.com/s/standard-setting-organization-ssol/>. “Standard setting organization” is defined in 42 USCS § 1320d(8) as “a standard setting organization accredited by the American National Standards Institute, including the National Council for Prescription Drug Programs, that develops standards for information transactions, data elements, or any other standard that is necessary to, or will facilitate, the implementation of this part.”

³² U.S. DEP’T OF JUSTICE & U.S. PATENT & TRADEMARK OFFICE, POLICY STATEMENT ON REMEDIES FOR STANDARDS-ESSENTIAL PATENTS SUBJECT TO VOLUNTARY FRAND COMMITMENTS 2–3 (Jan. 8, 2013).

³³ *About ETSI*, ETSI, <http://www.etsi.org/about>.

(WCDMA), and Long-Term Evolution (LTE) technologies.³⁴ ETSI and five other SSOs comprise the 3rd Generation Partnership Project (3GPP),³⁵ which maintains and develops globally applicable technical specifications for the 2G (second generation), 3G (third generation), and 4G (fourth generation) mobile systems.³⁶

GSM was the first 2G standard released, and today it accounts for 80 percent of mobile telecommunications subscribers around the world.³⁷ GPRS and EDGE, additional 2G standards introduced to the global wireless market after GSM, enabled faster data transfer speeds. GSM uses Time Division Multiple Access (TDMA) technology, whereas other 2G standards use Code Division Multiple Access (CDMA).³⁸ The 2G standards collectively became ubiquitous and are still the backbone of wireless telecommunications networks in the United States and worldwide. The International Telecommunication Union (ITU) introduced the 3G family of wireless standards in 2000 with the release of the International Mobile Telecommunications-2000 specifications.³⁹ UMTS, WCDMA, HSPA+, and CDMA2000 are all standards developed under the 3G umbrella.⁴⁰ WCDMA was the original standard developed, and it is still the most widespread 3G technology.⁴¹

As 3G technology was rolled out, handset manufacturers did not drop 2G and introduce 3G-only wireless devices.⁴² Because simultaneously upgrading all base station hardware and software across the country from 2G to 3G was

³⁴ See, e.g., *Mobile Communications*, ETSI, <http://www.etsi.org/technologies-clusters/technologies/mobile>.

³⁵ 3GPP, <http://www.3gpp.org>. The five other members of 3GPP are the Association of Radio Industries and Businesses (ARIB) in Japan, the Alliance for Telecommunications Industry Solutions (ATIS) in the United States, the China Communications Standards Association (CCSA), the Telecommunications Technology Association (TTA) in Korea, and the Telecommunications Technology Committee (TTC) in Japan. *Id.*

³⁶ 3GPP, ETSI, <http://www.etsi.org/about/our-global-role/3gpp>; *Technologies*, 3GPP, <http://www.3gpp.org/Technologies>.

³⁷ *About 3GPP*, 3GPP, <http://www.3gpp.com/About-3GPP>; *2G/3G/4G Mobile Networks*, ORANGE, <http://www.orange.com/en/networks/our-network/mobile-network>.

³⁸ *CDMA IS-95 (Code Division Multiple Access)*, MOBILECOMMS-TECHNOLOGY, http://www.mobilecomms-technology.com/projects/cdma_is95/; *LTE*, 3GPP, <http://www.3gpp.com/LTE>; RYSAVY RESEARCH, *HSPA TO LTE-ADVANCED: 3GPP BROADBAND EVOLUTION TO IMT-ADVANCED (4G)*, at 17 (Sept. 2009), available at http://www.3gamerica.org/documents/3G_Americas_RysavyResearch_HSPA-LTE_Advanced_Sept2009.pdf [hereinafter *HSPA TO LTE-ADVANCED*].

³⁹ *HSPA TO LTE-ADVANCED*, *supra* note 38, at 14–15; *IMT-Advanced Standards Announced for Next-Generation Mobile Technology*, INTERNATIONAL TELECOMMUNICATION UNION (ITU), http://www.itu.int/net/pressoffice/press_releases/2012/02.aspx.

⁴⁰ *About 3GPP*, 3GPP, <http://www.3gpp.com/About-3GPP>.

⁴¹ See, e.g., *W-CDMA*, ETSI, <http://www.etsi.org/technologies-clusters/technologies/mobile/w-cdma>.

⁴² Kevin Walsh & Jackie Johnson, *3G/4G Multimode Cellular Front End Challenges: Part 2*, at 2, RFMD (2009), available at <http://www.rfmd.com/cs/documents/WP%203G-4G%20Multimode%20Handset%20Challenges%20Part%202%20Architecture%20Discussion.pdf>.

infeasible, wireless service providers rolled out 3G technology gradually.⁴³ As a result, telecommunications hardware and software is “multi-mode” or “backwards compatible” to communicate with both 2G and 3G as necessary. As consumers became more connected and the processing capabilities of mobile phones increased, greater bandwidth and speed became necessary.⁴⁴ The International Telecommunication Union Radiocommunication Sector specified the requirements for 4G wireless service in 2010.⁴⁵ The first publicly available 4G service, an Ericsson system using Release 8 of the 3GPP LTE standard, began in Stockholm on December 14, 2009.⁴⁶ As with the introduction of 3G, the 4G rollout has required multi-mode capability with older technologies.

The IEEE is an international organization comprised of technical professionals from electrical, computing, and related fields.⁴⁷ In addition to performing other activities, IEEE develops standards for a number of technologies, including the IEEE 802.11 set of standards for wireless local area networks (W-LAN), commonly called “Wi-Fi.”⁴⁸ The 802.11 standard is a local network communication protocol that is used in wireless home and business data networks. Although the 802.11 standard was originally developed for computer networking, nearly all smartphones include 802.11 connection capabilities, as do many other consumer electronics products, such as televisions and Blu-ray players. The IEEE 802.11n standard is an amendment to IEEE 802.11 family of standards.⁴⁹

2. SSO IPR Policies

An SSO develops standards that meet the technical objectives of a specific sector.⁵⁰ Members of ETSI and the IEEE routinely patent technologies related to certain standards promulgated by the SSOs, including the standards discussed above. When a patented technology is implemented in a standard,

⁴³ CISCO, *EVOLVING TO LTE: CISCO’S SEAMLESS MIGRATION FOR UMTS OPERATORS* (2013), available at http://www.cisco.com/en/US/solutions/collateral/ns341/ns973/ns1076/white_paper_c11-609205.pdf; Kevin Walsh & Jackie Johnson, *3G/4G Multimode Cellular Front End Challenges: Part 1*, at 2, 5–6, RFMD (2009), available at <http://www.rfmd.com/CS/Documents/WPSPACE3G-4GSPACEMultimodeSPACEHandsetSPACEChallengesSPACEPartSPACE1SPACESpectrumSPACEandSPACERegulatorySPACEIssues.pdf>.

⁴⁴ VERIZON, *LTE: THE FUTURE OF MOBILE BROADBAND TECHNOLOGY 3* (2010), available at http://opennetwork.verizonwireless.com/pdfs/VZW_LTE_White_Paper_12-10.pdf.

⁴⁵ 4G AMERICAS, *4G MOBILE BROADBAND EVOLUTION: 3GPP RELEASE 10 AND BEYOND 9* (Feb. 2011), available at http://www.4gamericas.org/documents/4G%20Americas_3GPP_Rel-10_Beyond_2.1.11%20.pdf.

⁴⁶ *History*, ERICSSON, http://www.ericsson.com/us/thecompany/company_facts/history.

⁴⁷ *IEEE at a Glance*, IEEE, http://www.ieee.org/about/today/at_a_glance.html.

⁴⁸ *Id.*

⁴⁹ *802.11n-2009*, IEEE STANDARDS ASSOCIATION, <http://standards.ieee.org/findstds/standard/802.11n-2009.html>.

⁵⁰ *See, e.g.*, ETSI Rules of Procedure, Annex 6: ETSI IPR Policy § 3.1 (Nov. 30, 2011), available at http://www.etsi.org/images/etsi_ipr-policy.pdf [hereinafter ETSI IPR Policy].

the use of the patent becomes essential, such that making a product that complies with a standard without practicing the SEP is technically impossible. Parties who manufacture standard-compliant products may be required to license the patented technologies that are incorporated into the standard. Although a patent holder has the statutory right in the United States to refuse to license its technology, if an SEP holder refused to license its SEP, the standard would be made impracticable, because implementers could not comply with the standard without infringing the SEP. In such circumstances, the SSO would need to redesign the standard to bypass the technology in question. Redesigning standards would cause additional costs and delay. To avoid those costs and delays, SSOs normally require technology owners who wish to contribute their patents to a standard to declare that they will license their SEPs on FRAND terms. To facilitate the licensing process, both ETSI and the IEEE have policies that generally require their members to disclose or declare any patents that they believe are essential to a standard. As part of this declaration process, the declaring parties agree to license their declared-essential patents on fair, reasonable, and nondiscriminatory (FRAND) or reasonable and nondiscriminatory (RAND) terms. I summarize the relevant terms of the ETSI IPR Policy and the IEEE Patent Policy below.

The ETSI IPR Policy is Annex 6 to the ETSI Rules of Procedure, November 2011. Clause 6.1 of the IPR Policy provides as follows:

6.1 When an ESSENTIAL IPR 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 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.⁵¹

In turn, ETSI's IPR Policy defines "essential" as follows:

"ESSENTIAL" as applied to IPR means that it is not possible on technical (but not commercial) grounds, taking into account normal technical practice and the state of the art generally available at the time of standardization, to make, sell, lease, otherwise dispose of, repair, use or operate EQUIPMENT or METHODS which comply with a STANDARD without infringing that IPR. For the avoidance of doubt in exceptional cases where a

⁵¹ *Id.* § 6.1.

STANDARD can only be implemented by technical solutions, all of which are infringements of IPRs, all such IPRs shall be considered ESSENTIAL.⁵²

When a patent holder voluntarily submits an IPR licensing declaration to ETSI, the patent holder becomes obligated, by virtue of this undertaking, to offer licenses to the declared IPR to the extent that the declared IPRs are or become essential on terms and conditions that satisfy Clause 6.1. ETSI's IPR Policy guidelines make clear that "specific licensing terms and negotiations are commercial issues between the companies, and . . . shall not be addressed within ETSI."⁵³ ETSI members are not obligated to disclose within ETSI's Technical Body the commercial terms for SEP licenses granted under FRAND terms.⁵⁴

The IEEE's Patent Policy is section 6 of the IEEE-SA Standards Board Bylaws.⁵⁵ Section 6.2 of the Policy provides in part: "If the IEEE receives notice that a [Proposed] IEEE Standard may require the use of a potential Essential Patent Claim, the IEEE shall request licensing assurance, on the IEEE Standards Board approved Letter of Assurance form, from the patent holder or patent applicant."⁵⁶ Section 6.2 further provides that the Letter of Assurance shall be either:

- a) A general disclaimer to the effect that the Submitter without conditions will not enforce any present or future Essential Patent Claims against any person or entity making, using, selling, offering to sell, importing, distributing, or implementing a compliant implementation of the standard; or
- b) A statement that a license for a compliant implementation of the standard will be made available to an unrestricted number of applicants on a worldwide basis without compensation or under reasonable rates, with reasonable terms and conditions that are demonstrably free of any unfair discrimination. At its sole option, the Submitter may provide with its assurance any of the following: (i) a not-to-exceed license fee or rate commitment, (ii) a sample license agreement, or (iii) one or more material licensing terms.⁵⁷

Pursuant to and to the extent required by its Letters of Assurance, a patent holder is obligated to make licenses available to its Essential Patent Claims on the terms and conditions specified in section 6 of the IEEE Patent Policy.⁵⁸

⁵² *Id.* § 15.

⁵³ *Id.* § 4.1.

⁵⁴ It is a current debate among scholars and practitioners whether SSOs should be more active in determining a FRAND royalty for SEPs. *See, e.g.*, Deborah L. Feinstein, Robert Skitol, Dennis Carlton, Gregory Leonard, Christine Meyer & Carl Shapiro, *Economists' Roundtable on Hot Patent-Related Antitrust Issues*, 27 ANTITRUST ABA 10, 16 (2013).

⁵⁵ IEEE-SA Standards Board Bylaws § 6 (Dec. 2012), available at http://standards.ieee.org/develop/policies/bylaws/sb_bylaws.pdf.

⁵⁶ *Id.* § 6.2.

⁵⁷ *Id.*

⁵⁸ *Id.* § 6.1. The IEEE's definition further provides: "An Essential Patent Claim does not include any Patent Claim that was essential only for Enabling Technology or any claim other than that set forth above even if contained in the same patent as the Essential Patent Claim." *Id.*

The IEEE in turn defines “Essential Patent Claim” as “any Patent Claim the use of which was necessary to create a compliant implementation of either mandatory or optional portions of the normative clauses of the [Proposed] IEEE Standard when, at the time of the [Proposed] IEEE Standard’s approval, there was no commercially and technically feasible non-infringing alternative.”⁵⁹

Similar to ETSI, the IEEE explicitly disclaims responsibility “for determining whether any licensing terms or conditions provided in connection with submission of a Letter of Assurance, if any, or in any licensing agreements are reasonable or non-discriminatory.”⁶⁰ The IEEE’s guidelines emphasize that the IEEE bears no responsibility for identifying essential patent claims for which a license may be required or for investigating the legal validity or scope of essential patent claims.⁶¹

3. *Conceptualizing the SSO as a Joint Venture Having the FRAND Commitment as an Ancillary Restraint*

One can conceptualize a standard-setting organization as a joint venture and the FRAND commitment as an ancillary restraint on joint venturers that is essential to their collective success. In turn, the joint venture’s success enables downstream manufacturers to make and sell a new product incorporating the standard to consumers, who value that product more highly than the price they pay.

The doctrine of ancillary restraints originated in the English common law in 1711 in *Mitchel v. Reynolds*⁶² and permits two or more firms to restrain competition among themselves if doing so is essential to their creation of a new market, product, or productive efficiency. Such cooperation among firms benefits consumers. In this respect, the doctrine of ancillary restraints embodies a kind of cost-benefit analysis that is compatible with, if not identical to, the view that a court should evaluate a restraint of trade on the basis of whether it benefits or harms consumer welfare.

Congress outlawed *any* contract in restraint of trade when it enacted section 1 of the Sherman Act in 1890.⁶³ This language sweeps so broadly that, if taken literally, it would outlaw cooperation among firms that manifestly benefits consumers. It is not surprising, therefore, that within only nine years the Supreme Court qualified the literalism of section 1 when, in *United States v. Addyston Pipe & Steel*, it incorporated the doctrine of ancillary restraints into American

⁵⁹ *Id.* (bracketed text in original).

⁶⁰ *Id.* § 6.2.

⁶¹ *Id.* (“The IEEE is not responsible for identifying Essential Patent Claims for which a license may be required, [or] for conducting inquiries into the legal validity or scope of those Patent Claims.”).

⁶² (1711) 24 Eng. Rep. 347 (Q.B.).

⁶³ 15 U.S.C. § 1.

antitrust jurisprudence.⁶⁴ The Court affirmed the opinion of Judge (later, President and Chief Justice) William Howard Taft for the Sixth Circuit that a covenant “merely ancillary to the main purpose of a lawful contract, and necessary to protect the covenantee in the full enjoyment of the legitimate fruits of the contract” is not unlawful.⁶⁵

In the 1980s, the antitrust titans of the federal judiciary reconciled the doctrine of ancillary restraints with the consumer-welfare approach of modern antitrust law. Judge Robert Bork wrote for the D.C. Circuit in *Rothery Storage & Van Co. v. Atlas Van Lines, Inc.* that “a joint venture made more efficient by ancillary restraints . . . is a fusion of the productive capacities of the members of the venture.”⁶⁶ A restraint is ancillary if it is “subordinate and collateral” to the purpose of a legitimate transaction.⁶⁷ Similarly, Judge Frank Easterbrook wrote for the Seventh Circuit in *Polk Brothers, Inc. v. Forest City Enterprises, Inc.* that “a restraint is ancillary when it may contribute to the success of a cooperative venture that promises greater productivity and output.”⁶⁸ By 2010, it was thoroughly uncontroversial for the Supreme Court to reiterate in *American Needle, Inc. v. National Football League* that American courts judge ancillary restraints within joint ventures according to their reasonableness rather than according to the *per se* rule of illegality that condemns agreements among competitors to raise prices or reduce output.⁶⁹

In 2010, the Federal Circuit in *Princo Corp. v. International Trade Commission* considered whether a patent licensing agreement between standard-setting parties was anticompetitive and an illegal restraint of trade.⁷⁰ Philips and Sony established a patent pool to include licenses for patents, both essential and nonessential, to perform the standards for rewritable compact discs—the Recordable CD Standards, commonly called the Orange Book.⁷¹ Both companies patented solutions to encoding the discs, but they agreed that Philips’ patent was superior and less prone to error. Philips’ and Sony’s patent pool included both parties’ patents and licensed them to third parties as a package that contained a field-of-use restriction that limited the patent licenses to the manufacture of compact discs in accordance with the Orange Book standards.⁷²

The case arose from Philips’ complaint to the International Trade Commission (ITC) when Princo Corporation, which licensed the patent

⁶⁴ *United States v. Addyston Pipe & Steel*, 85 F. 271, 282 (6th Cir. 1898), *aff’d*, 175 U.S. 211 (1899).

⁶⁵ *Id.*

⁶⁶ 792 F.2d 210, 224 (D.C. Cir. 1986); *see also* *Engine Specialties, Inc. v. Bombardier, Ltd.*, 605 F.2d 1, 11 (1st Cir. 1979) (an agreement between joint venturers not to compete within the joint venture is “not offensive in and of itself”).

⁶⁷ *Rothery Storage & Van Co. v. Atlas Van Lines, Inc.*, 792 F.2d 210, 224 (D.C. Cir. 1986).

⁶⁸ *Polk Bros., Inc. v. Forest City Enterprises, Inc.*, 776 F.2d 185, 189 (7th Cir. 1985).

⁶⁹ *Am. Needle, Inc. v. Nat’l Football League*, 130 S. Ct. 2201, 2216–17 (2010).

⁷⁰ *Princo Corp. v. Int’l Trade Comm’n*, 616 F.3d 1318 (Fed. Cir. 2010).

⁷¹ *Id.* at 1322.

⁷² *Id.* at 1322–23.

package from Philips, ceased paying its license fees on the rationale that Philips was misusing its patents.⁷³ On appeal, the Federal Circuit found that an agreement to refrain from licensing a patent for use outside a standard is not presumptively anticompetitive. Treating the standard-setting process and patent pool as a joint venture and the Orange Book standard as an ancillary restraint, the panel held that “Philips and Sony acted legitimately in choosing not to compete against their own joint venture.”⁷⁴ Thus, the Federal Circuit’s treatment of a standard-setting agreement as a joint venture in *Princo* establishes the foundation for analyzing FRAND commitments within the context of the ancillary restraints doctrine.⁷⁵

B. The Combinatorial Value of SEPs

Understanding a FRAND royalty requires understanding the economic difference between standard-essential patents and implementation patents. Standard-essential patents can be viewed only in terms of their *combinatorial* value—not their incremental value. The value associated with a standard is joint and common among the SEPs. Once a patent is essential to the standard, the hypothetical-negotiation framework used to determine the royalties for implementation patents does not apply. This distinction between combinatorial value and incremental value informs the meaning of FRAND. Competition among downstream products that implement the standard occurs only with respect to features that depend on “nonessential” implementation patents.

Owing to the complementarity of SEPs, analysis of the incremental value of a patent is insufficient for SEPs because each SEP holds zero incremental value without all other SEPs. Because of the combinatorial value of SEPs, the value to the consumer of the downstream standard-compliant product is joint and common among the SEPs. FRAND royalty terms are appropriately derived by viewing the SSO as a joint venture among its member firms that has as its objective the maximization of the joint surplus created by the standard. The attainment of this shared objective should define FRAND royalties that are *ex ante* efficient (in terms of promoting widespread participation in and consensus on a commercially valuable standard) and *ex post* efficient (in terms of stimulating demand in the downstream market for products that implement the patents that are essential to that standard). The FRAND commitment is

⁷³ *Id.* at 1323.

⁷⁴ *Id.* at 1334. Chief economists of the U.S. and EU enforcement agencies have observed that “market power . . . achieved through the joint action of entities—the SSO members—that might be in competition with each other outside the SSO . . . is acceptable for society because it trades off possible technology competition among SSO members for production of a standard that can speed innovation and expand output.” Kai-Uwe Kuhn, Fiona Scott Morton & Howard Shelanski, *Standard Setting Organizations Can Help Solve the Essential Patents Licensing Problem*, 3 COMPETITION POL’Y INT’L CPI ANTITRUST CHRON. (SPECIAL ISSUE) 3 (2013).

⁷⁵ The ETSI IPR policy does not explicitly state that the SSO does not constitute a partnership. ETSI IPR Policy, *supra* note 50.

an ancillary restraint on the individual pricing freedom of joint venturers that is voluntarily accepted by the joint venturers because they understand this commitment to be essential to their collective success.

Some notation will clarify the combinatorial nature of the value of SEPs. In the case of a downstream product (such as a smartphone) that reads on many patents, let there be N patented inputs, consisting of I nonessential patents (known as implementation patents) and \mathcal{J} essential patents, where $I + \mathcal{J} = N$. All \mathcal{J} essential patents must be used in fixed proportion to produce the downstream product, which consumers value at S .⁷⁶ No substitutability at all is possible among SEPs. To the contrary, SEPs are complements rather than substitutes. Patent law's conventional analysis for valuing a patent examines the patent's incremental contribution to the implementer's profitability over that of the next-best noninfringing substitute. This inquiry exemplifies marginal analysis. Its economic import is to ask what the marginal productivity of the patent in suit is. As a matter of mathematics, marginal analysis in economics requires calculating a derivative (in this case, the partial derivative of the implementer's output with respect to the factor of production represented by the patent in suit and its next-best noninfringing alternative). One can calculate the partial derivative of a smooth, continuously differentiable production function with respect to a given factor of production. But a fixed-proportion production technology is not smooth or continuously differentiable. Consequently, marginal analysis of a fixed-proportion production technology is not possible—as a matter of mathematical computation or economic theory or simple logic.⁷⁷

The removal of any one SEP from the downstream product causes its value to consumers to disappear, such that $S = 0$. An analogy is an automobile having all its essential components except a transmission: the car will not go, and it is therefore worthless to the consumer. Adding a fifth wheel will not compensate for the missing transmission, because no substitutability is possible in the first place between the essential input of a transmission and the essential input of a wheel. In other words, the *decremental* value of any of the \mathcal{J} essential patents is therefore S .⁷⁸

⁷⁶ In other words, the SEPs implemented in the downstream product as factors of production exhibit the fixed-proportion production technology first described by Nobel laureate Wassily Leontief. Cost-minimizing production can occur only at a single fixed point, rather than at any one of an infinite number of possible combinations of the two substitutable factors of production. See WASSILY LEONTIEF, *THE STRUCTURE OF THE AMERICAN ECONOMY, 1919–1929: AN EMPIRICAL APPLICATION OF EQUILIBRIUM ANALYSIS* (Harvard Univ. Press 1941). For a concise explanation of the Leontief production technology, see HAL R. VARIAN, *MICROECONOMIC ANALYSIS* 4–5 (Norton 3d ed. 1992).

⁷⁷ Leontief observed (as a more general principle of economic theory, of course) that fixed-proportions technology constitutes “no less than a formal rejection of the marginal productivity theory” because “the marginal productivity of any [factor] . . . is zero.” LEONTIEF, *supra* note 76, at 38.

⁷⁸ Saying that the entire value of a product disappears if one removes any one of the SEPs that the product implements is not the same thing as saying that a given SEP “drives” the product's value. In other words, the recognition that an SEP's decremental value is S is not a restatement of the entire market value rule.

It bears emphasis that the incremental value and decremental value are not symmetric in the case of an SEP. The incremental value of any of the \mathcal{J} standard-essential patents is 0—because the downstream product is valuable to consumers if and only if all $\mathcal{J} - 1$ other standard-essential patents are simultaneously supplied. Moreover, the same phenomenon of zero incremental value holds for every possible combination of $\mathcal{J} - 1$ standard-essential patents. This combinatorial nature of the value conferred on a downstream product by an aggregation of SEPs resembles Gerald Faulhaber's influential analysis of the combinatorial nature of common costs within a multiproduct firm.⁷⁹

What I will call a “breakthrough” product consists of only \mathcal{J} standard-essential patented features, which (as noted above) are *not* substitutes. Such products are properly characterized as a matter of law as the successful outcome of the standard having been established through the cooperation of many firms functioning collectively as a kind of joint venture. The breakthrough product results from the joint production among actual and potential competitors, as well as firms that have only an actual or potential vertical relationship (suppliers of technological inputs and manufacturers of downstream products) and firms that have only an actual or potential complementary relationship (suppliers of complementary technological inputs). These firms have agreed to share their respective technologies on FRAND terms, rather than less favorably on arms-length terms. Through such cooperation among the SSO's members it becomes possible for implementers to combine all \mathcal{J} essential patents and thereby enable SEP holders collectively to reap royalties based on S , the value that consumers ascribe to the downstream product that successfully embodies the minimum combination of all those technologies. Moreover, the total size of the market (the aggregate demand for the breakthrough product) will enable SEP holders to earn royalties over a larger volume of units sold than if they chose instead to monetize their inventions outside the SSO. For the consumer, the value of the breakthrough product is joint and common among the \mathcal{J} essential patents. Put differently, the value of the downstream product, S , is (as a first approximation, at least, for reasons I will explain momentarily) indivisible among its \mathcal{J} constituent, standard-essential patents, which the implementer must use in fixed proportions.

Once an SSO adopts a standard, competition can occur only over the differentiating features of downstream products that read on *nonessential* implementation patents. Only with respect to implementation patents is substitutability possible, because competition cannot exist without at least the possibility that consumers can substitute one product for another, which they cannot do with respect to SEPs. (In this instance, the implementers are the consumers of

⁷⁹ See Gerald R. Faulhaber, *Cross-Subsidization: Pricing in Public Enterprises*, 65 AM. ECON. REV. 966 (1975); Gerald R. Faulhaber, *Cross-Subsidy Analysis with More Than Two Services*, 1 J. COMPETITION L. & ECON. 441 (2005). See also J. GREGORY SIDAK & DANIEL F. SPULBER, *DEREGULATORY TAKINGS AND THE REGULATORY CONTRACT: THE COMPETITIVE TRANSFORMATION OF NETWORK INDUSTRIES IN THE UNITED STATES* 23 (Cambridge Univ. Press 1998).

inputs.) As Justice Stephen Breyer has said in an analytically similar context in *AT&T Corp. v. Iowa Utilities Board*, “It is in the *un*-shared, not in the shared, portions of the enterprise that meaningful competition would likely emerge.”⁸⁰ Only with respect to implementation patents does it therefore make economic sense for a court to identify the incremental benefit that the patented functionality creates over the next-best noninfringing substitute, to use that increment of value to define the bargaining range between the patent holder and the infringer in a hypothetical negotiation occurring at the moment of first infringement, and then to use some point estimate within that bargaining range to set a reasonable royalty to compensate for the infringement of that patent. It is thus a fallacy of economic and legal reasoning to apply the incremental value framework to the valuation of an SEP and the corresponding determination of its FRAND royalty.

Figure 3 depicts the value of a retail product that uses $\mathcal{J} + I$ patented inputs, \mathcal{J} of which are standard-essential, and the remaining I of which are implementation patents that are by definition not standard-essential. The X -axis shows the cumulative number of patents, and the Y -axis shows the cumulative value of the patents. The “cumulative value curve” runs flat along the horizontal axis until the point \mathcal{J} because the incremental value of each standard-essential patent is zero. At \mathcal{J} standard-essential patents, the cumulative value of the patents jumps from 0 to S , which is the combinatorial value of the \mathcal{J} essential patents. To the right of point \mathcal{J} , the implementation patents are added in decreasing order of their contribution of value to the downstream product. The value $V - S$ is the incremental value associated with all of the implementation patents. The product’s value increases from S along the value curve, but the value curve after \mathcal{J} has a horizontal parabolic shape because of the diminishing marginal returns associated with additional implementation patents having lesser individual economic value for the downstream product.

The value of SEPs and implementation patents will vary depending on the specific downstream products. The implementation patents might be less valuable than SEPs if they protect technologies that have only marginal relevance for the downstream product. On the contrary, implementation patents can be more valuable than SEPs if the features that the implementation patents cover are particularly relevant for the success of the downstream product.

C. The Difference Between a Patent’s Having Been Declared Essential and Its Being Essential in Fact

Judge Davis of the Eastern District of Texas has observed that “[t]here is no way to determine the exact number of standard-essential patents.”⁸¹ As

⁸⁰ *AT&T Corp. v. Iowa Utils. Bd.*, 525 U.S. 366, 429 (1999) (Breyer, J., concurring in part and dissenting in part) (emphasis in original).

⁸¹ Memorandum Opinion & Order at 49, *Ericsson Inc. v. D-Link Sys., Inc.*, No. 6:10-cv-473 (E. D. Tex. Aug. 6, 2013). “Neither side attempted to determine the exact number of standard-essential patents.” *Id.*

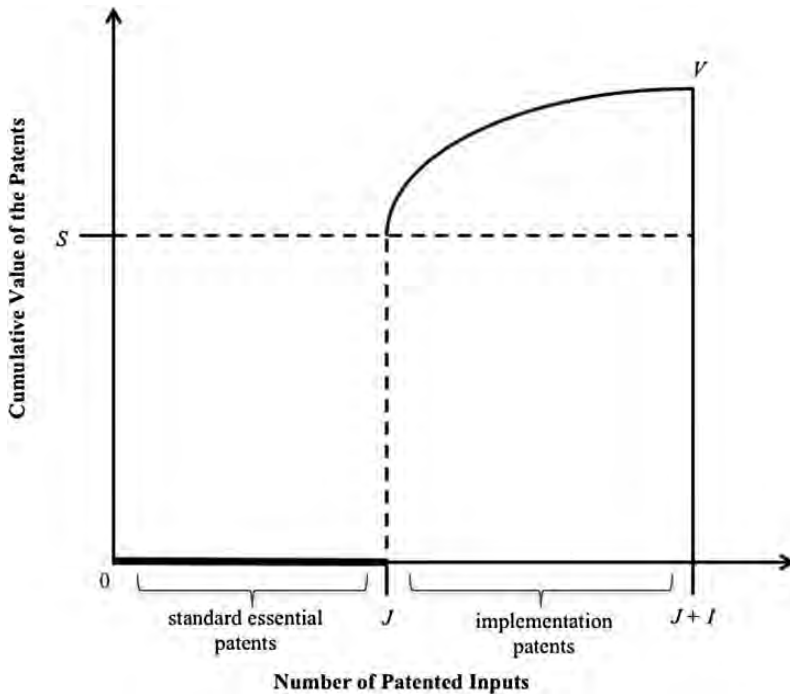


Figure 3. The value of the downstream product combining standard-essential and standard-nonessential (implementation) patents

noted earlier, ETSI defines intellectual property rights, including patents, to be “essential” if

it is not possible on technical (but not commercial) grounds, taking into account normal technical practice and the state of the art generally available at the time of standardization, to make, sell, lease, otherwise dispose of, repair, use or operate EQUIPMENT or METHODS which comply with a STANDARD without infringing that IPR.⁸²

Thus, a downstream manufacturer must use all such essential patents to implement the standard at issue. However, declaring a patent to be essential to a standard does not ensure that it is essential in fact—either at the time of the standard’s adoption or later, when actual consumer demand for the downstream product implementing the standard has manifested itself.⁸³ ETSI states in its IPR Database FAQs:

The information reflected in the ETSI IPR database [regarding the essentiality of a given patent to the ETSI standard] is based on the information received and ETSI has not

⁸² ETSI, INTELLECTUAL PROPERTY RIGHTS (IPRs); ESSENTIAL, OR POTENTIALLY ESSENTIAL, IPRs NOTIFIED TO ETSI IN RESPECT OF ETSI STANDARDS, ETSI SR 000 314 V2.13.1, at 6 (2012).

⁸³ See, e.g., Maurits Dolmans & Daniel Ilan, *European Antitrust and Patent Acquisitions: Trolls in the Patent Thickets*, COMPETITION L. INT’L, Aug. 2012, at 7, 16 n.16.

checked the validity of the information, nor the relevance of the identified IPRs and *is not in a position to confirm, or deny, that the IPRs are, in fact, essential, or potentially essential*. In other words, the information that appears on the ETSI IPR database reflects the ETSI Members' declarations with regards to IPRs that they have considered essential for a particular ETSI STANDARD.⁸⁴

Generally, SSOs do not verify the essentiality of patents. Consequently, as Judge Holderman observed in *Innovatio*, there is "no guarantee that all [declared] essential patents are in fact essential."⁸⁵ It is likely that the number of declared SEPs exceeds the number of patents that are truly essential for practicing the standard. For example, in 2005, D.J. Goodman and R.A. Myers examined the patents and patent applications declared essential for the 3GPP and 3GPP2 standards. They found that only 21 percent of the declared patents were actually essential.⁸⁶ Furthermore, essentiality goes to the *claims* in the patent. A given patent could have certain claims that are essential to the standard and other claims that are not.

There are several reasons why a company might overdeclare its number of SEPs. One possibility is that the over-disclosure is unintentional. For instance, the patent or patent application declared as essential may eventually not have been granted, or perhaps it was granted but with significant changes. Second, it is possible that the over-disclosure is intentional and is used as a strategy to signal a strong position in the market. The patent holder may believe that the sheer number of its declared-essential patents will signal to important constituencies the patent holder's technological prowess. This signal may, for example, help the patent holder to attract customers, investors, or skilled workers. At the same time, a company with a large patent portfolio, including a large number of SEPs, is more likely to obtain favorable licensing conditions. A third possible reason to overdeclare one's patents as being standard-essential is to reduce legal risk. The FTC undertook enforcement actions in *Rambus*,⁸⁷ *Dell*,⁸⁸ and *Unocal*⁸⁹ on the theory that the patent holder engaged in an unfair method of competition in violation of section 5 of the Federal Trade Commission Act by misrepresenting or knowingly failing to disclose the essentiality of its patent to the SSO before its adoption of the patented technology into the standard. In at least one famous case, *Broadcom Corp. v. Qualcomm Inc.*, another member of an SSO privately sued the SEP holder for breach of contract, fraud, and antitrust violations.⁹⁰ To

⁸⁴ *ETSI IPR Database FAQs*, ETSI, <http://www.etsi.org/about/570-etsi-ipr-database-faqs> (emphasis added).

⁸⁵ RAND Opinion in *Innovatio*, *supra* note 4, at 84.

⁸⁶ David J. Goodman & Robert A. Myers, *3G Cellular Standards and Patents*, IEEE WIRELESSCOM (June 13, 2005), available at <http://eeweb.poly.edu/dgoodman/wirelesscom2005.pdf>.

⁸⁷ *In re Rambus, Inc.*, No. 9302 (F.T.C. Aug. 2, 2006), *rev'd sub nom.* *Rambus, Inc. v. Fed. Trade Comm'n*, 522 F.3d 456 (D.C. Cir. 2008).

⁸⁸ *In re Dell Computer Corp.*, 121 F.T.C. 616 (May 20, 1996).

⁸⁹ *In re Union Oil Co. of Cal.*, No. 9305 (F.T.C. July 27, 2005).

⁹⁰ *Broadcom Corp. v. Qualcomm Inc.*, 501 F.3d 297 (3d Cir. 2007).

eliminate the risk of such enforcement actions and private lawsuits, the patent holder may prefer to err on the side of declaring its patents to be standard-essential.

In litigation over infringement of a patent declared to be standard-essential, the finder of fact rather than the parties must determine whether the patent is essential in fact. (I am assuming here that a court would consider the determination of a patent's essentiality in fact to be a question of fact to be decided by the finder of fact rather than a question of law, which the court would decide in a jury trial. Needless to say, the case law gives little guidance at this time.)

In his opinion in *Apple v. Motorola* regarding the parties' requests for damages and injunctive relief, Judge Posner distinguished between a patent declared by its owner to be essential and a patent proven by its owner to be essential in fact.⁹¹ In an earlier summary judgment order, Judge Posner had found that Apple had not infringed Motorola's '559 patent, which Motorola had declared to be essential to the Universal Mobile Telecommunications Standard (UMTS).⁹² That finding, Judge Posner said, "may seem inconsistent with the proposition that Apple's 3G ('third generation') mobile devices, which are governed by the Universal Mobile Telecommunications Standard (UMTS), must therefore use patents declared essential to that standard, such as the '559."⁹³ However, Judge Posner explained, "there is no inconsistency," because

Motorola's standards-essential patents . . . are merely *claimed* to be standards-essential. The European Telecommunications Standards Institute collects declarations by companies that claim to own patents essential to compliance with the UMTS standard, but the Institute does not determine whether they really are essential.⁹⁴

Judge Posner reasoned that, although Apple's handsets "generate the preamble sequences (the subject of the Motorola's '559 patent) required by the 3G UMTS standard, they do not do so in the manner claimed by '559, and so the '559 isn't essential."⁹⁵ Thus, as Judge Posner's opinion illustrates, it is possible for a manufacturer to implement a standard in a downstream product without infringing patents that have been declared essential to the standard. Essentiality depends on technical and economic facts external to the contractual operation of the SSO. Essentiality does not spring into creation through the unilateral expression of the patent holder.

For the reason that Judge Posner observed, one must qualify the combinatorial-value framework for evaluating SEPs, recognizing that not all patents that have been declared to be standard-essential are in fact essential to either the creation of the standard or the production of a downstream product implementing that

⁹¹ *Apple, Inc. v. Motorola, Inc.*, 869 F. Supp. 2d 901, 912 (N.D. Ill. 2012).

⁹² *Id.*

⁹³ *Id.*

⁹⁴ *Id.* (emphasis in original) (citing *ETSI IPR Database FAQs*, ETSI, <http://www.etsi.org/about/570-etsi-ipr-database-faqs>).

⁹⁵ *Id.*

standard. In contrast to patents that are truly standard-essential, a patent declared to be standard-essential but subsequently found not to be standard-essential does *not* have a decremental value of S , the entire consumer value of the downstream product implementing the standard. The consequence of a patent's being determined *ex post* not to be standard-essential in fact is to evaluate claims for its infringement in the same manner that implementation patents are treated—by assessing the marginal contribution of the patent in suit relative to the next-best noninfringing substitute at the time of first infringement. That incremental value may be small. Consequently, it is entirely conceivable that a patent erroneously declared by its owner to be standard-essential may justify only a trivial royalty for infringement.

Over time, implementers may find that some of the declared SEPs are in fact not essential to the standard. Figure 4 shows how the value to consumers of the retail product shifts when implementers deem K of the \mathcal{J} essential patents to be commercially *nonessential*. The cumulative value curve shifts left from the point \mathcal{J} to $\mathcal{J} - K$. The combinatorial value S of a product that incorporates all genuinely standard-essential patents occurs at the point $\mathcal{J} - K$. The K patents join the I implementation patents, and each such implementation patent adds positive but diminishing incremental value. There are now $K + I$ nonessential patents. Although Figure 4 shows the K nonessential patents immediately following the \mathcal{J} essential patents in their contribution to the downstream product's cumulative value to consumers, the true incremental value of those K patents may be smaller, such that they would be ordinarily ranked farther to the right among the other implementation patents. For example, if the K patents are found to be nonessential and they are not actually practiced, they would move toward the right-most end of the implementation patents, such that their incremental value corresponds to the flatter part of the value curve, where each additional nonessential patent contributes value at a diminishing marginal rate. One could question in such a case whether, as a matter of contract law or promissory estoppel, the FRAND declaration continues to encumber the patent despite its subsequently being deemed not to be standard-essential in fact.

Finally, the royalty on a patent that a court has found to be invalid—regardless of whether it is a standard-essential patent or an implementation patent—should be zero.

D. The Aggregate FRAND Royalties Based on the Combinatorial Value of SEPs

Figures 3 and 4 represent the entire value to consumers of a downstream product generated by the patents practiced in the product. However, the patent holders do not keep the entire value of the downstream product. They and the downstream implementers divide this value with consumers. Otherwise, demand for the product would collapse, and this new technological

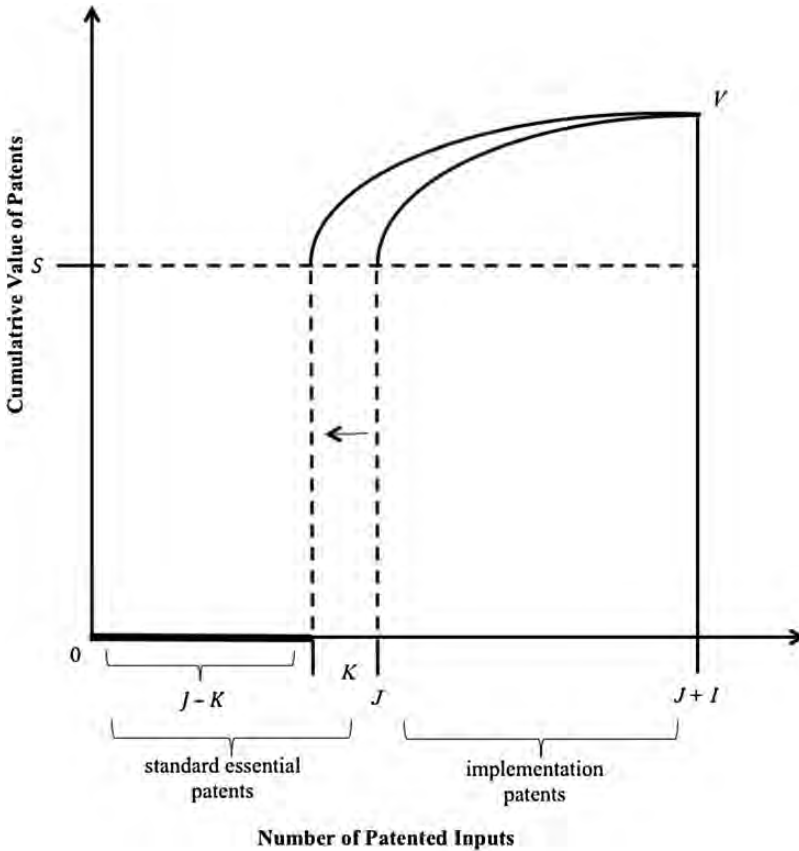


Figure 4. The value of the downstream product combining standard-essential and standard-nonessential (implementation) patents after K declared patents are found to be nonessential in fact

marvel would create no consumer surplus whatsoever. Consequently, the aggregate royalties that patent holders earn from the downstream product necessarily will be less than the total value of the downstream product.

1. The Aggregate Royalty Burden of All SEPs in a Standard

Figure 5 shows the value of aggregate royalties for standard-essential and implementation patents. The aggregate royalty burden on the downstream product is βS , where β is the percentage of the downstream product’s revenue that is the aggregate royalty burden. Values for β will range between 0 and 1 because SEP holders do not keep the entire value created by the combination of all SEPs. (Although the FRAND royalties will not exceed the value of the downstream product, in practice the aggregate FRAND royalties can exceed the net sales price of the product—for example, if the product is sold at an artificially low price.) The value from βS to S is the surplus on SEPs flowing to the

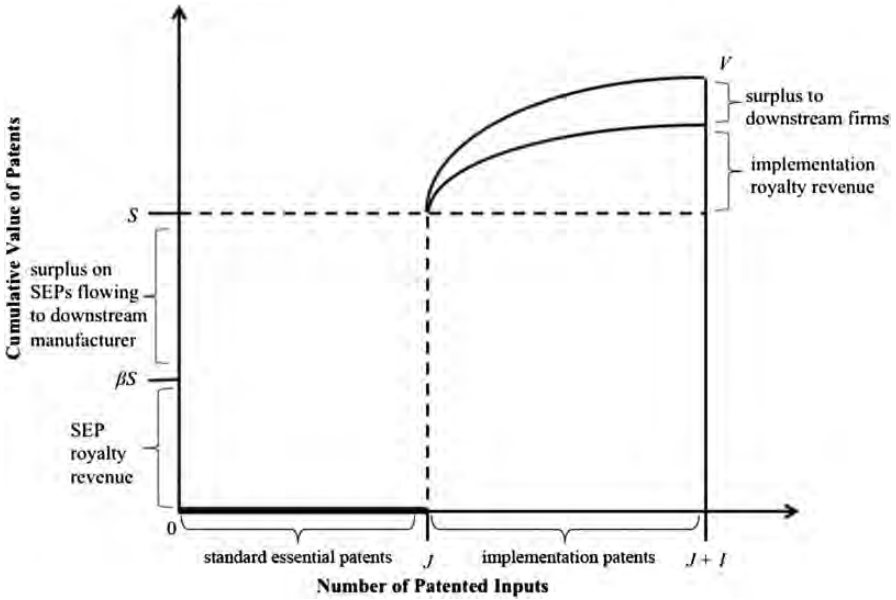


Figure 5. Aggregate royalties for standard-essential and implementation patents

downstream manufacturers (some fraction of which those manufacturers will share with consumers). Determination of the royalties for implementation patents proceeds from a traditional hypothetical-negotiation analysis. Like the economic value of SEPs, the value of all I implementation patents is split between patent holders and downstream firms.

The actual royalty rates on implementation patents may exceed royalty rates on SEPs in a given downstream product despite the fact that the latter might seem inherently more valuable because of their essentiality to the standard. There are at least two possible explanations for this relationship. First, the actual royalty rates for SEPs may appear lower because they are part of cross-licensing agreements. The predominant consideration flowing to the SEP holder in a cross-licensing agreement will be the reciprocal right to use the licensee’s valuable patents (both standard-essential and implementation). The payment of a royalty to the SEP holder may be a small component of the total consideration that the SEP holder receives. Second, the royalties may function as a two-part tariff if the same parties engaged in the FRAND negotiation are likely to make complements. The FRAND rate is the low, fixed component of the two-part tariff, and the implementation-patent royalty subsidizes the low FRAND rates.

The aggregate royalty burden of the SEPs may exceed the aggregate royalty burden of the implementation patents, particularly during the early life of a standard. However, as the standard ages and alternative standards or more advanced implementation patents are developed, the aggregate royalty burden

of implementation patents may surpass the aggregate royalty burden of SEPs. The increase in the value generated by the implementation patents does not mean that the value of the standard itself falls over time. Implementation patents are complements to the standard, such that the development of implementation patents increases the value of the standard.

2. *Who Decides the Size of the Aggregate Royalty Burden That SEPs Impose on the Downstream Product?*

Point βS in Figure 5 is a stylized depiction of the aggregate royalty burden that SEPs impose on the downstream product, such as a smartphone. However, identifying in principle the existence of the aggregate royalty burden does not begin to answer three practical but challenging questions relevant to the calculation of reasonable royalties on individual SEPs.

First, how large should the aggregate royalty burden be? How large should the pie that SEP holders will divide among themselves be? Here it is useful to invoke the terminology of old-fashioned cost-of-service regulation for public utilities—although in doing so I do not imply that the owner of a patent, even a standard-essential patent, is analogous on either economic or legal grounds to a public utility. In effect, the public utilities commission represents consumers in repeated negotiations with the regulated firm to supply service over the course of many years. The first step in setting the regulated rates of a public utility under cost-of-service regulation is to determine its “revenue requirement” for the period of time that the rate order will be in effect. The revenue requirement for a utility is a kind of break-even constraint: the firm will need revenue to cover its operating expenses and a risk-adjusted competitive return on the capital that it has dedicated to a public purpose. Operating expenses include depreciation, so it is commonly said that a regulated utility is entitled to receive, in addition to its operating costs, a reasonable opportunity to earn a return *of and on* its invested capital. The typical public utilities statute in the United States provides for “just and reasonable” rates (with a requirement of nondiscrimination lurking in the background, if not already inferred from the common law principle of common carriage). The nomenclature of public utility rate regulation (just, reasonable, and nondiscriminatory) thus sounds remarkably close to the fair, reasonable, and nondiscriminatory attributes of royalties for SEPs. It is well established in the American takings jurisprudence on regulated ratemaking that a “just and reasonable” rate may not be set so low as to deny the utility the ability to attract capital from willing investors in the future.⁹⁶ In other words, considerations of dynamic efficiency motivate the constitutional interpretation of “just and reasonable.” This insight about the connection between dynamic efficiency and the fairness of pricing should apply with even greater force to royalties on patents since they, far more than

⁹⁶ Fed. Power Comm’n v. Hope Natural Gas Co., 320 U.S. 591, 605 (1944). See also Duquesne Light Co. v. Barasch, 488 U.S. 299, 310 (1989); SIDAK & SPULBER, *supra* note 79, at 381.

the business of regulated utilities, are generally considered the engine of economic growth and consumer betterment.

The public-utility analogy is helpful for underscoring that rates should not be too low, but the analogy quickly loses its salience. The negotiation over the revenue requirement is a bilateral one, between a monopoly provider of regulated services and a single, public representative of all ratepayers. In contrast, many more parties are affected by the determination of the optimal size of the aggregate royalty burden for SEPs embodied in the downstream product that consumers highly prize.

A second and closely related question is, assuming that the necessary information is feasible to collect and analyze, who may lawfully determine how large the aggregate royalty burden shall be? Should the SEP holders or the downstream implementers of a standard determine the size of the aggregate royalty burden for SEPs? Collaboration among SEP holders to determine the aggregate royalties, or a cap on the aggregate SEP royalties, should not raise antitrust concern, because SEPs are complements, not substitutes. In contrast, collaboration among downstream implementers to cap the aggregate royalties for SEPs may produce buyer collusion, because downstream implementers are competitors.⁹⁷ The matter is more complicated because many SEP holders are vertically integrated into the implementation of standards in downstream products. Consequently, antitrust authorities (mainly outside the United States after the Supreme Court's 2009 decision in *linkLine*⁹⁸) may be concerned that vertically integrated SEP holders would try to increase the aggregate royalty burden to "squeeze" the margins of downstream competitors that are not vertically integrated into SEP ownership. However, the nondiscrimination requirement of the FRAND commitment attenuates the incentive for downstream implementers to collude over aggregate SEP royalties, as implementers would need only to ensure that the first (similarly situated) licensee pays a low aggregate royalty for SEPs. (However, given the nascent state of the case law, it is far from clear as a matter of legal interpretation, under either contract law or public law, that the nondiscrimination component of the FRAND commitment by itself creates for a given implementer a legally enforceable right to cap its *aggregate* royalties for SEPs.)

Contrary to the suggestion that SEP holders are indifferent or oblivious to the size of their aggregate royalty burden, SEP holders have collectively attempted to cap aggregate royalties for 3G and 4G standards. In November 2002, Nokia, NTT DoCoMo, Siemens, and Ericsson announced that they reached a "mutual understanding" to license their patents essential to the

⁹⁷ See J. Gregory Sidak, *Patent Holdup and Oligopsonistic Collusion in Standard-Setting Organizations*, 5 J. COMPETITION L. & ECON. 123 (2009).

⁹⁸ *Pacific Bell Telephone Co. v. linkLine Commc'ns, Inc.*, 555 U.S. 438 (2009). See also J. Gregory Sidak, *Abolishing the Price Squeeze as a Theory of Antitrust Liability*, 4 J. COMPETITION L. & ECON. 279 (2008).

WCDMA standard such that the cumulative royalty rate for WCDMA technology would be, in Nokia's words, "at a modest single digit level."⁹⁹ Nokia petitioned the industry to adopt a 5-percent cumulative royalty for WCDMA.¹⁰⁰ Again in April 2008, Ericsson, Alcatel-Lucent, NEC, NextWave Wireless, Nokia, Nokia Siemens Networks, and Sony Ericsson announced their "support that a reasonable maximum aggregate royalty level for LTE essential IPR in handsets is a single-digit percentage of the sales price."¹⁰¹ Those efforts, to cap aggregate SEP royalties at 5 and 9.9 percent, confirm that SEP holders well understand the Cournot complementarity argument—at least as a matter of business intuition, if not in a formally analytical manner. Possessing that understanding, SEP holders have individually acted in their enlightened self interest to try to prevent the problem from occurring to their own detriment and to the detriment of implementers and ultimate consumers.

These attempts to create a focal point for the aggregate royalty burden for SEPs may not have succeeded in achieving a cap as low as originally proposed.¹⁰² However, neither have these attempts ultimately failed in their overriding purpose, for the aggregate royalty burden of SEPs clearly has not taken so large a share of implementers' operating margins as to prevent them from profitably exploiting the standard to manufacture smartphones. In short, though confronted with a daunting pricing question requiring collective action to answer, SEP holders and implementers have nonetheless muddled on with considerable success—to the great benefit of consumers, notwithstanding the dire predictions of the economists and lawyers who espouse the conjecture that royalty stacking leads to market failure. Consequently, it is hardly clear that (necessarily imperfect) government intervention limiting the legal and equitable remedies of SEP holders would produce a superior outcome for

⁹⁹ Press Release, Nokia, Industry Leaders NTT DoCoMo, Ericsson, Nokia and Siemens, and Japanese Manufacturers Reach a Mutual Understanding to Support Modest Royalty Rates for the W-CDMA Technology Worldwide (Nov. 6, 2002), <http://press.nokia.com/2002/11/06/industry-leaders-ntt-docomo-ericsson-nokia-and-siemens-and-japanese-manufacturers-reach-a-mutual-understanding-to-support-modest-royalty-rates-for-the-w-cdma-technology-worldwide/>.

¹⁰⁰ Press Release, Nokia, Nokia Advocates Industry-wide Commitment to 5% Cumulative IPR Royalty for WCDMA 17 (May 8, 2002), <http://press.nokia.com/2002/05/08/nokia-advocates-industry-wide-commitment-to-5-cumulative-ipr-royalty-for-wcdma/>.

¹⁰¹ Press Release, Ericsson, Wireless Industry Leaders Commit to Framework for LTE Technology IPR Licensing (Apr. 14, 2008), <http://www.ericsson.com/thecompany/press/releases/2008/04/1209031>.

¹⁰² See, e.g., Keith Mallinson, *A Compendium of Industry and Market Analysis Articles on Intellectual Property in Mobile Communications Standards: Response to FTC Request for Comments on the Practical and Legal Issues Arising from Incorporation of Patented Technologies in Collaborative Standards* (June 12, 2011); Philip Solis & Stuart Carlaw, *Mobile Device Royalties* (ABI Research 2011); Rudi Bekkers, René Bongard & Alessandro Nuvolari, *Essential Patents in Industry Standards: The Case of UMTS*, Proceedings of the 6th International Conference on Standardization & Innovation in Information Technology (2009).

consumers than what (necessarily imperfect) market forces have actually delivered.

The third difficult question concerning the aggregate royalty burden for SEPs is how to slice the pie. If no one SEP has incremental value unless an implementer uses it in conjunction with all other SEPs, how shall the many owners of SEPs divide among themselves the aggregate royalty burden for standard-essential patents? I return to this question in Part VII.

E. The Proper Scope of the Entire Market Value Rule in the Context of SEPs

Economists and courts have largely rejected the entire market value rule as a rigorous method for calculating reasonable-royalty damages in cases of infringement of implementation patents. A reasonable royalty must be based on the disaggregated value of the patent in suit. The Federal Circuit and the district courts have excluded damages testimony when an expert witness has used the entire market value but failed to prove that the patented technology at issue was the basis for customer demand for the product implementing the patent.¹⁰³ Consumer electronics products often contain hundreds of patented and non-patented components, and consumers may value those downstream products due to features not covered by the patent in suit. Consequently, the entire market value of the downstream product does not necessarily represent the value of the patent in suit. The Federal Circuit therefore held in *LaserDynamics* in 2012, that, “in any case involving multi-component products, patentees may not calculate damages based on sales of the entire product, as opposed to the *smallest salable patent-practicing unit*, without showing that the demand for the entire product is attributable to the patented feature.”¹⁰⁴

Some would argue that as a practical matter any approach that allocates some aggregate value to an individual patent in suit would suffer from “focal point bias”—the overvaluation of the contribution of the patent in suit relative to the collective contribution of all other patented and unpatented components, occurring particularly in a trial that focuses almost entirely on the patent in suit.¹⁰⁵ A judge exacerbates this cognitive bias among the jury when he allows only a few days for the trial and thus precludes any serious inquiry into

¹⁰³ See, e.g., *LaserDynamics, Inc. v. Quanta Computer, Inc.*, 694 F.3d 51, 68 (Fed. Cir. 2012); *Uniloc USA, Inc. v. Microsoft Corp.*, 632 F.3d 1292, 1320 (Fed. Cir. 2011) (citing *Garretson v. Clark*, 111 U.S. 120, 121 (1884)); *Lucent Techs., Inc. v. Gateway, Inc.*, 580 F.3d 1301, 1336 (Fed. Cir. 2009); *Rite-Hite Corp. v. Kelley Co.*, 56 F.3d 1538, 1549 (Fed. Cir. 1995); *IP Innovation, LLC v. Red Hat, Inc.*, 705 F. Supp. 2d 687, 690 (E.D. Tex 2010); *Cornell University v. Hewlett-Packard Co.*, 609 F. Supp. 2d 279, 286–87 (N.D.N.Y. 2009).

¹⁰⁴ *LaserDynamics*, 694 F.3d at 67–68 (emphasis added).

¹⁰⁵ See generally Amos Tversky & Daniel Kahneman, *Judgment Under Uncertainty: Heuristics and Biases*, 185 SCIENCE 1124 (1974).

the other value-creating inputs. To the extent that one has confidence that the phenomenon of focal point bias is factually present in patent litigation, this bias supports the use of the “smallest salable unit” as the rate base. That is, using the smallest salable unit would increase the ratio of the value of the patent in suit to the value of all other inputs and ideally would reduce the magnitude of the jury’s error in estimating damages owing to focal point bias.

Does the Federal Circuit’s reasoning disfavoring use of the entire market value rule apply with equal force to SEPs? At least one company involved in smartphone patent litigation, Nokia, argues that it should not. Nokia advocates reversal in the Federal Circuit of any rule that would require patent damages for SEPs to be based on the smallest salable component of the product embodying the patent.¹⁰⁶ Nokia correctly argues that “royalty rates for such patents are typically based on, and applied against, the price of the end product,” such as a smartphone.¹⁰⁷ The company therefore defends the use of the entire market value rule to measure damages for infringement of SEPs. However, courts have not always followed this suggestion. Judge Holderman ruled in *Innovatio* that the court must calculate the FRAND royalty “on the smallest salable patent-practicing unit.”¹⁰⁸

In the context of FRAND royalties for SEPs, which royalty base should apply—the entire market value of the downstream product or the smallest salable component of the downstream product that implements the SEP in suit? In a sense, the answer is both. The answer turns on whether or not the declared-essential patent is indeed standard-essential in fact. For an SEP, the smallest salable component must be the entire product embodying the standard. Suppose to the contrary that there exists a salable component that implements only part of the standard. By construction, there must therefore be parts of the standard that this component does *not* implement. If so, then the component itself is not fully standard-compliant, and the essentiality of the patent in suit to the standard is illusory and nonexistent. Characterizing a patent as being standard-essential only has meaning when the standard is actually implemented in the downstream product. For patents that are not SEPs in fact, FRAND has no meaning. This category includes patents that read on a part of the standard that implementers never use because it solves an engineering problem to offer a functionality for which no commercial demand materializes. As a result, for patents that are genuinely standard-essential, the smallest salable component in the FRAND context must be the product that implements the standard.

Using as the royalty base the market value of the downstream product implementing the standard satisfies both the entire market value rule and the

¹⁰⁶ Brief for Nokia Corp. and Nokia Inc. as *Amici Curiae* in Support of Reversal and in Support of Neither Party at 8, *Apple Inc. v. Motorola Inc.*, No. 11-cv-8540 (filed Fed. Cir. May 6, 2013) [hereinafter *Amici Curiae* Brief for Nokia in *Apple v. Motorola*].

¹⁰⁷ *Id.* at 8.

¹⁰⁸ RAND Opinion in *Innovatio*, *supra* note 4, at 23.

Federal Circuit’s “smallest salable component” requirement. In contrast, for implementation patents, the value of the smallest salable component is almost always smaller than the value of the downstream product because implementation patents have substitutes. The same is true of patents declared to be standard-essential but which subsequently prove not to be standard-essential in fact. For a genuinely standard-essential patent, the entire market value rule and the smallest salable component rule converge and produce the same answer.

IV. PROBLEMS WITH THE *EX ANTE* INCREMENTAL VALUE METHOD—IN GENERAL AND WITH RESPECT TO SEPs SPECIFICALLY

In April 2013, Judge James Robart determined the RAND rates that Microsoft must pay Motorola to use certain of Motorola’s SEPs.¹⁰⁹ He modified the *Georgia-Pacific* framework (which a court uses to set a reasonable royalty in the simplest of patent-infringement cases concerning non-SEPs). To set a RAND royalty, Judge Robart engrafted onto *Georgia-Pacific* the *ex ante* incremental value approach advocated by the proponents of the patent-holdup and royalty-stacking conjectures. Consequently, he equated the RAND royalty to the increment by which the value created by the patent in suit exceeded the value created the next-best substitute, *as hypothetically evaluated by the SSO when it decided to adopt into its standard, to the exclusion of alternative technologies not chosen, the technology covered by the patent in suit.*¹¹⁰

Judge Robart’s analysis is wrong. Its implicit economic assumptions consistently bias the estimate of the FRAND royalty in favor of the infringer. *Microsoft v. Motorola* exposes not only the legal and economic deficiencies of *Georgia-Pacific* in general, but also the problems inherent in converting that already deficient framework into an *ex ante* incremental value methodology for setting FRAND royalties. After identifying Judge Robart’s errors of commission and omission, I identify the necessary corrections to his approach so that it would be less biased should other courts choose to use it. I also explain how Judge Holderman’s decision implements some of the suggested corrections.

A. Why General Deficiencies of *Georgia-Pacific* Make Its Framework Inadquate to Identify a FRAND Royalty

When it invokes the *Georgia-Pacific* framework, a district court dumps into the jury’s lap the chore of evaluating fifteen factors that are neither mutually exclusive nor exhaustive to determine a reasonable royalty, all with no guidance as

¹⁰⁹ *Microsoft Corp. v. Motorola Inc.*, No. C10-1823JLR, 2013 WL 2111217 (W.D. Wash. Apr. 25, 2013) (Robart, J.). For purposes of discussion in this article, I follow the usual convention of making no legal or economic distinction between FRAND and RAND royalties. By making this assumption for present purposes, I do not exclude the possibility that someone may eventually make a compelling argument for why “fair” is not a throwaway word.

¹¹⁰ *Id.* at *16–20 (citing *Georgia-Pacific*, 318 F. Supp. at 1119–20).

to the relative importance or weight to assign to any particular factor.¹¹¹ Multi-factor tests without weights are difficult to implement rigorously and may permit arbitrary determinations to support any claim. Faced with a large number of factors, a judge or jury could simply choose to weight a given factor more heavily to support virtually any royalty. The application of a modified *Georgia-Pacific* framework to the determination of a FRAND royalty does more than simply replace a poorly structured multi-factor test with another. This particular application of *Georgia-Pacific* takes a poor solution to one type of dispute and extends it to an entirely new class of disputes. Although courts have embraced the *Georgia-Pacific* test, the Federal Circuit, as noted earlier, did rule in *Whitserve* in 2012 that an expert witness (and presumably therefore also the finder of fact) need not use the *Georgia-Pacific* factors.¹¹²

In addition to manifesting the generic problems of multi-factor legal tests that lack relative weights, the *Georgia-Pacific* factors are poorly suited to representing a hypothetical negotiation for FRAND royalties. First, SEPs do not fit within the *Georgia-Pacific* framework unless they are not genuinely essential to the standard (either because the patent holder exaggerated when declaring the SEPs to be essential, or because some subsequent technology has become a technologically and commercially feasible substitute for the (formerly) standard-essential patent). In these two instances, the patent's incremental value will likely be small.

Second, one can view the FRAND commitment as a form of private contracting around a default rule supplied by either statute or case law. In effect, patent holders participating in the SSO opt out of their right to receive a reasonable royalty calculated according to the case law applying the *Georgia-Pacific* method. Other interpretations of the FRAND commitment have portrayed it as the patent holder's (qualified) waiver of its statutory right to an injunction under the Patent Act (and, by extension, the patent holder's (qualified) waiver of its right to an exclusion order from the International Trade Commission under section 337 of the Tariff Act). That alternative interpretation is not persuasive because it would treat many words in the FRAND commitment in an SSO's contractual documentation as inconsequential verbiage. If the FRAND commitment truly consisted only of the SEP holder's forbearance from enjoining an infringer, the SSO could have expressed the nub of that idea much more simply as a blanket prohibition on injunctions, without addressing how the FRAND commitment contractually modifies and circumscribes a patent holder's statutory right to receive a reasonable royalty from the

¹¹¹ See, e.g., *Apple, Inc. v. Motorola, Inc.*, 869 F. Supp. 2d 901, 910–11 (N.D. Ill. 2012) (Posner, J.); Daralyn J. Durie & Mark A. Lemley, *A Structured Approach to Calculating Reasonable Royalties*, 14 LEWIS & CLARK L. REV. 627, 628, 632 (2010). I assume that the patent holder typically will demand a jury trial. However, my criticisms of *Georgia-Pacific* do not materially change if instead a judge is applying the framework in a bench trial or in a ruling on a post-trial motion to set aside the jury's verdict or reduce the size of its damage award.

¹¹² *Whitserve, LLC v. Computer Packages, Inc.*, 694 F.3d 10, 31 (Fed. Cir. 2012).

infringer. Instead, what SSO actually have done is to specify as well the attributes of a permissible royalty within the standard-setting context (namely, the FRAND commitment). One can view those required elements of an acceptable royalty as an election by members of the SSO (and, derivatively at a higher level of legal abstraction, by the third-party beneficiaries who receive only as many rights as the SSO's members collectively choose to assign to them) to opt out of public law's default framework for setting patent royalties. Within the United States, therefore, far from viewing the adoption of a FRAND commitment as inviting or instructing the finder of fact to use the public law framework of *Georgia-Pacific* and its progeny to calculate the royalty for an SEP, a court could, with greater intellectual defensibility, interpret the FRAND commitment as the agreement of SEP holders and implementers to opt out of the *Georgia-Pacific* framework because of its unsuitability for identifying whether a given royalty for a given SEP in a given dispute is FRAND. A court embracing that interpretation of FRAND's relationship to *Georgia-Pacific* would then resort to first principles of law, economics, and equity to define the proper framework for the finder of fact to decide whether a given rate for an SEP is fair, reasonable, and nondiscriminatory.

Third, it is useful to consider analogies to tort and contract, and to recognize the legal and economic significance of the differences between the two analogies. The typical royalty dispute in which a court applies the *Georgia-Pacific* factors resembles a tort (such as trespass or conversion).¹¹³ In a hypothetically voluntary negotiation between the tortfeasor and his victim, the price is struck a split second before the infliction of harm. The *Georgia-Pacific* approach mirrors tort theory in this respect, because the moment of first infringement is when noninfringing substitutes are evaluated for purposes of calculating the royalty in a hypothetically voluntary licensing negotiation. In the stereotypical tort action, the parties do not necessarily know one another. They do not have expectations of repeat transactions. So there is no reason for the patent holder, who is analogous to the tort victim, to forbear from seeking the highest possible compensation for what has been taken from him. The equilibrium that emerges from the hypothetical negotiation is one of mutual opportunism. In the language of economics, the patent holder's objective function for the hypothetical license negotiation is one of unconstrained optimization. The negotiation (and the potential litigation) over a reasonable royalty is not the beginning of a repeated game in this scenario. More likely, the parties hope never to see one another again. The *Georgia-Pacific* approach rests on these same implicit assumptions about the nature of the hypothetical royalty negotiation between the patent holder and the infringer.

¹¹³ See, e.g., *Vincent v. Lake Erie Transp. Co.*, 109 Minn. 456, 124 N.W. 221 (1910) (awarding damages for trespass notwithstanding the defense of private necessity). See also RICHARD A. POSNER, *ECONOMIC ANALYSIS OF LAW* 204–09 (Aspen 7th ed. 2007) (discussing damages for intentional torts).

In contrast, a legal dispute requiring a court to confirm or establish a FRAND royalty rate may expressly arise from a breach-of-contract suit concerning the FRAND obligation. Unlike the parties to the stereotypical tort dispute, the parties to a FRAND dispute are probably members of an SSO who have long known one another, are already contracting with one another, and expect to do so again, repeatedly, into the foreseeable future. Theirs is a repeated-play game *across an infinite sequence of innovations*. In their repeat contracting, these SSO members will form their mutual expectations (and hence their framework for measuring harm in the event of a breach of the licensing promises made by a member of the SSO to the SSO as a whole) far before *Georgia-Pacific's* moment of first infringement. The current fashion circa 2013 in legal and economic scholarship and in early court decisions interpreting FRAND is to peg this critical meeting of the minds to the moment that the SSO adopts the standard in question. Judge Robart did so in *Microsoft v. Motorola*, and so did Judge Holderman in *Innovatio*. This view seems manifestly incorrect. As I will explain momentarily, the more persuasive moment for recognizing this critical meeting of the minds is earlier, when the inventor belonging to the SSO chooses to monetize his inventions through participation in the SSO rather than by some alternative business strategy. This dichotomy between hypothetical negotiations in tort versus hypothetical negotiations in repeat-play contracting sheds light on the doubtful suitability of a court's use of the *Georgia-Pacific* approach for determining or confirming that a royalty offered for a given SEP is FRAND.

In a common law system, it is the essence of judging to extend an existing legal principle or framework to a novel dispute. To his credit, Judge Robart recognized the need to adjust the *Georgia-Pacific* factors before one can begin to apply them to a RAND royalty determination. However, the decision to retrofit *Georgia-Pacific* for FRAND disputes was an error on Judge Robart's part. Given the opportunity to create the first legal authority on RAND, Judge Robart chose to apply an already deficient framework to a new type of dispute which that framework was never intended to address. It is equally if not more plausible to interpret the FRAND commitment as rejecting the *Georgia-Pacific* approach as the starting point for setting FRAND royalties. Judge Robart, however, interpreted the contract between an SEP holder and other members of the SSO as doing just the opposite.

B. Arguments for the *Ex Ante* Incremental Value Method

A patent's incremental value is the difference between the patent's value and the value of the next-best noninfringing substitute patent. A patent's *ex ante* incremental value is the difference between the patent's value and the value of the next-best noninfringing substitute patent before the first patent has been adopted into the standard. As noted earlier, SEPs have incremental value only *before* they are adopted into the standard, when there is still competition among substitute technologies for adoption into the standard.

Critics of my argument that the incremental value of a patent is an insufficient means to calculate the royalty for an SEP (because each SEP holds zero incremental value without all other SEPs) may argue in rebuttal that I elide the critical distinction between *ex ante* and *ex post* valuation. I do not agree, but it is useful to walk through the rebuttal argument to see where the divergence of views occurs.¹¹⁴

Critics will argue that the invalidity of setting a FRAND royalty on the basis of the incremental value of the patent in suit for use in the standard only applies *after* the SSO has set the standard and all the other SEPs have by definition become essential. Before that point, the SSO usually has options. The SSO might be able to include patent *A* (which I use as a shorthand for “the technology claimed by patent *A*” and which I assume the SSO will actually select) or patent *B* in what would otherwise be the same standard. Or the SSO might be able to use patent *C* in a very different standard intended to serve the same purpose.

In choosing between *A* and *B*, the SSO will assess the incremental value of *A* over *B*. In hypothetical negotiations occurring before the standard’s adoption, the potential implementers would not necessarily be able to agree to pay only that increment of value to be licensed for *A*. After all, a car buyer cannot buy a Lincoln for only its incremental value compared with the next-best alternative, which might be a Ford, because the Ford is not free. So the proper measure of the maximum *ex ante* value of a patent that could become standard-essential is not the patent’s *ex ante* incremental value *per se*, but rather the sum of the price that the buyer (in this stylized case, the SSO is acting in some collective sense for all the future implementers of the standard) would need to pay for the next-best alternative (*B*) and the incremental value of *A* over *B*.

Here is where the implicit economic assumptions of the proponents and opponents of the *ex ante* incremental value method become critical to distinguish. Proponents of the *ex ante* incremental value approach implicitly assume that competition with *A* would drive the royalty for *B* down to its owner’s reservation price, such that implementers would need to pay for only the *B* patent holder’s minimum willingness to accept. Proponents believe that the holder of patent *B* will usually have a minimum willingness to accept that approaches zero (in part because, unlike the Lincoln, patent *B* is intellectual property and thus has an incremental cost of essentially zero). In that case, the SSO’s maximum willingness to pay will be the incremental value of *A* relative to *B*, since the acquisition cost of *B* will drop out. If so, then the minimum willingness to accept of the holder of patent *A* will approach zero, and the hypothetical *ex ante* bargain at the time of standard adoption might result in a price below the implementers’ maximum willingness to pay.

¹¹⁴ I base the following discussion on my actual correspondence with the general counsel of a major technology company who is active in the debate over the meaning of FRAND. He prefers to remain anonymous but has allowed me to paraphrase his argument here.

Proponents of the *ex ante* incremental value approach acknowledge that the holder of patent *A* will have a minimum willingness to accept that exceeds zero if the patent holder would incur an opportunity cost by allowing patent *A* to be used in the standard rather than outside the standard. *Rambus v. Infineon* might have been such a case because of the patent holder's belief that it could create a *de facto* RDRAM standard.¹¹⁵ One can imagine a similar situation if multiple SSOs are establishing competing standards. If so, then the holder of patent *A* might, in determining its minimum willingness to accept for submitting to a FRAND commitment with respect to standard *X*, take into account the diminished value to it of competing standard *Y* if its superior technology is used in standard *X*. Proponents of the *ex ante* incremental value rule implicitly assume that this scenario is rare or nonexistent.

The choice between patented technology *A* and patented technology *C* is more difficult. In the choice of *A* versus *B*, everything else was assumed to remain constant. In the choice of *A* versus *C*, more facts need to change. Proponents of the *ex ante* incremental value approach would concede that the SSO's evaluation of *A* versus *C* would require a more complex calculation of the incremental contribution of the patented technology to the value of the standard. However, they would regard the exercise as conceptually identical to the calculation in the choice of *A* versus *B*.

In other words, proponents of the *ex ante* incremental value rule believe that no patent holder will share in the combinatorial value that is created by the standard except to the extent that the value is captured in the incremental value of the patent (for example, if patent *A* increases the value of the standard by *M*, *M* is the patent's incremental value). Instead, the patent holder is more like a paper clip seller that can engage in price discrimination but winds up selling at its minimum willingness to accept because it faces meaningful competition in each buyer's auction.

In this discussion, the SSO is treated as the hypothetical buyer or licensee (or, more precisely, the agent that determines the terms on which the inputs will be combined). That treatment is consistent with my premise that the SSO can be analogized to a joint venture. The critics' view would, however, suggest that the analogy does not result in the outcome I propose, for two reasons. First, the ordinary joint venture engages in commercial conduct—it buys or sells something. It thus makes sense to think of maximizing the joint surplus through the terms on which the joint venture buys or sells. In contrast, a standard is usable by anyone, and the surplus that the standard creates is realized by users in their implementations of the standard—for example, by selling a standard-compliant product. Second, one could argue that an SSO is not like an existing partnership that tries to serve the partners by creating and distributing surplus to them. Instead, one could frame the SSO as a would-be partnership whose role is to facilitate surplus creation by standard implementers and

¹¹⁵ *Rambus Inc. v. Infineon Techs. AG*, 318 F.3d 1081 (Fed. Cir. 2003).

that uses competition to select partners—that is, contributors to any particular standard—with an eye toward minimizing the quality-adjusted cost of technology inputs for the benefit of standard implementers.

One can consider the second point as another way of framing the *ex ante* versus *ex post* point; and it seems essential to the forgiving antitrust treatment of SSOs, compared with the treatment likely afforded a more ordinary joint venture of thousands of industry firms. The second point might also reflect a different but related foundational difference between my way of viewing the framework for a FRAND royalty and the critics' view. I view the SSO as an ordinary, market-based joint venture whose purpose is to further the interests of the joint venture partners as sellers of technology inputs into the joint venture's product (SEP holders) and as implementers of the joint venture's output (licensees). An alternative view would have the SSO serving a quasi-governmental, transactions-cost-reducing function to enable implementers (including but not limited to SSO members and vertically integrated SEP holders) to maximize profits and surplus in the downstream markets in which they implement the standard.

Membership in SSOs is voluntary, so if participants in SSOs (not merely implementers of standards) are not permitted to be market-surplus maximizers, market players will underinvest in standard setting. Critics would provide two responses to this principle. First, as I say of SEPs, there is a difference between a patent being declared essential and its being essential in fact. As a practical matter, if a firm wants to influence industry standards, it needs to participate in the SSO. The would-be SEP holder knows that it is trading the ability to set a higher per-unit price on its technology in return for a higher volume of sales (future licensees created by the standard). Second, my framework could be construed as not being a true member-maximizing model but rather an SEP holder-maximizing model. However, if one expects SSO investment to be driven by the rewards to SSO members, and if those rewards are paid to SEP holders, then underinvestment in SSOs may result by those unlikely to own many SEPs. Consequently, SSOs would become more like Moving Picture Experts Group (MPEG) patent pools.

Critics would argue that my analogy of the SSO to a joint venture implies that SSOs must reward SEP holders entirely by the royalty. Critics would respond that, until recently, most SSO members and patent holders expected to be compensated mostly by product sales in the downstream market, which is presumably what drove them to join the SSO and participate in setting the standard in the first place. One can dispute the plausibility of this argument on the grounds that it means that the SSO is not a robust mechanism for standard setting as the business models of its members move from homogeneity to heterogeneity. But, if that characterization is correct, then one implication might be that the occasional patent holder that does not make products can decide (1) to avoid the SSO and hope the resulting standard incorporates its patented technology (which would ordinarily be a risky strategy) or (2) to bargain with

the SSO by saying that it will agree to license its technology on FRAND terms. In other words, FRAND can be reserved for those who have a more complicated reward structure, and others are free to bargain *ex ante* (if they want to increase the likelihood of volume) or *ex post* (if they want to preserve pricing discretion).

C. The Unsupported *Ceteris Paribus* Assumption Underlying the *Ex Ante* Incremental Value Rule

The *ex ante* incremental value approach contains a strong implicit assumption which, when recognized explicitly, is manifestly absurd. Because SEPs are *complements*—not substitutes, like implementation patents—one cannot examine the next-best noninfringing alternative to an SEP unless one backdates the hypothetical negotiation between the patent holder and the implementer to the moment of standard adoption. The *ex ante* incremental value method does so and then implicitly makes the economist’s *ceteris paribus* assumption—all other factors remain the same. But do all other factors really remain the same in the real world? Certainly not. The need to undertake a hypothetical bargaining analysis is not license to include dispositive assumptions, either explicit or implicit, that are manifestly unworldly.

In the case of the *ex ante* incremental value rule, the rule’s absurdity is apparent if one goes even farther into the past to ask the more probative hypothetical question. Rather than begin at the time of standard adoption by members of the SSO, begin at the moment that the inventive firms are deciding how to monetize their inventions. These firms are, or will be, the holders of patents likely to be valuable—perhaps even essential—to the next standard to be adopted. Each one of these inventive firms is deciding whether to participate in the SSO, which would require its declaration of the patents it believes to be standard-essential and its acceptance of the commitment to license those patents to anyone at a price no higher than what is fair, reasonable, and nondiscriminatory.

Suppose that this inventive firm were informed at the moment that it is deciding whether to participate in the SSO that, if the SSO selects its technology for the standard, the firm will receive FRAND royalties calculated according to the *ex ante* incremental value rule. The reward for the inventive firm’s participation in the SSO will be limited to the incremental value that its SEP confers on implementers *relative to the best losing technology* considered by the SSO at the moment of standard adoption. Suppose further that the SSO tells the inventive firm, “We know you want to monetize your patents related to the next generation of mobile communications devices that hundreds of millions of consumers will use, but don’t worry about the low royalty you will receive on your portfolio of standard-essential patents—you’ll make it up on volume!”

Reasonable minds can differ over whether a rational, profit-maximizing firm engaged in inventive activity would find this offer too attractive to refuse.

The important point is that the hypothetical negotiation at the time of standard adoption assumes the enthusiastic participation of at least *two* competing inventors. If the two inventors were equally likely to have their technology chosen (because members of the SSO consider the technologies to be close substitutes *ex ante*), then those two inventors would each have a 50-percent chance of winning the tournament and receiving the payoff of FRAND royalties. What assurance is there that an amount equal to 0.5 multiplied by the incremental profits of all implementers using this particular contribution to the standard would exceed the costs to the winning inventor of developing its patented technology and participating in the standard-setting process?

Put differently, the *ex ante* incremental value method makes a categorical assumption—essentially a conclusion of law—that rests on a highly debatable factual proposition that will surely vary from patent to patent and case to case. There is no basis in fact or economic theory to assume that in all cases the *ex ante* incremental value interpretation of FRAND would suffice to give an inventor a sufficiently large payoff in expected value terms to cause that inventor to decide to monetize his patents through participation in the open standard of an SSO rather than through some other business strategy. In effect, the *ex ante* incremental value method assumes that the inventor has no outside option for monetizing his patent. In other words, the SSO is implicitly assumed to be a monopsony over technology over the relevant time horizon. One needs only to notice that Apple has prospered with a proprietary standard for the iPhone to realize that the real world does not match the hypothetical world that is a necessary (but not sufficient) condition for the *ex ante* incremental value approach to be a plausible interpretation of what constitutes a FRAND royalty.

D. Economic Rent, Quasi Rent, and the Incentive to Invest in the Uncertain Creation of Patentable Inventions

A proper understanding of FRAND royalties requires understanding the relationship that economic rent and quasi rent have to the incentive to invest in the creation of patentable inventions. Suppose that, to undertake a line of research and development intended to produce a patentable invention, a firm must invest k dollars.¹¹⁶ This investment is not a direct investment in a particular innovation *ex ante*. Rather, firms invest in research and development (R&D) in search of new innovations. Among a set of N projects, K total R&D dollars may be spent. However, the cost of any given project is not merely the quotient K/N . Rather, many of the funded projects will be unsuccessful. That is not to say, however, that failed investments have no value in terms of advancing knowledge. The sunk cost of successful projects must include expenditures on

¹¹⁶ This discussion draws from SIDAk & SPULBER, *supra* note 79, at 423–25.

unsuccessful projects. *Ex ante*, no one can know the likelihood of any given project's success, or even the overall success rate among proposed projects. As an entrepreneurial activity, R&D is uncertain. The existence of this uncertainty is why the rewards for successful innovations include the right to a temporary monopoly, or patent. Encouraging economic agents to pursue uncertain successes requires large rewards. The cost of a successful project, k , is then $(K/N)(1/u)$, where u is the entrepreneur's estimation of the success rate among funded projects, where $0 < u < 1$.

Suppose that the investment k is irreversible, so that k represents a sunk cost. Assume that the firm intends to monetize its invention by licensing its patent to third parties rather than manufacturing its own downstream product employing the patent. The firm has operating costs c , which are low because they consist solely of the cost of licensing its patent to implementers. The firm expects to earn revenues R .

The firm's economic rent is defined as revenues net of operating costs and investment costs, $R - c - k$. Economic rent provides the incentive for entry. In contrast, the firm's quasi rent is defined as net revenue, $R - c$. The quasi rent provides a firm the incentive to stay in the industry after it has incurred the sunk costs of entry. Having sunk k , the firm decides whether or not to license its patent on the basis of its comparison of R and c only. In a static sense, it would manifest the fallacy of sunk costs for the firm to base its decision to license its patent on the magnitude of k . Thus, after k is sunk, only quasi rents—not economic rents—affect the firm's decision whether or not to license the patent.

That condition does not mean that pricing should ignore the sunk costs k . It is an economic fallacy to ignore the firm's expectations when it is deciding whether to invest k . It would be fallacious for the firm to base its investment decision on quasi rents alone, ignoring the magnitude of k . *Before* the firm has sunk k , it is economic rents that count, not quasi rents.

The FRAND commitment is an enforceable contract between a patent holder and an implementer (including any third-party beneficiary, regardless of its participation in the SSO). That the patent holder willingly chooses to enter into this contract implies that its expected economic rents from contracting are positive: $R - c - k > 0$, which is equivalent to the condition $R - c > k$. In other words, the firm must expect that its net revenue will exceed its sunk investment. If instead the firm expects that its FRAND royalty payment will only recoup its quasi rents, then any incentive for the firm to undertake transaction-specific investment evaporates. Critics of this argument assume away the problem. They simply assert that no transaction-specific investments accompany the FRAND commitment (except perhaps for the costs associated with participation in the SSO), as the SEP holder's research expenses are sunk by the time of standard setting. This rejoinder is unpersuasive because it oversimplifies the standard-setting process. Standards are dynamic. They evolve over years. A firm constantly invests in research and will rationally anticipate that

some of its innovations may become standard-essential over time. The firm's investment decision will directly reflect its expectations about the value of these innovations. As the expected revenues from a FRAND royalty fall, investment will fall for any SSO participant that expects to be a net licensor of SEPs *ceteris paribus*.

The firm's reaction to falling FRAND rates can be offset by an increase in demand for the firm's technology. As SSO participants cooperate to lower the costs of production of standard-compliant end-user products, the quantity demanded of those end-user products will increase. This end-user demand increases the number of products implementing the firm's technology, and thereby the firm's total royalty revenue. For a running royalty, the revenue that the firm collects from patent royalties is the royalty rate, r , times the price of the good, p , times the number of implementing units of the downstream product, q . The innovator can maximize its revenue by remaining outside the SSO, and charging a monopoly rate for its technology, which implies limiting the number of products that can profitably implement that technology. Alternatively, the innovator can, if he is able to cooperate with other SEP holders, charge a sufficiently low royalty rate such that the number of implementing products increases. Total revenue can increase by lowering price and increasing quantity if the increase in quantity demanded for end-user products is sufficiently large and demand is sufficiently price-elastic. An innovator will be motivated to participate in any arrangement that increases its overall profits. The SSO relies on the FRAND commitment to establish an institutional constraint that successfully achieves this alternative business model, increases revenues for all firms (innovators and implementers alike), and lowers prices faced by consumers of the end-user product. The FRAND commitment simply ensures that all firms will license their technology at rates low enough to maintain the greater net gains to all.

In the standard-setting context, a patent holder's expected revenue happens to be based on sunk research costs because, under a FRAND commitment, the patent holder necessarily uses its research and development costs to calculate its revenue requirements before contract formation. That calculation does not mean that R&D costs are part of the firm's economic cost of licensing its SEP. Nevertheless, because the firm's expected revenues reflect those sunk costs, the expected revenues should be used to compensate the firm. The fact that the firm's patented technology has a lower (or higher) incremental value in comparison with other competing patents is not relevant to the compensation decision. To ensure that contract formation occurs between the patent holder and the SSO, the patent holder's expectation of cost recovery must include its past research cost. If FRAND royalties cover only quasi rents and not economic rents, then the level of investment by net licensors will fall. If the patent holder who is a net licensor expects revenue from FRAND royalties to fall far enough, contract formation will not occur.

E. The Economic Errors in Judge Robart's Use of the *Ex Ante* Incremental Value Method for Determining FRAND Royalties in *Microsoft v. Motorola*

Judge Robart's adjustments and interpretations of the *Georgia-Pacific* factors set the patent's *ex ante* incremental value as a basis for the FRAND royalty. In modifying the *Georgia-Pacific* factors, Judge Robart said that

a reasonable royalty would not take into account the value to the licensee created by the existence of the standard itself, but would instead consider the contribution of the patent to the technical capabilities of the standard and also the contribution of those relevant technological capabilities to the implementer and the implementer's products.¹¹⁷

Judge Robart reasoned that "there is substantial value in the agreed standard itself apart from any contribution of the patented technology to the standard, and the RAND commitment exists so that SEP patent holders cannot demand more than they contribute."¹¹⁸ He considered it improper for the patent holder to receive any portion of the standard's value: "Rewarding the SEP owner with any of the value of the standard itself would constitute hold-up value and be contrary to the purpose behind the RAND commitment."¹¹⁹ This assertion is incorrect, as I shall explain.

In addition, Judge Robart found that *Georgia-Pacific* factor 9, which considers the advantages of a patent over existing alternatives, provides the pathway to incorporate Microsoft's *ex ante* incremental value approach into the determination of a FRAND royalty.¹²⁰ Thus, Judge Robart ruled that "*an incremental value approach . . . is required* in the court's hypothetical negotiation paradigm."¹²¹ By moving the time of the hypothetical negotiation from the moment of first infringement to the moment of standard adoption, Judge Robart embraced the *ex ante* incremental value framework for measuring FRAND royalties.

The nascent case law on FRAND royalties offers little guidance on whether or how to use the *ex ante* incremental value approach. In *Apple v. Motorola*, Judge Posner briefly addressed what a FRAND commitment implies. Calculation of a FRAND royalty "starts with what the cost to the licensee would have been of obtaining, just before the patented invention was declared essential to compliance with the industry standard, a license for the function performed by the patent."¹²² Judge Posner understood his interpretation of a FRAND royalty to ensure that the patent holder would not be rewarded for the holdup value of the SEP.¹²³ It was not necessary for Judge Posner to

¹¹⁷ *Microsoft Corp. v. Motorola Inc.*, No. C10-1823JLR, 2013 WL 2111217, at *18 (W.D. Wash. Apr. 25, 2013) (Robart, J.).

¹¹⁸ *Id.*

¹¹⁹ *Id.* at *19.

¹²⁰ *Id.*

¹²¹ *Id.* at *80 (emphasis added).

¹²² *Apple, Inc. v. Motorola, Inc.*, 869 F. Supp. 2d 901, 913 (N.D. Ill. 2012) (Posner, J.).

¹²³ *Id.*

determine a FRAND rate in his opinion, and his comments on FRAND were therefore understandably brief. Judge Posner did use the patent's *ex ante* value as the starting point, but he did not say where the analysis should go next. He also did not expressly endorse the incremental value approach. The word "incremental" never appears in his opinion.

It is therefore important not to leap to the unsubstantiated conclusion that Judge Posner's use of an *ex ante* price as the starting point of the FRAND royalty determination implies that he would use *ex ante* incremental value for determining the FRAND royalty rate for an SEP in the same manner that Judge Robart did. Judge Posner is silent on the use of incremental value as an indicator of a FRAND royalty rate, and Judge Posner's understanding of *ex ante* value need not be equivalent to Judge Robart's understanding of *ex ante* incremental value. In particular, one can and should read special significance into Judge Posner's phrase "what the cost to the licensee would have been of obtaining . . . a license for the function performed by the patent,"¹²⁴ for this choice of wording is consistent with a recognition by Judge Posner of the need to avoid the common error of failing to include in a hypothetically negotiated patent royalty the cost to the licensee of lawfully acquiring the right to use the next-best noninfringing substitute.

Judge Robart's depiction of a patent's *ex ante* incremental value does not contain this same caveat. To the contrary, it manifests at least five errors of economic reasoning that materially understate the magnitude of a FRAND royalty.

1. *The Invention's Marginal Contribution to the Standard versus the Invention's Incremental Value over the Next-Best Substitute*

The first error of economic reasoning by Judge Robart is one that permeates his opinion: the incremental value of a specific patent does not reflect its marginal contribution to the standard. For example, railroad transportation was standardized during the nineteenth century. Suppose that various steam engine designs existed, and the incremental value of the best design over the second-best might have been slight. (Diesel and electric locomotives were not feasible alternatives until later.) However, the steam engine likely had a high marginal contribution to the standard, relative to other technologies in the standard, such as the precise gauge of the track (1,434 millimeters, or 4 feet, 8-1/2 inches), which initially was subject to considerable variation.¹²⁵

¹²⁴ *Id.* (emphasis added).

¹²⁵ See, e.g., DOUGLAS J. PUFFERT, TRACKS ACROSS CONTINENTS, PATHS THROUGH HISTORY: THE ECONOMIC DYNAMICS OF STANDARDIZATION IN RAILWAY GAUGE (Univ. of Chicago Press 2009); FRANCIS WHISHAW, THE RAILWAYS OF GREAT BRITAIN AND IRELAND: PRACTICALLY DESCRIBED AND ILLUSTRATED (John Weale 1842) (repub. David & Charles 1969); Warton W. Evans, *The Narrow Gauge Question*, THE ARGUS (MELBOURNE, VICTORIA), Oct. 2, 1872, at 15, available at <http://trove.nla.gov.au/ndp/del/article/5839798>.

The critical distinction is that *ex ante* incremental value compares the patent to other *substitute* patents that existed before the technology's adoption into the standard (various steam engine designs), whereas the marginal contribution to the standard compares a given patent's contribution to the standard with the contributions made by other *complementary* patents adopted in the standard (the chosen steam engine design versus the chosen track gauge).

2. *The Potential for the Legal Definition of Essentiality to Create an Economic Tautology in the Hypothetical Negotiation*

Second, Judge Robart's assessment of essentiality contradicts the IEEE definition of essentiality. This error is legal as well as economic. According to the IEEE, a patent claim is essential if "there was no commercially and technically feasible non-infringing alternative" for the patent at issue "at the time of the [proposed] IEEE Standard's approval."¹²⁶ Judge Holderman recognized the significance of the IEEE's definition of essentiality in *Innovatio*, holding that, to prove that a patent is essential to an IEEE standard, one must establish that "'no commercially or technically feasible non-infringing alternative' by which to implement the standard" was available "at the time of the standard's approval."¹²⁷ "If [a] later technological development creates another, non-infringing means to comply with the standard," he said, "a patent claim is *still* standard-essential"¹²⁸ because essentiality is defined at the time of standard adoption.

Thus, by definition, one cannot apply the *ex ante* incremental value rule to determine the value of or FRAND royalties for patents essential to IEEE standards because there are, at the relevant moment, no non-infringing substitutes for the patents over which to calculate incremental value. Judge Robart, however, assumed that there *are* substitutes at the time of standard adoption, indeed so many compelling substitutes that the chosen technology makes only a small incremental contribution to the value of the standard over the contribution that the runnerup technology would have made if it had been chosen instead. But, as defined by the IEEE, an SEP *would* in fact have significant incremental value under the *ex ante* incremental value test because a patent must have "no commercially and technically feasible non-infringing alternative"¹²⁹ at the time of standard approval to be deemed "essential" in the first place. Based on this definition of essentiality supplied by the SSO itself, it is inappropriate—as a matter of economic logic or as a matter of contractual interpretation—to apply Judge Robart's version of the *ex ante* incremental value approach to *any* IEEE standard-essential patent.

¹²⁶ IEEE-SA Standards Board Bylaws, *supra* note 55, § 6.1.

¹²⁷ RAND Opinion in *Innovatio*, *supra* note 4, at 16 (quoting IEEE-SA Standards Board Bylaws, *supra* note 55, § 6).

¹²⁸ *Id.* (emphasis added).

¹²⁹ *Id.* (emphasis added).

3. *The False Ceteris Paribus Assumption and the Biased Characterization of the Investor's Outside Options at the Chosen Moment of the Hypothetical Negotiation*

Judge Robart's third economic error was making the false *ceteris paribus* assumption described earlier and thus ignoring the need to ensure the continued participation of inventors in the current standard and in future standards. He said that "[a] RAND royalty should be set at a level consistent with the SSOs' goal of promoting widespread adoption of their standards."¹³⁰ Yet he also asserted that the SEP holder should not be compensated for its invention being adopted into a standard. That assertion is inconsistent with the former premise. Firms invest not only in developing patents, but also in competing to be adopted into a standard.¹³¹ This form of rivalry exemplifies dynamic competition, in which firms compete not *within* the market but *for* the market.¹³² As the D.C. Circuit observed in its *Microsoft* antitrust decision, "[r]apid technological change leads to markets in which 'firms compete through innovation for temporary market dominance, from which they may be displaced by the next wave of product advancements.'"¹³³ This kind of "Schumpeterian competition . . . proceeds 'sequentially over time rather than simultaneously across a market.'"¹³⁴ If the winner of that tournament—whose patented technology the SSO adopts into the standard—is not compensated for that additional investment, how can one expect patent holders to invest in participation in standard setting? Investment in innovation would flow instead into proprietary standards—of precisely the sort which, if they proved to be commercially successful, fuel titanic disputes over monopolization or abuse of dominance.

The "winner-take-all" nature of standard setting increases the risk to inventors and their investors. Using the *ex ante* incremental value method and other rent-shifting proposals that view low prices as the sole objective of standard setting fails to compensate inventors and their investors for their risk bearing. A royalty that excludes all value associated with the patent's essentiality for the standard is inconsistent with what Judge Robart called "the SSOs' goal of promoting widespread adoption of their standards," because it will deter investments in contributions to the standard.

¹³⁰ *Microsoft Corp. v. Motorola Inc.*, No. C10-1823JLR, 2013 WL 2111217, at *12 (W.D. Wash. Apr. 25, 2013) (Robart, J.).

¹³¹ See, e.g., Troy J. Scott, *Standards and the Incentives for Innovation*, presented at the Research Roundtable on Innovation and Technology Standards (2013) (explaining that the net effects of standards for intellectual property protection are positive, increasing innovative investments and increasing their private and social value).

¹³² See Harold Demsetz, *Why Regulate Utilities?*, 11 J.L. & ECON. 55, 57 & n.7 (1968); see also J. Gregory Sidak & David J. Teece, *Dynamic Competition in Antitrust Law*, 5 J. COMPETITION L. & ECON. 581 (2009).

¹³³ *United States v. Microsoft Corp.*, 253 F.3d 34, 49 (D.C. Cir. 2001) (per curiam) (quoting Howard A. Shelanski & J. Gregory Sidak, *Antitrust Divestitures in Network Industries*, 68 U. CHI. L. REV. 1, 11–12 (2001)).

¹³⁴ *Id.* at 50 (quoting Shelanski & Sidak, *supra* note 133, at 11–12).

The easiest way to understand the significance of the false *ceteris paribus* assumption in Judge Robart's approach is to recognize that his approach is "not *ex ante* enough." The chosen moment of the hypothetical negotiation between the willing licensor and the willing licensee should be pushed back in time not merely from *Georgia-Pacific's* moment of first infringement to Judge Robart's moment of standard adoption, but rather all the way back to the moment when the inventor decides whether or not to monetize his invention within the open standard of an SSO rather than outside the SSO through a proprietary standard or some other business strategy predicated on exclusion rather than open access. At that earlier moment, both the inventor (the future patent holder) and the implementer still have outside options to the hypothetical negotiation. Both the seller and the buyer of innovative inputs intended for the downstream product still have substitution opportunities. *Neither* party at that anterior moment is subject to lock in or holdup.

That moment, far more than Judge Robart's later moment for conducting supposedly *ex ante* analysis, more closely achieves the Rawlsian ideal of the original position, in which the inventor and implementer are both still veiled in some considerable degree of ignorance concerning the commercial potential of the technology before them. In contrast, Judge Robart's approach is selective, asymmetric, and therefore inherently biased: it sets a FRAND rate so as to restore the implementer—but not the inventor—to the original position. The buyer in the hypothetical negotiation would still have substitution opportunities, but the inventor would not.

4. *The Neglected Cost of Acquiring the Next-Best Noninfringing Alternative*

The fourth error of economic reasoning committed by Judge Robart was, as noted above, to ignore the implementer's acquisition cost of the next-best noninfringing substitute. His version of *ex ante* incremental value analysis mischaracterizes what a FRAND royalty commitment represents.

Consider the following. First, if a patent is essential to a standard, then it will have positive value as an implementation patent in a counterfactual world in which the standard does not exist and inventors instead choose to monetize their inventions through other business strategies. Second, more than one firm will receive positive value in licensing the rights to practice the patent in this counterfactual world. Those assumptions are not strong ones. However, based on those assumptions alone, licensees would be willing to pay more than Judge Robart's measure of the patent's *ex ante* incremental value. So long as the *ex ante* incremental value exceeds the difference in the licensing price for two competing patented technologies, the licensees will purchase the rights to the higher-valued technology at a price up to the incremental value of that patent *plus* the price of lawfully acquiring the right to use the less valuable patent. So, even under these relatively weak assumptions, the price for the patent must exceed Judge Robart's interpretation of the *ex ante* incremental value.

To return to the earlier example, if a Lincoln is worth \$4,000 more to me than a Ford, I still must pay, say, \$40,000 for the Lincoln—not \$4,000—because other buyers have their own private valuations of the Lincoln and have bid up its price. The price I must pay for the Lincoln is still \$40,000, and not only the \$4,000 of incremental value that the Lincoln gives me over the Ford.

Consider another example that more closely resembles a tournament between two inventors to supply an implementer. Airbus and Boeing manufacture large passenger aircraft. The newest generation of Airbus aircraft is the double-deck A380. The newest generation of Boeing aircraft is the 787 Dreamliner. Suppose that Lufthansa intends to make a fleet purchase of only one of the two kinds of jetliners and therefore requests bids, with prices, from Airbus and Boeing. Suppose that the price of the 787 is \$250 million, and the price of the larger A380 is \$300 million. Suppose that Lufthansa estimates that it would earn \$300 million of profit from the 787 over its useful life or \$330 million of profit from the A380 over its useful life. Because the A380 will generate greater profit for Lufthansa than the 787, Lufthansa chooses the A380.

Under the logic of Judge Robart's version of *ex ante* incremental value analysis, the A380 would confer an incremental benefit on Lufthansa of \$30 million (= \$330 million in incremental profit from using the Airbus A380 – \$300 million in incremental profit from using the Boeing 787). Of course, if Lufthansa paid only \$30 million for the A380, it would be paying only a fraction of what Airbus (and other airlines) thought was a competitive price for the airliner. Airbus has the outside option of selling its A380s to Air France and other airlines instead. More generally, there is no assurance under Judge Robart's approach to defining *ex ante* incremental value that Lufthansa's incremental profit will be a large enough payment to Airbus for it to recover the quasi rents (on a per plane basis) of designing and manufacturing an A380.

Judge Robart's approach provides no assurance that the licensee's incremental profit from using the patent in suit rather than the next-best noninfringing substitute will translate into a high enough royalty to enable the patent holder to recover the sunk costs of developing the patented technology. Consequently, his approach provides no assurance that the hypothetical transaction between a willing licensor and a willing licensee would ever occur. Put differently, Judge Robart assumes the answer to his hypothetical question.

5. *The Failure to Disaggregate the Increment of the Implementer's Bargaining Power Attributable to the Implicit But Erroneous Assumption That Implementers Collectively Negotiate as a Monopsonist*

A fifth, and particularly serious, error of economic reasoning that Judge Robart implicitly committed was to fail to disaggregate the degree of bargaining power that an individual implementer would wield vis-à-vis an SEP holder from the degree of bargaining power that all implementers would collectively wield vis-à-vis the same SEP holder if they were coordinating their purchases

as a monopsonist. The hypothetical negotiation at the time of standard adoption is properly cast as *a series of simultaneous, bilateral negotiations* between the SEP holder and each of the implementers. It is incorrect to treat that hypothetical negotiation in the FRAND context as a single transaction occurring between one SEP holder and a solitary representative of all implementers. The difference between the two versions of the hypothetical negotiation is the increment in bargaining power that implementers gain when they act collectively. It is well understood in economic theory that a monopsonist pays a lower price for an input (and consumes a lower volume of the input) than do competing buyers acting individually.¹³⁵ It is similarly incorrect to assume implicitly in the hypothetical negotiation that implementers (who are horizontal competitors in the various markets for downstream products) may lawfully exchange information with one another about the prices that they are bilaterally negotiating with the SEP holder, so that implementers may simulate monopsony power.

Judge Robart makes no adjustment for the difference between competitive and monopsonistic negotiation over the FRAND royalty for an SEP. For him to equate, without any such adjustment, the *ex ante* incremental value of a given SEP to its FRAND price is to assume tacitly that implementers may lawfully acquire and exploit monopsony power to reduce the SEP's price. Such an interpretation of FRAND demands that the SSO must play the role of a buyer's cartel in the innovation market. However, the law does not permit implementers to do so. Section 1 of the Sherman Act forbids horizontal price fixing among buyers as well as sellers. Clearly, the monopsonistic suppression of the competitive price for an SEP would exceed the legitimate purpose of the FRAND commitment as an ancillary restraint that increases economic efficiency. At a minimum, this erroneous interpretation of FRAND would make the contract void at common law for being contrary to the public interest.

To advance economic efficiency and increase consumer surplus, the ancillary restraint needs only to ensure that the selection of the standard does not empower the patent holder to charge implementers a monopoly price after the SSO has selected the patent holder's technology and made the patent covering that technology essential to the standard. To interpret the FRAND price as being the monopsony price goes too far—as a matter of legal analysis, as a matter of economic analysis, and as a matter of common sense. No plausible interpretation of the FRAND commitment should conclude that the inventor consented to receiving a royalty suppressed to the monopsony level. Furthermore, the output-suppressing effect of monopsony would violate what Judge Robart called “the SSOs’ goal of promoting widespread adoption of their standards.”¹³⁶ Wider adoption of a standard would occur if the FRAND royalty were set in a manner

¹³⁵ See Sidak, *Patent Holdup and Oligopsonistic Collusion in Standard-Setting Organizations*, *supra* note 97.

¹³⁶ *Microsoft Corp. v. Motorola Inc.*, No. C10-1823JLR, 2013 WL 2111217, at *12 (W.D. Wash. Apr. 25, 2013) (Robart, J.).

than attempts to simulate the outcome of a competitive equilibrium rather than Judge Robart's monopsonistic equilibrium.

6. *Summary: The Implications of Judge Robart's Opinion for Understating a FRAND Royalty*

The FRAND commitment is a contract that, like all other contracts, should be interpreted and applied in accordance with the intent of the parties (that is, the SSO and the SEP holder). According to Judge Robart, the purpose of FRAND is to ensure the standard's success. Yet his decision places, through the *ex ante* incremental value cap, all of the burden for the standard's success on patent holders. It is a cap to which no other member of the community supported by the standard is held as a matter of law or fact. Placing the burden entirely on a single party is not the delicate balance of interests and obligations that many claim that the FRAND commitment embodies.

Judge Robart's *ex ante* incremental value approach limits the compensation for inventors to marginal returns, while permitting implementers to hold the residual claim to the value created by the standard, regardless of the relative contribution that each class of stakeholder makes. This asymmetric burden is paradoxical in view of the fact that the only parties for whom the adequacy of compensation is an objective of FRAND policies are the inventors whose technology propels the standard.

Finally, the *ex ante* incremental value method is unworkable. As Judge Robart himself pointed out, the approach "lack[s] . . . real-world applicability."¹³⁷ It would require the court to measure the value of every SEP in a portfolio or at issue, identify the alternatives available at the time of the discussion of the standard, and their respective value. This task would be fact-intensive, time-consuming, and extremely difficult—if not impossible—to perform in practice.¹³⁸ It is therefore not surprising that, to my knowledge, courts and SSO members do not actually use the *ex ante* incremental value method in the real world. SSO members and patent holders never measure the exact monetary value of individual patents. It would be impossible to ask parties and courts to do so.

F. Judge Holderman's Revised *Ex Ante* Incremental Value Approach

In *Innovatio*, in September 2013, Judge Holderman of the Northern District of Illinois set a RAND royalty of \$0.956 per unit for a portfolio of nineteen SEPs

¹³⁷ *Id.* at *13.

¹³⁸ See, e.g., David J. Teece, Peter C. Grindley & Edward F. Sherry, *SDO IP Policies in Dynamic Industries*, Submission to the ITU Patent Roundtable (Oct. 10, 2012) ("One obvious difficulty with making this [*ex ante*] approach realistic is that, in practice, most licensing negotiations for standards-essential patent licenses . . . take place *ex post*, after the standard has been set and after the parties have some basis for determining which patents are standards-essential and which are not.").

concerning the 802.11 standard for Wi-Fi.¹³⁹ The case concerned a dispute between Innovatio, the owner of patents essential for the 802.11 standard, and several manufacturers of electronic devices produced in compliance with the standard.¹⁴⁰ Before the hearing on validity, the parties agreed to evaluate the potential damages available to Innovatio if the manufacturers were subsequently found to have infringed the SEPs at issue.¹⁴¹ Given that the SEPs were subject to a RAND commitment, the court determined the damages by assessing the appropriate RAND royalty for Innovatio's portfolio.¹⁴²

Judge Holderman's determination of the RAND rate bears several parallels to Judge Robart's decision in *Microsoft v. Motorola*, decided earlier in 2013. As Judge Robart did, Judge Holderman used a variant of the *Georgia-Pacific* factors to determine the RAND royalty.¹⁴³ To a greater extent than Judge Robart, however, Judge Holderman emphasized the need to set a RAND rate high enough to maintain the innovator's incentives to invest in future R&D and to contribute its inventions to SSOs.¹⁴⁴ Although Judge Holderman did not implement the *ex ante* incremental value method, he placed the hypothetical negotiation at the time of the adoption of the standard,¹⁴⁵ as Judge Robart did. Judge Holderman concluded that a RAND commitment aims to avert patent holdup and royalty stacking, and consequently he believed that courts should take into account those risks when determining the RAND royalty.¹⁴⁶ Furthermore, Judge Holderman maintained that the RAND rate must, to the extent possible, reflect only the value of the underlying technology and not the holdup value.¹⁴⁷ He suggested that the SEP holder should not capture any portion of the standard's value.¹⁴⁸

For the reasons I have explained, the *ex ante* incremental value approach is inappropriate for the determination of a (F)RAND royalty. Judge Holderman's approach amends the *ex ante* approach and thereby corrects some of the flaws in Judge Robart's RAND opinion that I delineated above.

Judge Holderman's approach differs from Judge Robart's in several important respects. First, Judge Holderman did not determine a RAND range, but rather a specific RAND rate.¹⁴⁹ Second, Judge Holderman considered that the SEPs in question were valid and infringed, and refused to discount the RAND royalty because of pre-litigation uncertainty about the validity and essentiality

¹³⁹ RAND Opinion in *Innovatio*, *supra* note 4. Judge Holderman did not release a redacted version of his opinion until October 2013.

¹⁴⁰ *Id.* at 1, 2.

¹⁴¹ *Id.* at 2.

¹⁴² *Id.*

¹⁴³ *Id.* at 36.

¹⁴⁴ *Id.* at 19.

¹⁴⁵ *Id.* at 14.

¹⁴⁶ *Id.* at 14, 17.

¹⁴⁷ *Id.* at 16.

¹⁴⁸ *Id.* at 79.

¹⁴⁹ *Id.* at 11.

of the SEPs in suit.¹⁵⁰ Third, and most important, Judge Holderman rejected the argument that when two equally effective alternatives compete for incorporation into the standard, the RAND royalty could be driven to zero. Accepting the testimony of Professor David Teece, who served as the patent holder's expert economic witness, Judge Holderman found that "it is implausible that in the real world, patent holders would accept effectively nothing to license their technology."¹⁵¹ He noted that "such a low return . . . would discourage future innovators from investing in new technology and from contributing their technology to future standards."¹⁵² Judge Holderman thus correctly recognized that, in using the *ex ante* incremental value method, the determination of the value that the SEPs contribute to the standard requires not only the identification of the non-infringing alternative technologies that competed for adoption into the standard, but also the cost of lawfully acquiring the use of those alternatives.

Judge Holderman again emphasized the need to consider the acquisition cost of the best noninfringing substitute when rejecting the "bottom up" approach proposed by Dr. Gregory Leonard, the expert economic witness for the alleged infringers. Leonard used the incremental value rule and argued that a hypothetical licensee at the time of standard adoption would not pay more for Innovatio's patents than the amount necessary to adopt an alternative, non-infringing technology.¹⁵³ His "bottom up" approach to calculating a RAND royalty would "determin[e] the cost of implementing reasonable alternatives to the Innovatio patents that could have been adopted into the standard, and dividing that cost by the total number of infringing units to determine the maximum per unit royalty Innovatio's patents would have merited in the . . . hypothetical negotiation."¹⁵⁴ Judge Holderman rejected this methodology. He observed that "Dr. Leonard did not account for the royalty that the alternatives to Innovatio's patent might be able to charge."¹⁵⁵ In other words, like Judge Robart, Leonard neglected the acquisition cost of the next-best noninfringing alternative.

V. AN ECONOMIC FRAMEWORK FOR IDENTIFYING FRAND ROYALTIES

The scholarly literature on "fair" and "reasonable" royalties for SEPs does not consistently define these terms.¹⁵⁶ Some scholars oppose trying to set precise definitions applicable to all cases.¹⁵⁷ Some who do favor a precise definition

¹⁵⁰ *Id.* at 13.

¹⁵¹ *Id.* at 37.

¹⁵² *Id.*

¹⁵³ *Id.* at 72.

¹⁵⁴ *Id.*

¹⁵⁵ *Id.* at 73.

¹⁵⁶ See, e.g., Damien Geradin, *Ten Years of DG Competition Effort to Provide Guidance on the Application of Competition Rules to the Licensing of Standard-Essential Patents: Where Do We Stand?*, 9 J. COMPETITION L. & ECON. 1125 (2013).

¹⁵⁷ See, e.g., Roger G. Brooks & Damien Geradin, *Interpreting and Enforcing the Voluntary FRAND Commitment*, 9 INT'L J. IT STANDARDS & STANDARDIZATION RES. 1, 11 (2011).

argue that a FRAND royalty cannot exceed the SEP's incremental value over the next-best noninfringing alternative.¹⁵⁸ Others would define a FRAND royalty as a royalty (1) based on the proportion of all SEPs incorporated into the standard¹⁵⁹ or (2) calculated in light of the alternative patented technologies available when the SSO adopted the standard¹⁶⁰ or (3) based on the Shapley value from cooperative game theory.¹⁶¹

I provide here a framework for determining a FRAND royalty that clarifies the differences between these perspectives and reconciles those differences to the extent possible. From a practical perspective, comparable FRAND licenses for the SEPs at issue are the most reliable starting point for determining FRAND royalties.

A. Maximizing the Joint Producer Surplus Created by the Standard Subject to the Individual-Rationality Constraint

A FRAND commitment has both a ceiling and a floor. A FRAND royalty may not be less than reasonable for the SEP holder or more than reasonable for the licensee. The creation of the standard will generate joint producer surplus, as discussed in Part III.B. The underlying principle that will determine which royalties are FRAND is that fair and reasonable royalties for SEPs will maximize the surplus resulting from the standard's creation. Under this rule, each SEP holder will have an incentive to cooperate in the *next* generation of breakthrough technology for which the SSO will undertake to establish its *next* open standard.¹⁶²

This maximization of surplus will have two essential elements. The first concerns the constraint the individual rationality imposes on the surplus-maximizing FRAND royalty. The second relates to maximizing the standard's joint surplus given that the downstream products of vertically integrated SEP holders will bear FRAND royalties as marginal costs.

1. Individual Rationality as a Constraint on the FRAND Royalty

The first essential element of the maximization of the joint producer surplus associated with the standard is that, for the SEP holder and licensee voluntarily

¹⁵⁸ See, e.g., Mark A. Lemley & Carl Shapiro, *Patent Holdup and Royalty Stacking*, 85 TEX. L. REV. 1991, 2039 (2007).

¹⁵⁹ See, e.g., Philippe Chappatte, *Frاند Commitments—The Case for Antitrust Intervention*, 5 EUR. COMPETITION J. 319 (2009).

¹⁶⁰ See Daniel G. Swanson & William J. Baumol, *Reasonable and Nondiscriminatory (RAND) Royalties, Standard Selection, and Control of Market Power*, 72 ANTITRUST L.J. 1, 21 (2005).

¹⁶¹ Anne Layne-Farrar, A. Jorge Padilla & Richard Schmalensee, *Pricing Patents for Licensing in Standard Setting Organizations: Making Sense of FRAND Commitments*, 74 ANTITRUST L.J. 671, 693 (2007); David J. Salant, *Formulas for Fair, Reasonable and Non-Discriminatory Royalty Determination*, 7 J. IT STANDARDS & STANDARDIZATION RES. 67 (2009).

¹⁶² Annalisa Biagi and Vincenzo Denicolò propose that the optimal policy rewards early inventors more generously than late inventors to speed the innovation process. Annalisa Biagi & Vincenzo Denicolò, *Timing of Discovery and the Division of Profit with Complementary Innovations*, presented at the Research Roundtable on Innovation and Technology Standards (2013).

to agree on a FRAND royalty and participate in the SSO, each participant must satisfy its own *individual-rationality constraint*.¹⁶³ The individual-rationality constraint is a fundamental principle in the economics of contracts. Also called the “participation constraint,” the individual-rationality constraint requires that each party to the FRAND licensing transaction prefer participating in the SSO and implementing its open standard to not participating in the SSO.¹⁶⁴ Under the individual-rationality constraint, the holders and licensees of SEPs (including implementers that are not members of the SSO) must be better off implementing the standards than not. Each member must expect to receive enough compensation to ensure its participation in the SSO’s open standard.

The individual-rationality constraint provides a bargaining range. The lower bound is the SEP holder’s minimum willingness to accept, equal to the SEP holder’s opportunity cost of licensing its patents—as SEPs—under FRAND terms. The upper bound is the licensee’s maximum willingness to pay to license the SEPs. The bargaining range for a FRAND royalty should be tighter, and the convergence from the opening bid-ask spread to a mutually agreeable price should occur more quickly, than in the stereotypical *Georgia-Pacific* negotiation that hypothetically occurs *at arm’s length* between a willing licensor and a willing licensee of a non-standard-essential patent at the time of first infringement. One can view the licensee’s commitment to expeditious negotiation of the SEP royalty as the *quid pro quo* of being entitled as an SSO member (or as the SSO’s third-party beneficiary) to avail oneself of the FRAND obligations that the SEP holder willingly accepted. To date, courts and commentators have oddly overlooked how the speed at which the bid-ask spread converges might shed light on the legal question of whether a party is negotiating a FRAND royalty in good faith.

For the SEP holder, the minimum willingness to accept will include the opportunity cost of licensing *plus* the fixed costs of participation in the SSO, and possibly also the expected direct costs of reaching a licensing agreement. Because the minimum willingness to accept for an implementation patent holder is only the opportunity cost of licensing, the minimum willingness to accept for an SEP holder will exceed the minimum willingness to accept for the implementation patent holder. Additional costs may arise from participation in an SSO. For example, failure to disclose a potentially essential patent may subject a firm to antitrust scrutiny, and the costs of defending a potential suit.

Likewise, for an implementation patent, the licensee’s maximum willingness to pay is the profit it expects to gain from using the licensed patent, relative to the profit it would gain by not licensing the patent. For reasons

¹⁶³ See, e.g., PATRICK BOLTON & MATHIAS DEWATRIPONT, *CONTRACT THEORY* 245 (MIT Press 2005).

¹⁶⁴ See, e.g., JEAN TIROLE, *THE THEORY OF INDUSTRIAL ORGANIZATION* 154–55 (MIT Press 1988); LUIS M.B. CABRAL, *INTRODUCTION TO INDUSTRIAL ORGANIZATION* 175 (MIT Press 2000).

examined above, the incremental value of an SEP is not necessarily defined. At the time of standard setting, every patent is in effect an implementation patent having some incremental value. Even with an observable incremental value, the licensee's maximum willingness to pay for a patent as an SEP will fall below the maximum willingness to pay for the same patent as an implementation patent just before the standard selection. This difference represents the implementer's direct and indirect costs of participating in the standard-setting process. Note that this comparison is for patents that exist at the time of standard setting. There may be patents that have no value at all unless they are incorporated into the standard because they cover inventions created for the sole purpose of solving a problem that exists only within the standard. In that case, the licensee's maximum willingness to pay for a patent as an SEP would be higher than if the patent were an implementation patent with zero value.

To ensure the licensee's participation in the SSO, the maximum willingness to pay cannot exceed the incremental value of the patent (including the value of acquiring the lawful right to use the next-best alternative) minus the transactions costs of participating in the SSO and the direct costs of licensing. The timing of this hypothetical bargaining would be before the creation of the standard (since the negotiation by definition requires a willing licensor who has already found the prospect of monetizing his invention through an open standard superior to monetizing it through an alternative business would). The range of royalties for an SEP that can result from a number of bilateral negotiations must satisfy the individual-rationality constraint to ensure participation in the standard.

The individual-rationality constraint incorporates insights from other economic approaches to determining FRAND royalties. The Swanson-Baumol approach considers the royalty rate upon which the parties would have agreed when setting the standard.¹⁶⁵ This royalty rate will indirectly affect the patent holder's individual-rationality constraint. Assuming an *ad valorem* running royalty, to ensure a patent holder's participation in the SSO, the FRAND royalty rate (multiplied by the size of the royalty base multiplied by the number of units sold under the open standard) must equal or exceed the (higher) *ex ante* royalty rate (multiplied by the size of the royalty base multiplied by the (smaller) number of units sold under the proprietary standard). Otherwise, the patent holder would expect to reap a higher profit through *non-FRAND* licensing occurring before the patent's adoption into the standard. The *ex ante* royalty rate is therefore a lower bound to the fair and reasonable rate that satisfies the individual-rationality constraint.

The approach of Anne Layne-Farrar, Jorge Padilla, and Richard Schmalensee considers the marginal contribution of the patent to the standard.¹⁶⁶ Again, the individual-rationality constraint will incorporate that

¹⁶⁵ Swanson & Baumol, *supra* note 160, at 29.

¹⁶⁶ Layne-Farrar, Padilla & Schmalensee, *supra* note 161, at 698.

information. An SEP with a more significant marginal contribution will have fewer close substitutes and a higher expected licensing value if it is not incorporated into the standard. Therefore, to satisfy individual rationality for the patent holder, the FRAND royalty must exceed the royalties that the patent holder could gain from not committing to FRAND rates. These royalties represent the patent holder's outside option and would not be bound by a FRAND commitment. So, the royalty rate could exceed the FRAND rate. However, without the adoption of the patent's technology into the standard, fewer manufacturers would choose to license the patent. Nonetheless, as the marginal contribution of the patent increases, both the expected royalty rate and the expected number of licensees will increase. Therefore, to ensure participation in the SSO, the FRAND royalty rate must be higher for patents with higher marginal contributions.

2. *Maximizing the Standard's Joint Producer Surplus Given the FRAND Royalties that Vertically Integrated SEP Holders Will Bear in the Marginal Costs of Their Downstream Products*

As members of a joint venture, the members of an SSO seek to maximize the joint producer surplus created by the standard, or SSO. FRAND royalties should thus maximize the joint producer surplus of the SSO. The objective function that the SSO must collectively maximize may incorporate royalties as a marginal cost of the production of the breakthrough good. As royalties per unit increase, the marginal cost of producing a unit of the downstream good will increase, the profit-maximizing price of that good will rise, the quantity demanded will fall, and the producer surplus from sales of that good will also fall. If royalties always took the form of a marginal cost for the licensee (as in the standard case of an *ad valorem* royalty on the product's price), then the solution to the surplus-maximization problem would be for each SEP holder to charge as low a royalty as possible while still satisfying the individual-rationality constraint for the SEP holder and the licensee (which I explain below).

One complicating factor deserves attention: some firms that participate in the SSO both produce retail goods (for which they must pay royalties) and own SEPs (from which they receive royalties). In the joint maximization problem, the intra-SSO royalty payments would be included as both a cost and revenue and would cancel each other out. Put simply, aggregate *net* royalties for SEPs would be zero among members of the SSO, as in a royalty-free cross license. Thus, transfers of payments among members of the SSO—just as among members of a joint venture—do not increase the joint surplus created by the SSO. For that reason, the surplus-maximizing royalty will be based on the optimal royalty charged to implementers who are not members of the SSO, or who have zero patents to cross-license to members of the SSO.

Even if firms within the SSO have different marginal costs for and different marginal revenues from their retail products, the differences result from firm-specific product differentiation that occurs *after* the standard's creation.

Let the standard itself represent an intermediate product. Manufacturers purchase that intermediate product first by licensing the SEPs in the standard. Then, as manufacturers implement the standard in their retail products, they differentiate their products with implementation patents and other non-patented product attributes. Thus, before implementers have incurred the costs of licensing, and before they have differentiated the intermediate product, that product is still homogeneous. It has the same costs of production for all implementers. Thus, the royalty rates charged by one member of the SSO to an implementer will not affect the joint surplus created by the standard. Therefore, the determination of the optimal royalty rate will be based on the optimal royalty rate charged to implementers who are not members of the SSO.

There are likely to be some firms that are not part of the constructive joint venture but still produce the breakthrough good. There are also likely to be some firms that specialize in producing technology that are a part of the constructive joint venture but which do not produce the breakthrough good. Thus, there will also be royalty payments made from firms outside the SSO to SSO members.

Focusing purely on the royalties paid by non-SSO members, the SSO faces a standard pricing problem. As the SEP holder increases the royalty rate, the royalty base will decrease. At some point, the marginal benefit to the SEP holder from raising its royalty rate will fall to zero. This point defines the royalty rate that maximizes the joint surplus of the SSO members from the setting of the standard. If this rate also satisfies individual rationality (meaning that all parties are better off for having participated in the SSO), then the rate will satisfy the requirement of being fair and reasonable. If individual rationality is not satisfied, then the fair and reasonable royalty would be that which makes the individual-rationality constraint bind. That is, the fair and reasonable royalty would be the lowest royalty that ensures the patent holder's participation in the SSO.

B. Elements of a FRAND Royalty

A FRAND royalty ensures participation in the SSO by requiring that both the patent holder and the implementer satisfy the individual-rationality constraint, such that both are better off implementing the standard than not. Based on the analysis below and the concept of the combinatorial value of SEPs that I explained earlier, I argue here that a royalty is FRAND if the royalty:

- (1) ensures the patent holder's continued participation in standard setting;
- (2) does not deny the implementer access to the standard;
- (3) is consistent with a sustainable aggregate royalty burden for all SEPs on the implementer's product practicing the SEPs in suit; and
- (4) approximates the royalty rates (as a function of an implementer's sales of its product practicing the SEP in suit) of similarly situated licensees.

The first three factors define a “fair and reasonable” royalty. The fourth factor defines a “nondiscriminatory” royalty. I explain now the economic reasoning for this interpretation of FRAND.

1. *A Robust Definition of “Fair and Reasonable”*

A fair and reasonable royalty promotes participation in the standard by both SEP holders and implementers. Such a royalty adequately rewards the SEP holder for its investment in standard setting and does not deny the implementer access to the standard.

a. *Ensuring the SEP Holder’s Continued Participation in Standard Setting*

Research and development does not occur once and for all. It is a continuous process. Inventors produce patentable innovations on a recurring basis. Similarly, a standard evolves over time. Patents that are essential to the standard are revealed over time. As technology changes, the marginal contributions of different patents to the value of the downstream product also change. A fair and reasonable royalty must be high enough to ensure the patent holder’s continued participation in standard setting.¹⁶⁷

In Part IV, I explained the problems with setting a FRAND royalty as the *ex ante* incremental value of SEPs. In addition, a FRAND royalty equal only to the difference between the value of the SEP and the value of the best runner-up technology would fail to reward the SEP holder adequately. Particularly, the FRAND royalty must incorporate the *ex ante* incremental value of the SEPs and the price of the next-best noninfringing alternative. That amount approximates the value of the SEP. By rewarding the patent holder based on the value that the SEP contributes to the standard and to the downstream product implementing the standard, patent holders will have the incentive to invest in valuable inventions for the next generation of standards.

b. *Neither Denying the Implementer Access to the Standard Nor Contributing to an Unsustainable Aggregate Royalty Burden*

Two conditions define a fair and reasonable royalty from the implementer’s perspective. First, a FRAND royalty must not be so high as to deny the implementer access to the standard. Second, an individual FRAND royalty must not contribute to an unsustainable aggregate royalty burden. Thus, a FRAND royalty should not be excessive—either individually or in combination with the

¹⁶⁷ See, e.g., RAND Opinion in *Innovatio*, *supra* note 4, at 19 (“a RAND rate must be set high enough to ensure that innovators in the future have an appropriate incentive to invest in future developments and to contribute their inventions to the standard-setting process”); *Microsoft Corp. v. Motorola Inc.*, No. C10-1823JLR, 2013 WL 2111217, at *12 (W.D. Wash. Apr. 25, 2013) (Robart, J.) (“[t]o induce the creation of valuable standards, the RAND commitment must guarantee that holders of valuable intellectual property will receive reasonable royalties on that property”).

other royalties required to implement the standard without infringing any SEPs. These parameters determine the upper bound of a FRAND royalty for a licensee.

The FRAND commitment ensures *access* to the standard. SSOs' IPR policies do not say how to divide economic rents between the SEP holder and the licensees. A common claim is that preventing patent holdup is a goal (in the eyes of some, *the* goal) of a FRAND commitment, and that the FRAND royalty should be deemed to be what would have resulted in competitive bidding among inventors for adoption of their respective technologies into the standard (what Swanson and Baumol call the "*ex ante* competitive" level¹⁶⁸). As noted earlier, this claim lacks factual support, as SSO IPR policies do not mention patent holdup. In contrast, it would flout the explicit obligation to license one's SEPs on FRAND terms if the SEP holder demanded prices, terms, or conditions so extreme that their practical effect was to render the offer to license nugatory and thus deny the implementer the ability to make a standard-compliant product. But there is no reason to expect that the *ex ante* competitive level that Swanson and Baumol define is the point above which the royalty for an SEP would be so high as to constitute a *de facto* denial of access and thus a violation of the licensor's FRAND obligation.

A royalty would not be FRAND if it denied the implementer access to the standard and contributed to an unsustainable aggregate royalty burden. Such a royalty, which I call the "shutdown royalty," would cause the licensee to refrain from producing a standard-compliant product. A firm will stop making its products (that is, shut down) when the price of the product falls below the average variable cost of producing the product.¹⁶⁹ Thus, a firm will shut down if its operating profit is at or below zero. Therefore, the royalty that lowers the licensee's operating margin to zero is the upper bound for the sum of all *ad valorem* royalties that the implementer can afford to pay before ceasing to produce its product. It bears emphasis that I do not advocate that, if an aggregate royalty for an SEP were one penny below the implementer's entire profit margin, that aggregate royalty would necessarily be FRAND. Rather, the usefulness of the shutdown royalty is that it provides a reality check. It is a measurable threshold that would cause the implementer not to produce its standard-compliant product. One can conclude that a royalty is excessive or an aggregate royalty is stacked too high for an implementer if it exceeds the implementer's profit margin. Real-world litigation over FRAND royalties is likely to concern offers from the SEP holder that are far below the implementer's shutdown royalty. In such cases, an implementer's claims of patent holdup and royalty stacking will lack plausibility.

The implementer's operating margin includes all the royalties that the implementer is already paying on the patents practiced in the implementer's product.

¹⁶⁸ See, e.g., Swanson & Baumol, *supra* note 160, at 10–15.

¹⁶⁹ See, e.g., DENNIS W. CARLTON & JEFFREY M. PERLOFF, MODERN INDUSTRIAL ORGANIZATION 59–60 (Addison-Wesley 4th ed. 2005).

The operating margin does not include royalties on the infringed patents in suit or other patents for which the implementer is currently negotiating a license. Therefore, the operating margin is the highest aggregate royalty the implementer would pay on the patents in suit (standard-essential or implementation), plus other outstanding royalties (standard-essential and implementation) for patents.

2. *A Robust Definition of “Nondiscriminatory”*

Price discrimination in economics is “selling two units of the same physical good at different prices.”¹⁷⁰ However, that definition is not applicable in all situations.¹⁷¹ Even units of a homogeneous good may sell at different prices when the producer’s cost of selling to one purchaser differs from his cost of selling to another.¹⁷² Conversely, uniform pricing is actually price discrimination if the cost of providing the good varies from purchaser to purchaser.¹⁷³ An SEP holder’s opportunity costs of licensing to two different licensees may not be equal. If so, it is not price discrimination for the SEP holder to charge different royalty rates to the different licensees. In considering whether royalties are nondiscriminatory, one must assess whether the licensees are similarly situated in terms of the licensor’s opportunity costs of licensing its patent portfolio to the licensees.

The parties to a negotiation are free to define “nondiscriminatory” licensing in their contract however they like. In the absence of a contractually specified definition, there is no consensus among economists yet as to whether “nondiscriminatory” has a connotation in the FRAND context that differs from how economists define discriminatory pricing generally. Dennis Carlton and Allan Shampine define “nondiscriminatory” in the FRAND context as requiring that all licensees seeking to implement a standard receive licenses to SEPs reading on the standard, and that all “similarly situated” licensees pay the same royalty rate for a given SEP holder’s portfolio.¹⁷⁴ Roger Brooks and Damien Geradin distinguish nondiscriminatory pricing from most-favored-nations (MFN) clauses, which would require royalties to a particular firm to be no greater than those charged to other firms.¹⁷⁵ Instead, they find latitude in “nondiscriminatory” that allows for adjustment according to the particular situations of any firms in a licensing negotiation. Swanson and Baumol define a nondiscriminatory rate using the efficient component-pricing rule (ECPR), which Baumol

¹⁷⁰ TIROLE, *supra* note 164, at 133.

¹⁷¹ *Id.*

¹⁷² See GEORGE J. STIGLER, *THE THEORY OF PRICE* 209 (Macmillan Co. 3d ed. 1966) (“Price differences do not necessarily indicate discrimination.”); TIROLE, *supra* note 170, at 133–34 (“Hence, we will say there is no price discrimination if differences in prices between consumers exactly reflect differences in the costs of serving these consumers.”).

¹⁷³ STIGLER, *supra* note 173, at 209–10 (“If a college charges the same tuition for a large elementary class taught by an instructor, and a small advanced class taught by an expensive professor, it is clearly discriminating.”).

¹⁷⁴ Dennis W. Carlton & Allan L. Shampine, *An Economic Interpretation of FRAND*, 9 J. COMPETITION L. & ECON. 531, 546 (2013).

¹⁷⁵ Brooks & Geradin, *supra* note 157, at 15.

developed for pricing competitor access to bottleneck facilities in network industries.¹⁷⁶ The Swanson-Baumol ECPR solution amounts to the requirement that the royalty rate that a vertically integrated patent holder charges its retail competitors be the same as the implicit royalty that it would charge its own downstream retail arm. Swanson and Baumol argue that the royalty rate should compensate the patent holder for the transactions costs of licensing plus the opportunity cost, leaving the patent holder indifferent between licensing and not licensing the patent. However, Layne-Farrar, Padilla, and Schmalensee argue that one cannot apply this method when licensing multiple complementary patents, as one typically does not observe the incremental value of an individual patent to the standard.¹⁷⁷

a. Narrow and Broad Definitions

There are at least two options for defining “nondiscriminatory” in FRAND cases. Under the narrower definition, nondiscriminatory licensing would require an equal per-unit royalty across licensees. The problem with this definition is that, in the presence of frequent cross licenses, even determining the per-unit royalties contained within a single cross license can be difficult. In addition, this definition would not maximize the surplus generated by the standard’s creation. As I explain below, a multipart tariff, such as a two-part tariff, would generate more licensing revenue for the SSO in terms of the royalties paid by implementers that are not members of the SSOs, compared with licensing revenues from requiring all implementers to pay the same rate.

Under a broader definition, nondiscriminatory licensing would require that royalties be approximately the same across licensees with similar output levels. This definition requires only that the SEP holder offer similarly situated licensees the same approximate royalty rate as a function of output.¹⁷⁸ That is, if an SEP holder offers one implementer a royalty rate that falls as output increases, then the SEP holder should offer a similar declining royalty rate to a second, similarly situated implementer. Terms can vary with the risk preferences of licensees and changes in the perceived value of patents. However, as long as the SEP holder offers terms to two similarly situated licensees that are not grossly disproportionate, the SEP holder should be deemed to have satisfied the “nondiscriminatory” component of the FRAND commitment.

¹⁷⁶ Swanson & Baumol, *supra* note 160, at 29. For further explanation of the ECPR, see WILLIAM J. BAUMOL & J. GREGORY SIDAK, *TOWARD COMPETITION IN LOCAL TELEPHONY* 105 (MIT Press 1994).

¹⁷⁷ Layne-Farrar, Padilla & Schmalensee, *supra* note 161, at 698.

¹⁷⁸ Dennis Carlton proposes determining whether firms are similarly situated by examining their cost savings. If one firm gets a large cost saving from using the SEP and another firm does not, then the firms are not similarly situated, and the SEP holder therefore would not necessarily violate the nondiscriminatory component of the FRAND commitment by charging the two licensees different royalty rates. See Feinstein, Skitol, Carlton, Leonard, Meyer & Shapiro, *supra* note 54, at 14.

b. Two-Part Tariffs and Optional Tariffs

This broader definition of “nondiscriminatory” would permit nonlinear pricing of SEPs, including two-part tariffs and optional tariffs. A two-part tariff is a price that includes an access fee and a usage price. For example, a licensing agreement could include both a flat fee and a running royalty based on unit sales or revenues.¹⁷⁹ An optional tariff is different: the licensee chooses between paying an established rate and negotiating an alternative rate.¹⁸⁰ An example of an optional tariff would be the SEP holder announcing a price of X percent of net sales as the running royalty for a portfolio of SEPs while also allowing licensees to enter into agreements on different terms. A potential licensee could either accept the SEP holder’s standard fee structure or negotiate its own royalty structure. (In effect, an SEP holder offers an optional tariff when it opens any licensing negotiation with standard “reference rates.”) Under this broader definition of “nondiscriminatory,” the average per-unit or *ad valorem* running royalties may differ across licensees of the same portfolio of SEPs, but the royalty terms would still be nondiscriminatory, since any licensee would have the same choice of two alternative ways to structure its payment of royalties.

The understanding that the SSO functions as a joint venture supports the broader definition of “nondiscriminatory.” That definition is consistent with joint profit maximization within the joint venture and thus encourages participation in the SSO by both patent holders and implementers. To consider why the SSO would define “nondiscriminatory” to require that all licensees face the same nonlinear pricing schedule and *not* the same per-unit or same *ad valorem* running royalty, I examine how the selection of a nonlinear tariff affects the surplus generated by the standard.

The magnitude of the royalties exchanged between SSO members will not change the surplus that the standard generates, because the net royalties exchanged between SSO members will always sum to zero. However, a two-part tariff, an optional tariff, or some other nonlinear pricing strategy will permit greater capture of surplus from non-SSO members without necessarily distorting their pricing decisions in the retail market.

For example, if a license includes a two-part tariff composed of an upfront lump-sum payment and a running royalty rate on sales of licensed products, the running royalty could be the optimal running royalty for the SSO. The lump-sum payment could include some portion of the surplus that the licensee will receive from licensing the technology at the running royalty rate. The existence of the lump-sum payment will not affect the output decision of the

¹⁷⁹ See CARLTON & PERLOFF, *supra* note 169, at 314.

¹⁸⁰ For a nontechnical summary of the economic literature on optimal tariffs, see John C. Panzar & J. Gregory Sidak, *When Does an Optional Tariff Not Lead to a Pareto Improvement? The Ambiguous Case of Self-Selecting Nonlinear Pricing When Demand Is Interdependent or Firms Do Not Maximize Profit*, 2 J. COMPETITION L. & ECON. 285 (2006).

licensee, because it will not change the marginal cost of producing a licensed product. In addition, the running royalty will be the same as the running royalty rate that is optimal without the lump-sum payment. As a result, the running royalty also will not change the marginal cost of producing a licensed product. So long as the lump sum does not exceed the surplus to the licensee from implementing the standard under the license, the licensee will still license the product and produce the same output as with the optimal running royalty rate and no lump-sum payment. Therefore, there will be no inefficient distortion in the product market resulting from the use of a two-part tariff instead of only a running royalty. This two-part tariff will allow SSO members and implementers to capture greater surplus from the standard than simple linear pricing would allow.

Even if an identical lump-sum payment and running royalty rate are offered to multiple licensees, these licensees may have varying per-unit licensing costs. As output by a licensee increases, the per-unit cost of the fixed fee will fall. Consequently, licensees with higher levels of output will pay a lower average royalty than licensees with lower levels of output.

Using nonlinear tariffs will maximize the surplus generated by the standard and will not cause inefficiencies in the product market. Consequently, the view of the SSO as a joint venture indicates that “nondiscriminatory” pricing should mean that each licensee is offered the same menu of licensing options. However, it does not require that all licensees pay the same royalty rate. The same terms offered thus allow that different licensees ultimately pay different average per-unit royalties.

Thus, nondiscriminatory licensing requires only that similarly situated licensees be offered the same approximate royalty rate as a function of output. That is, if a patent holder offers a license where the royalty rate falls as output increases to one licensee, a similar declining royalty rate should be offered to a similarly situated licensee. Terms may vary depending on the risk preferences of various licensees and changes in the perceived value of patents. However, as long as the terms offered to two similarly situated licensees are not grossly disproportionate, the “nondiscriminatory” aspect of the SEP holder’s FRAND commitment should be satisfied. The same terms offered thus allow different licensees to pay different average per-unit royalties. In addition, under the “nondiscriminatory” requirement of FRAND, licensees that are members of the SSO should not receive preferential terms relative to licensees that are not members of the SSO.

c. Royalties for Implementers That Are Not SSO Members

Finally, as I explained above, the surplus-maximizing royalty rate for SEPs is defined by the royalty that the SEP holder would charge to non-SSO members, because payments transferred among members of the SSO will not affect the joint surplus created by the SSO. Because the nondiscrimination requirement in the FRAND commitment prevents an SEP holder from giving

SSO members discounts compared with non-SSO members, that requirement imposes the surplus-maximizing rate on implementers that are SSO members as well. Put differently, SSO members should not get preferential treatment as licensees compared with licensees that are not SSO members. Nondiscrimination is a less controversial element of FRAND pricing, but its precise meaning is still subject to conflicting opinions.¹⁸¹

C. Applying the FRAND Framework to Determine FRAND Royalties

The above framework for determining the economic meaning of FRAND royalties presents a specific value only in the abstract. In practice, the framework will reveal a range of values depending on the interpretation of the profit-maximization problem and the individual-rationality constraint. Through the presentation of this framework, I have identified different elements one should consider in determining what constitutes a FRAND licensing rate for a specific patent or a specific portfolio of patents. These elements include the incremental value of the patent, the cumulative royalty for the patents within the standard, the stand-alone cost of developing the patent, the royalty rate charged for the patent in other licenses, and the strength of the patent or patent portfolio. One weights those inputs based on the facts of the case to determine the range of royalty rates that would satisfy a FRAND commitment. Voluntarily negotiated royalty rates for comparable FRAND licenses typically should be the most heavily weighted element of this analysis and therefore should serve as the starting point for determining a FRAND royalty.

1. Using Comparable, Voluntarily Negotiated Licenses as the Most Reasonable Starting Point in the FRAND Analysis

Because of the dynamic nature of standard setting, the analysis of FRAND royalties should focus on continuously promoting incentives to invest in the creation and implementation of valuable standards.¹⁸² Research and development does not occur as a discrete process. It is a continuous process, and inventors produce patentable innovations on a recurring basis. Likewise, a standard evolves over time. Patents that are essential to the standard are revealed over time. As technology changes, the marginal contributions of different patents to the value of the downstream product also change. For example, the development of complementary products may make a touch screen more important to the commercial value of a smartphone than members of the SSO might have expected when they adopted the standard.

¹⁸¹ See, e.g., Anne Layne-Farrar, *Nondiscriminatory Pricing: Is Standard Setting Different?*, 6 J. COMPETITION L. & ECON. 811 (2010).

¹⁸² See, e.g., Daniel F. Spulber, *Innovation Economics: The Interplay Among Technology Standards, Competitive Conduct, and Economic Performance*, 9 J. COMPETITION L. & ECON. 777 (2013); Daniel F. Spulber, *Should Business Method Inventions Be Patentable?*, 3 J. LEGAL ANALYSIS 265, 297–304 (2011).

Because factors such as the marginal contribution of a patent to a standard, the *ex ante* value of a patent, or even the number of patents in a standard constantly change, these factors typically cannot be given substantial weight in a determination of FRAND royalty rates. The *ex ante* value of a patent depends upon the presence and value of complementary patents. As these patents are discovered or change in value, the “*ex ante*” value of the patent itself will change.¹⁸³ Other information, such as an industry consensus about the *ex ante* value of a patent or its marginal contribution to the standard, may clarify the importance of these factors affecting the value of a patent. Only then should one give these factors significant weight in determining FRAND royalty rates.

Because of the difficulties in identifying the value of specific inputs in the FRAND determination, the observed royalty rates from existing licenses are the most probative data at the economist’s disposal. “An established royalty,” the Federal Circuit has observed in patent-infringement litigation generally, “is usually the best measure of a ‘reasonable’ royalty for a given use of an invention because it removes the need to guess at the terms to which parties would hypothetically agree.”¹⁸⁴ Direct observation of a comparable, voluntarily negotiated royalty obviates more conjectural lines of economic analysis. Simply put, a royalty was “fair” and “reasonable” if both parties voluntarily agreed to it. That is what it means to be a “willing” buyer and a “willing” seller. License negotiations generally take place between sophisticated industry members, who can observe the relative strength of the licensed portfolios with respect to the strength of other members’ portfolios. License negotiations also typically involve technical discussions wherein the parties evaluate the technical contributions of the licensed portfolios. Consequently, it is unlikely that licensing parties would agree to pay significantly above the true value of the licensed technologies. Moreover, if a licensor expects to negotiate licenses in the future and expects its future technical contributions to be up for vote by its licensees, then the licensor is unlikely to demand royalties exceeding the true value of its patents.

The agreed-upon royalty necessarily ensured that both parties expected to be better situated as a result of the license than in its absence. Otherwise, the parties never would have agreed to the license. In addition, one can determine whether a license is nondiscriminatory only by comparing it to other licenses. Consequently, the most probative starting point for determining FRAND royalty rates is to analyze previous royalty rates established in comparable licensing agreements over FRAND terms.

¹⁸³ See, e.g., Gastón Llanes & Joaquín Poblete, *Ex-Ante Agreements in Standard Setting and Patent Pool Formation*, Research Roundtable on Innovation and Technology Standards (2013).

¹⁸⁴ *Monsanto Co. v. McFarling*, 488 F.3d 973, 978–79 (Fed. Cir. 2007). See also *LaserDynamics, Inc. v. Quanta Computer, Inc.*, 694 F.3d 51, 79–80 (Fed. Cir. 2012) (“Actual licenses to the patented technology are highly probative as to what constitutes a reasonable royalty for those patent rights because such actual licenses most clearly reflect the economic value of the patented technology in the marketplace.”).

a. Six Factors Influencing the Comparability of a Prior FRAND License

At least six factors influence how closely a comparable FRAND license informs the negotiated license terms at issue and how much weight one should give that comparable license in determining the appropriate FRAND royalty rate:

- (1) the patents included in the license agreement,
- (2) the date of the license,
- (3) the use of the licensed technology,
- (4) the inclusion of other consideration in the agreement,
- (5) whether the license was part of a settlement of litigation or arbitration, and
- (6) whether the royalty was a lump sum or a running royalty rate.

These factors inform the relative bargaining power of the parties in the benchmark license.

First, the patents in benchmark licenses affect the relative value of a license agreement in determining a FRAND royalty for the patent(s) in suit. Whether the benchmark agreements license individual patents or portfolios of patents for standards that contain the patent holder's SEPs in suit helps determine which benchmark agreements should receive the most weight. The more a benchmark agreement resembles the license negotiation at issue, the more weight it should receive as a benchmark.

Second, the date of a benchmark license affects its comparability to the FRAND negotiation at issue. The closer an agreement is in time to the FRAND negotiation at issue, the more weight it should receive in determining the reasonable royalty rate. Many factors that influence the relative bargaining power of the parties to a licensing agreement are unobservable. The more time that passes between two agreements, the less informative one agreement will be in predicting the outcome of a different, hypothetical royalty negotiation.

Third, the parties' uses of the licensed technology may affect the comparability of a benchmark license to the FRAND negotiation at issue. For example, if the licensee will use the technology in question to produce a horizontal substitute for a good that the licensor produces, the licensor will risk losing sales to the competing, licensed product. These lost sales are an opportunity cost of licensing the patent in suit. Consequently, the licensor may require a higher FRAND royalty to satisfy its individual-rationality constraint, and therefore the final royalty may be higher than if the licensee intended to use the licensed technology to produce a non-competing good or a vertical complement to the licensor's products. In short, for a benchmark license to receive more weight, the licensee's use of the patented technology should be the same as the infringer's intended use in the FRAND negotiation at issue. If licenses having this degree of comparability are unavailable, one must make appropriate adjustments when comparing the terms of benchmark

licenses that are available. Because the licensees that practice a standard typically compete within the same industry, this factor is often not a significant part of the analysis.

Fourth, when a benchmark agreement includes consideration beyond a license for the patents at issue (such as copyright licenses, licensing of trade secrets, or consideration unrelated to IP), then that benchmark agreement should receive less weight in determining the FRAND royalty. This weight should be even less when the terms for licensing the patent at issue comprise a small part of the entire benchmark agreement. The more unrelated the terms that the benchmark agreement contains, the more likely it is that the license terms do not accurately reflect the specific value of the patent at issue. Depending on the possibility of future agreements, either party may have an incentive to use other terms of the agreement to cross-subsidize the licensing terms to create royalty rates that are higher or lower than the true value of the license. A licensee who anticipates future licensing for similarly situated patents could overpay for other elements of the agreement to establish a low royalty rate. Conversely, a savvy licensor could permit the licensee to underpay for other terms to establish a high royalty rate. Even when a patent license is not part of a larger agreement, caution is necessary to identify any ancillary agreements between the parties to determine whether the royalty rate is only part of a more complex package of consideration. For example, Judge Posner found (in a non-FRAND case) that a plaintiff's expert economic witness misconstrued the royalty rates she calculated because she excluded from her calculation such ancillary agreements present in the settlement of litigation with the licensee.¹⁸⁵

This factor is particularly important given that participants in SSOs often manufacture goods that practice the SEPs. As a result, there is a high probability that any benchmark agreement will include cross licenses. Cross licenses may have royalty rates that obscure the FRAND royalty for a particular patent. For the net payment in a cross license to serve as a meaningful benchmark, the net balancing payment in the cross license must be based on identifiable one-way royalties for each parties' SEP portfolio.¹⁸⁶ Alternatively, if the

¹⁸⁵ Order of January 18, 2013 at 11–12, *Brandeis Univ. v. East Side Ovens Inc.*, Nos. 1:12-cv-01508, 1:12-cv-01509, 1:12-cv-01511, 1:12-cv-01513 (N.D. Ill. Jan. 18, 2013) (Posner, J.) (“The stated payment for this license is a \$[#] one-time payment to GFA [the licensor], but the payment appears to have been returned to [Company C] as ‘consulting fees’ over the next few months. The settlement also provides, however, for changing a strategic partnership between [Company C] and a GFA subsidiary. . . . But [the patent holder’s damages expert] has made no attempt to value any individual component of the complex settlement agreement, and so [the expert] cannot responsibly value the patent license itself.”).

¹⁸⁶ *See, e.g., Teece, Grindley & Sherry, supra* note 138, at 9 (explaining that in cross licenses, “[r]oyalties are typically determined based on the relative value of each company’s technology portfolio” and that “[t]he parties will calculate a balancing payment based on the relative values of the portfolios and each party’s expected volume of sales of licensed products”). Establishing a net balancing payment without first establishing the FRAND one-way royalties for each party’s SEPs would enable the parties to avoid charging other parties consistent

negotiation at issue is for a cross license, then cross licenses will be useful benchmarks, provided that the bundle of patents at issue is similar to the bundle of patents in the benchmark. The patents granted back in the benchmark cross license also need to be similar to the patents granted back in the negotiation at issue. In short, cross licenses may contain helpful information, but they should receive heavy weighting in the determination of the FRAND royalty only when they resemble the negotiation at issue.

In particular, care is necessary when using cross-licensing agreements as benchmarks for one-way licensing agreements. The vast economic literature on termination rates (access pricing) in telecommunications networks is informative.¹⁸⁷ When calls go in both directions among two independently owned networks and are relatively symmetric in their volumes, the termination rates tend to offset one another. In that case, a price of zero might be most efficient, since it would obviate pricing, metering, and collecting payment for a large number of individual calls. But, roughly speaking, if the flow of traffic is asymmetric (such that the first network on balance consumes substantially more termination services of the second network than the second network consumes of the first), then a termination rate that the parties have set on the expectation of reciprocal use of one another's network assets will be disproportionately generous to the first network and disproportionately disadvantageous to the second network. By the same reasoning, the terms of a cross license (which is predicated on the mutual expectation of the parties that the first patent holder will use the patents of the second patent holder about as much as the second will use the patents of the first) will not reflect the willing terms of trade for a one-way license to use an individual patent (or portfolio of patents).

Fifth, if a benchmark license was negotiated as part of a settlement to a lawsuit, then the royalty rate agreed upon may include some part of the expected (and avoidable) costs of litigation and the uncertainty surrounding the litigation's outcome. For a prospective licensee who is also a defendant in a patent infringement case, the settlement of the suit will include value above and beyond the value of the license—namely, the avoidance of litigation costs or the elimination of uncertainty related to the outcome of the litigation. If the settlement is limited to the license terms with no additional transfer of money or other consideration, then the settlement could overstate the true economic value of the patent in suit. Conversely, for a prospective licensor who is also the plaintiff in a patent-infringement case against the prospective licensee, the settlement of the suit could include value above and beyond the value of the license—namely, the avoidance of litigation costs or the elimination of

royalties, which would reduce the transparency of pricing and thus confound the nondiscrimination requirement of the FRAND commitment.

¹⁸⁷ See, e.g., JEAN-JACQUES LAFFONT & JEAN TIROLE, *COMPETITION IN TELECOMMUNICATIONS* (MIT Press 2001); SIDAK & SPULBER, *supra* note 79.

uncertainty related to the outcome of the litigation. If the settlement is limited to the license terms with no additional transfer of money or other consideration, then the settlement could understate the true economic value of the patent in suit. Judge Holderman, for example, refused to consider licensing agreements “that were adopted under the duress of litigation.”¹⁸⁸

Essentially, when a benchmark license results from the settlement of litigation, that license loses some of its probative value as a comparable benchmark for the negotiation at issue. Unobserved factors could bias the royalty rate upward or downward. Without additional evidence, it may be impossible to determine reliably which outcome will be more likely. Indeed, it may even be impossible to determine whether the net flow of consideration is to the licensor or the licensee. That latter could be the case if the licensee is the first of multiple defendants to settle and is being offered ancillary inducements from the licensor to negotiate a high royalty rate, which the licensor then intends to cite as evidence relevant to the FRAND royalty rate that the remaining defendants should be ordered to pay. For example, Judge Posner found (in a non-FRAND case) that this licensing strategy motivated the benchmark royalty proposed by the patent holder’s expert economic witness on damages.¹⁸⁹

Sixth, whether a past license was negotiated as a fixed, lump-sum payment or a payment that is a function of the use of the licensed technology (for example, a running royalty rate or a fee per unit sold) affects how comparable the benchmark license is to the FRAND negotiation at issue. Fixed and variable license terms allocate the economic risk regarding uncertainty over the true value of the licensed technology differently between the parties. With a fixed lump-sum payment, the licensee bears more of the risk that the license will become less valuable over its term, and the patent holder bears more risk that the license will become *more* valuable over its time—which would result in the patent holder being under-compensated. With a variable payment, the licensor bears the risk that the license will become less valuable over time. Because the different forms of payment allocate risk differently, royalty rates should include some payment for the allocation of risk. As a result, if a benchmark license has a different payment structure than that in the FRAND

¹⁸⁸ RAND Opinion in *Innovatio*, *supra* note 4, at 64.

¹⁸⁹ Order of January 18, 2013 at 12, *Brandeis*, Nos. 1:12-cv-01508, 1:12-cv-01509, 1:12-cv-01511, 1:12-cv-01513 (Posner, J.) (“[The patent holder’s damages expert] notes as bearing on the possible cost of the license to [Company C] a statement in the settlement agreement that the settlement’s value ‘equals or exceeds \$[#]’ and a claim by the CEO of GFA [the licensor] that it may be as much as \$[#]. Neither of these self-serving statements, apparently made for litigation purposes, can be the basis of a reliable calculation by an economist. . . . She has not used a reasonable methodology to calculate the plaintiffs’ damages by reference to the . . . license[s], or profits at risk, or to assess the cost of noninfringing alternatives.”).

license, it will be less relevant to the determination of the FRAND royalty at issue. If a party is offering as the benchmark a license having a different payment structure, that party's expert witness on damages must adjust for the allocation of risk before converting one type of payment to the other.

The preceding paragraph implicitly assumes that the licensor and the licensee are equally informed about the economic risk regarding uncertainty over the true (revealed) value of the licensed technology. In other words, there is not asymmetric information about the economic significance of the licensed technology. In that case, the preference for a lump-sum royalty rather than a running royalty will reflect each party's risk preferences or need for liquidity—as opposed to its possession of any asymmetric information about the economic value of the licensed technology. There is, however, a compelling economic rationale for lifting the assumption of symmetric information: the licensee has a comparative advantage in predicting its own future sales. In the presence of asymmetric information, a licensee who seeks a lump-sum royalty may do so because the licensee expects that the lump sum will undercompensate the licensor. This information advantage also suggests that, in converting a lump-sum payment to a running royalty, one should adjust the running royalty to incorporate the reassignment of the risk to the licensor and to account for information asymmetry.

One way to account for the difference in risk perceptions and differences in the accuracy of projections is to base any conversion of a lump sum to a running royalty rate on sales of the licensed product that occurred in the period immediately preceding the license agreement. These sales would be observable to both parties and are a more accurate indication of the parties' intended royalty rate than are sales that occurred after the licensing period has commenced. Another way to account for the difference in risk perceptions and differences in the accuracy of projections is to have a subsequent true-up mechanism. This kind of device is common to long-term commercial contracts generally, as well as to rate orders for regulated utilities that extend for a number of years.

If enough time has passed that one can verify the accuracy of the sales projection upon which the parties based the lump-sum royalty, then the lump-sum license can serve as a reliable benchmark for comparison only insofar as the original projections were accurate. If the initial projections proved particularly inaccurate, not only does that inaccuracy limit the value of the past license as a benchmark, it also suggests that satisfying the FRAND commitment may require a running royalty to ensure that the licensor is properly compensated. In the abstract, FRAND commitments do not necessarily require running royalties or lump-sum payments. But in industries where the projections of sales of downstream products using the patent in suit might be less accurate, it is reasonable that either party can demand a running royalty to ensure that it is properly compensated for risk arising from uncertainty over the future demand for the licensed product.

In summary, these six factors are not necessarily mutually exclusive or exhaustive. Nonetheless, these factors are necessary for determining the comparability of benchmark licensing agreements when calculating FRAND royalties. The FRAND calculation will result in a range of royalty rates that would satisfy the FRAND commitment. Using the best available information, one then determines where within that range the rate for a specific SEP or portfolio of SEPs should fall. Because many factors that determine FRAND rates may be unobservable, the actual outcomes of comparable negotiations provide valuable information in estimating FRAND royalties. The factors described above help the finder of fact to determine how much weight the different benchmark licenses should receive in determining the FRAND royalty.

b. Do All Prior Licenses Lack Comparability for Identifying a FRAND License on the Rationale That They Were Negotiated Against the Threat of Hold Up?

Some economists might argue that past licenses cannot serve as comparable benchmarks because they were all negotiated subject to the SEP holder's ability to "hold up" the licensee and extract excessive royalties. Under that conjecture, the royalties in past licenses cannot inform a FRAND royalty at issue—or, alternatively, one must quantify and adjust for the share of the agreed-upon royalties that is attributable to patent holdup, which would of course require laborious computations and would be a contentious matter for fact finding.

Fortunately, courts need not worry about this conjecture, as it is not credible that royalties negotiated under the FRAND obligation (and to which parties voluntarily agreed) were inflated by holdup. In *Ericsson v. D-Link*, the infringer argued that past licenses were not comparable because they "include value derived from Ericsson's 'overall patent leverage[.]'"¹⁹⁰ The U.S. District Court for the Eastern District of Texas rejected that argument when ruling on post-trial motions:

Ericsson's RAND obligations are public knowledge. Ericsson's letters of assurance to the IEEE are publically available, so any potential licensee would be able to determine whether Ericsson had RAND obligations. The previous licensees were sophisticated parties, making it likely they would have been aware of Ericsson's RAND obligations during the negotiations. Taken together, there was substantial evidence that the prior licenses were negotiated within the framework of Ericsson's RAND obligations.¹⁹¹

By the court's reasoning, the royalties in an SEP holder's past licenses with third parties would generally *not* be inflated due to holdup.

The effect of the SEP holder's ability to seek an exclusion order or an injunction on the magnitude of previously negotiated royalties is limited. The European

¹⁹⁰ Memorandum Opinion & Order at 33, *Ericsson Inc. v. D-Link Sys., Inc.*, No. 6:10-cv-473 (E.D. Tex. Aug. 6, 2013) (quoting ECF No. 529 at 8).

¹⁹¹ *Id.* at 35.

Commission, for example, has expressed such concern in its investigation of Samsung: “seeking an injunction could allow Samsung to impose royalty rates . . . a licensee would not agree to, absent the threat.”¹⁹² However, both the SEP holder and the prospective licensee know during negotiations that, if negotiations fail, the SEP holder can commence patent-infringement suits seeking an injunction, an exclusion order, or both. The mere filing of a section 337 patent-infringement suit at the ITC, for example, would certainly not guarantee that (1) the ITC will issue the exclusion order, (2) the President will not veto the exclusion order, and (3) the Federal Circuit will uphold the exclusion order provided that the President did not exercise his veto and the licensee appealed the ITC’s issuance of the exclusion order. President Obama’s veto in August 2013 of the ITC’s exclusion order against Apple’s infringing products in Investigation 337-TA-794¹⁹³ lowered the expected value of an SEP holder’s threat to attempt patent holdup, thereby reducing the probability that any royalties negotiated in bilateral, voluntary agreements are subject to holdup. The Northern District of California’s issuance of a preliminary injunction preventing the enforcement of an ITC exclusion order in *Realtek Semiconductor Corp. v. LSI Corp.*¹⁹⁴ similarly reduces the likelihood that an SEP holder can credibly threaten patent holdup *ex ante*.

Furthermore, even if the SEP holder is able to obtain an injunction against the infringer, there is no reason to assume that the licensing rates negotiated under such a threat are not FRAND. FTC Commissioner Joshua Wright has observed that, “[a]lthough the rate negotiated with the injunction threat is likely greater than the rate negotiated without the threat of injunction, it does not follow that the former is above F/RAND.”¹⁹⁵ An SEP holder that uses the threat of an injunction might still demand the infringer to pay only a FRAND royalty. The use of the injunction, in other words, might have a thoroughly legitimate purpose. For example, the SEP holder might use the injunction as a tool to “encourage an infringing implementer to come to the negotiation table” and negotiate FRAND royalties.¹⁹⁶ There is consequently no valid justification to assume that royalties negotiated under the threat of an injunction necessarily violate FRAND.

¹⁹² Press Release, European Commission, Antitrust: Commission Consults on Commitments Offered by Samsung Electronics Regarding Use of Standard Essential Patents (Oct. 17, 2013), http://europa.eu/rapid/press-release_IP-13-971_en.htm.

¹⁹³ Letter from Michael B.G. Froman, Executive Office of the President, to The Honorable Irving A. Williamson, Chairman, U.S. ITC (Aug. 3, 2013).

¹⁹⁴ Order Granting Plaintiff Realtek Semiconductor Corporation’s Motion for Partial Summary Judgment and Denying Defendants LSI Corporation and Agere System LLC’s Motion to Stay at 12, *Realtek Semiconductor Corp. v. LSI Corp.*, No. C-12-03451-RMW (N.D. Cal. May 20, 2013).

¹⁹⁵ Joshua D. Wright, Commissioner, Fed. Trade Comm’n, Remarks at The Inaugural Academic Conference: The Commercial Function of Patents in Today’s Innovation Economy, George Mason University School of Law, at 29–30 (Sept. 12, 2013).

¹⁹⁶ *Id.* at 31.

Moreover, past licenses are probative comparisons *even if* they were negotiated subject to the SEP holder's ability to engage in patent holdup. It is irrelevant whether the SEP holder was able to engage in holdup during the negotiations of past licenses used in comparisons. The reason for using past licenses is to compare the royalties at issue with other FRAND royalties for the SEP portfolios at issue. Even if one accepts for sake of argument the possibility of holdup occurring in past negotiations, one does not need to find royalties that have zero "holdup value" for the purposes of conducting the relevant comparison. In the past licenses that one uses, the fact that both parties agreed to the royalties in those licenses indicates that those royalties are FRAND, regardless of whether they include any "holdup value." ETSI and the IEEE oblige an SEP holder to license its SEPs on FRAND terms; ETSI and the IEEE do not oblige an SEP holder to license its SEPs at a price that contains no "holdup value." Equating FRAND with "no holdup value" is a construct of critics of SEP holders that was introduced after the fact. If an SEP holder and a licensee voluntarily agree to a license for the patent holder's SEPs, then the rate is necessarily FRAND.

Finally, to exclude any past license between an SEP holder and an implementer from serving as a benchmark because it could have been negotiated subject to the risk of holdup would present a practical problem for determining FRAND royalties. If past license agreements cannot serve as reliable benchmarks for a FRAND royalty rate, then what can? Without past licenses where the SEP holder and licensee agreed upon FRAND royalties, the finder of fact would be left with considerably less empirical evidence on what constitutes FRAND terms. FRAND royalty determinations would become inherently more conjectural and hypothetical. Past bilateral licenses voluntarily agreed upon, without litigation, thus represent the best available benchmark for the determination of FRAND royalties.

2. Comparing the Proportional Contribution and "Top-Down" Approaches

In the limited number of FRAND cases decided to date, courts have considered two methodologies for the calculation of FRAND royalties. One is what I call the "Proportional Contribution" methodology, which the SEP holder used in *Innovatio*. The second methodology, offered in the same case is the "Top-Down" methodology that Dr. Gregory Leonard used (and Judge Holderman applied). I examine the advantages and limitations of each methodology. I also examine the extent to which these methodologies are equivalent, and how likely it is that they will yield FRAND results.

The Proportional Contribution methodology calculates the FRAND royalty as the product of (1) the market-determined price of the downstream product, (2) the proportional share of the value of the product that derives from the standard, and (3) the proportional share of the value of the standard

that derives from the patent:

$$\begin{aligned} \text{FRAND Royalty} = & \text{Price of End User Product} \times \frac{\text{Contribution of Standard}}{\text{Value of Product}} \\ & \times \frac{\text{Contribution of Patent}}{\text{Value of Standard}}. \end{aligned}$$

In the Proportional Contribution methodology, the marginal contribution that an SEP makes to a standard is the SEP's share of the value of the standard. The total value of a standard is in turn the marginal contribution that the standard makes to the value of the end-user product. The price of the end-user product reflects the costs of production (including the royalties paid to patent holders) and consumer demand for the end-user product.

Innovatio's economic experts used the Proportional Contribution methodology. They calculated the FRAND royalty as the product of the price of the final product, a "feature factor," and a 6-percent benchmark royalty rate. The licensed product was a licensed smartphone with Wi-Fi capability.¹⁹⁷ The "feature factor" represented the value of the downstream product attributable to the functionality of the SEPs in question.¹⁹⁸ (It is unclear from Judge Holderman's description of this approach how Innovatio's expert calculated the feature factor and whether, in particular, the value of the feature factor resulted from a formal econometric estimation of hedonic demand for the various features embodied in a licensed smartphone with Wi-Fi capability.¹⁹⁹) The 6-percent benchmark royalty rate was "derived from comparisons with what Innovatio argues are comparable licenses for other 802.11 standard-essential patent portfolios" and comparable licenses for other SEPs implemented in the standard.²⁰⁰ Innovatio's methodology thus involves three components, two of which—the marginal contribution of patents to the standard and the marginal contribution of the standard to the value of the downstream end-user product (the feature factor)—cannot be observed directly (from any market transaction or internal transfer pricing exercise or the like) and must therefore be estimated. Such an estimation presumes that the data exist to conduct the estimation, which may not be the case.

Judge Holderman rejected Innovatio's FRAND royalty calculation because of what he regarded as the lack of rigor in the analysis presented by Innovatio's expert witnesses.²⁰¹ However, Judge Holderman did not maintain that the underlying methodology that Innovatio used was unsound. Rather, he rejected the royalty estimate derived from the method because the economic experts

¹⁹⁷ RAND Opinion in *Innovatio*, *supra* note 4, at 21.

¹⁹⁸ *Id.* at 22.

¹⁹⁹ See, e.g., Sherwin Rosen, *Hedonic Prices and Implicit Markets: Product Differentiation in Pure Competition*, 82 J. POL. ECON. 34 (1974).

²⁰⁰ RAND Opinion in *Innovatio*, *supra* note 4, at 22.

²⁰¹ *Id.* at 26–27.

did not reliably determine the inputs in the model, including the feature factor.²⁰² Judge Holderman found that the economic experts' determinations of the values of the two unobservable components—the SEPs' share of the value of the 802.11 standard and the 802.11 standard's share of the value of the downstream product—were based on speculation.²⁰³

As expert economic witness for the alleged infringers, Leonard proposed a different approach, which he called the “Top-Down” methodology. Judge Holderman relied on Leonard's Top-Down methodology to determine the FRAND royalty.²⁰⁴ Leonard argued that the calculation of a FRAND royalty starts with the average price of a Wi-Fi chip, which Judge Holderman determined to be the smallest-salable component in the downstream end-user product relying on the Wi-Fi standard.²⁰⁵ Based on that price, Leonard calculated the average profit that a chipmaker earns on the sale of each chip. Leonard then multiplied the profit margin and the price of the chip by an estimate of Innovatio SEPs' share of the value of the Wi-Fi standard.²⁰⁶ Leonard's Top-Down methodology can be described with the following equation:

$$\text{FRAND Royalty} = \text{Price of Smallest Salable Component} \\ \times \text{Average Profit Margin per Chip} \times \frac{\text{Contribution of Patent}}{\text{Value of Standard}}.$$

Leonard's Top-Down approach bears at least two important similarities to the Proportional Contribution methodology.

First, the SEP portfolio's share of the value of the standard is common to both methodologies. Thus, both methodologies address the concern about FRAND royalties including value exceeding the value of the SEP at issue (the so-called holdup value).

Second, both methodologies address the concern that FRAND royalties may result in an excessive aggregate royalty stack that, in theory, could threaten to capture all of the downstream manufacturers' profits. When aggregate royalties exceed a manufacturer's profit margin, the manufacturer will cease producing the product implementing the standard. (Or, more realistically, the manufacturer will cease selling that product in the jurisdiction that issued the SEPs in suit. There are, after all, other markets for smartphones in the world than the United States.) The Top-Down methodology sets a ceiling for aggregate royalties at the level of the manufacturer's profits from the smallest salable component. In *Innovatio*, Judge Holderman deemed that ceiling to be the profit margins of chipmakers. This method guarantees that the FRAND royalty does not drive the aggregate FRAND royalties above the manufacturers' profit

²⁰² *Id.*

²⁰³ *Id.* at 28.

²⁰⁴ *Id.* at 73.

²⁰⁵ *Id.*

²⁰⁶ *Id.*

margins—which would force them to cease implementing the standard. (Judge Holderman did acknowledge the general possibility that the downstream manufacturers may have the ability to raise prices (such that the existing profit margin would not be a binding constraint), although he seemed to conclude that the facts in *Innovatio* indicated that the allegedly infringing manufacturers lacked such ability.²⁰⁷) Similarly, the Proportional Contribution methodology can be used to set a ceiling for aggregate royalties among members of the SSO. For example, if all SEP holders set the aggregate royalty rate (or the percentage contribution of the standard to the downstream product) at 10 percent, and if they derive their royalties by multiplying 10 percent by the respective percentage contribution of their patent portfolios to the standard, then the aggregate royalty would in fact be driven down to 10 percent. If, however, SEP holders set the aggregate royalty component in the formula too high, the aggregate royalty will be high as well.

Both the Top-Down and Proportional Contribution methodologies have limitations. First, the SEP portfolio's share of the standard is not directly observable. Thus, the reliability of the final FRAND royalty estimate using either methodology depends on how rigorously one determines the SEP portfolio's contribution to the standard. Methods that have been used (which I examine in this article) include patent counting and counting approved contributions. I also propose a new model based on an adaptation of the Lorenz curve in Part VI. Leonard apportioned the contribution of *Innovatio*'s SEPs to the 802.11 standard by (1) dividing the patents in the 802.11 standard into groups based on their importance as estimated by technical experts and (2) then assigning each group a fraction of the total value of the standard. Judge Holderman adopted Leonard's apportionment method.²⁰⁸ One could use the same apportionment method in either the Proportional Contribution methodology or the Top-Down methodology.

The Proportional Contribution methodology has an additional component whose true value is unobservable: the contribution of the standard to the downstream product. The contribution of the standard to the end-user product used in the Proportional Contribution methodology is difficult to estimate, especially for the purposes of hypothetical royalty negotiations. *Ex ante*, the parties to the negotiations do not have complete information as to how important the standard may be for end-user products relative to the other technologies implemented, especially if the standard is not the key source of entrepreneurial profits from innovation for the product.

²⁰⁷ *Id.* at 75–76. Judge Holderman noted that *Innovatio*'s expert economist, Professor David Teece, “testified that in some cases, widespread infringement may have allowed manufacturers to set their prices very low, essentially ignoring the value of the intellectual property included in their products. Once that value is priced back in (through proper RAND valuations both in court and through license negotiations), manufacturers’ current profit margins will certainly be obliterated, but manufacturers will respond simply by raising their prices.” *Id.* at 75 (citations omitted).

²⁰⁸ *Id.* at 71.

Although estimating the standard's precise share of the value of the downstream product is a difficult task, one can use estimates of the aggregate royalty for SEPs in the standard to approximate the value of the standard. For example, the market research firm ABI Research has estimated aggregate 3G royalties (for an implementer who has no SEPs of its own to cross-license) at 17.5 percent of the net sales price of the downstream product as of 2011 and 4G aggregate royalties to reach 35.4 percent.²⁰⁹ Moreover, the aggregate royalty need not be estimated with exact certainty; rather, one can assume a conservative aggregate so as to put downward pressure on the aggregate royalty. Thus, the limitations in determining the standard's share of the value of the downstream product do not undermine the reliability of the Proportional Contribution methodology.

One limitation of the Top-Down methodology is that if the intermediate product—such as a chip—does not fully contain the value of the standard at issue, then using the profits of the intermediate producer may understate the benefits of the standard for the downstream product and for consumers. Under such circumstances, using the Top-Down approach could lead to underinvestment by SEP holders.

A key difference between the Top-Down and Proportional Contribution methodologies is the royalty base used for the determination of a FRAND royalty. The Proportional Contribution methodology uses the price of the downstream product as the royalty base, whereas the Top-Down methodology uses the price of the smallest-salable component (the chip). Judge Holderman rejected the use of the price of the final downstream product as the royalty base and emphasized that the court must calculate royalties “not on the entire product, but instead on the smallest salable patent-practicing unit.”²¹⁰

Both royalty bases are valid. The adequate royalty base depends on the characteristics of the standard, and the specific product produced in compliance with the standard. When a product has an easily observable component that provides all the functionality of the standard, courts should consider the price of the component as the royalty base. For example, Judge Holderman concluded that the Wi-Fi chip essentially contained the entire functionality of the 802.11 standard.²¹¹ However, there are cases in which it is not possible to identify a smaller unit within the final product that solely implements the standard. In such cases, the court should use the downstream product's net retail price as the royalty base, because the end-user product *is* the smallest-salable component implementing the standard. For example, it is the industry practice in voluntary, bilateral licensing of patents essential to the 2G, 3G, and 4G SEPs to use the price of the downstream product (most notably, the smartphones) as the royalty base for a running (*ad valorem*) royalty rate. (Sometimes

²⁰⁹ Solis & Carlaw, *supra* note 102, at 32, 34.

²¹⁰ *Id.* at 23, 28 (citing *Cornell Univ. v. Hewlett-Packard Co.*, 609 F. Supp. 2d 279, 283, 287–88 (N.D.N.Y. 2009)).

²¹¹ RAND Opinion in *Innovatio*, *supra* note 4, at 27.

such a running royalty will include a ceiling, expressed as fixed dollar amount, which will have the practical effect of capping the share of the price of the smartphone on which royalties will apply—which is a *de facto* way for the parties to acknowledge in bilateral negotiations that some residual amount of the value of the smartphone flows from features that do not read on SEPs.)

When the input values are reliably determined, both the Proportional Contribution and Top-Down approach should yield FRAND royalties. Importantly, both correlate directly with the technological contribution of the SEPs at issue to the standard. The Proportional Contribution approach involves patent holders agreeing to some aggregate royalty rate on the price of the end-user product. SEP holders will want to agree on an aggregate royalty rate that maximizes total profits. However, if the aggregate royalty rate is too high, manufacturers will pass royalty costs to consumers, and the total quantity sold will decrease, reducing total revenues and reducing total profits. Thus, contrary to the patent-holdup and royalty-stacking conjectures, an SEP holder has incentives to assume a conservative aggregate royalty rate. If the aggregate royalty rate is too low, manufacturers and consumers will benefit, but an SEP holder's returns to innovation will decrease. The Top-Down approach similarly seeks the profit-maximizing conditions among SEP holders. An SEP holder licenses the rights to implement its technology to producers of the smallest-salable component implementing the standard-essential technology. That component is priced on the basis of its contribution to the profits from the sale of the end-user product. If each component producer and each downstream manufacturer operates at the profit-maximizing level, the Top-Down approach yields equivalent results as the Proportional Contribution approach.

3. Measuring the Relative Contribution of the Various SEPs

As I explained above, a key input to both the Proportional Contribution and Top Down approaches is the percentage contribution that a particular SEP portfolio (or a set of asserted SEPs) makes to the value of the standard. I examine two methods for quantifying this value: counting approved contributions and deriving a distribution curve for the value of the patents in the standard.

a. Approved Contributions

An SEP holder's royalty rate should reflect a share of the aggregate royalties for a particular standard based on the SEP holder's relative contribution to the standard. For example, a report by Signals Research Group identified the largest contributors to the LTE standard.²¹² A "contribution" is a technical invention, submitted to a working group in an SSO, meant to address a technical problem with a standard. The contribution is "approved" when the SSO votes

²¹² SIGNALS RESEARCH GROUP, LLC, *THE ESSENTIALS OF INTELLECTUAL PROPERTY, QUANTIFYING TECHNOLOGY LEADERSHIP IN THE DEVELOPMENT OF THE LTE STANDARD 4* (Sept. 2010). Signals Research Group conducted its report at Ericsson's request as an independent audit of an internal Ericsson report.

by consensus to include the comments or suggestions contained within the contribution in the standard.²¹³ Contributions that are not approved are withdrawn, noted (but not approved), revised, or not acted upon by the working group.²¹⁴ The working group does not act upon most unapproved contributions.²¹⁵ Signals Research Group counted the approved contributions for each participant. If a contribution was jointly submitted by two parties, Signals Research Group assigned a half contribution to each contributor. Given that the vast majority of contributions are inventions for which the inventor has filed a patent application (or perhaps has already been issued a patent), a company with a large share of approved contributions will likely have a large and strong patent portfolio relating to the same technology. Although there is not a one-to-one mapping between a party's number of approved contributions and its number of patents, the number of approved contributions should highly correlate with the size and strength of a party's patent portfolio.

The Signals Research Group report analyzed publicly available documentation from 3rd Generation Partnership Project (3GPP) meetings to identify approved submissions to the LTE standard over 2007 and 2008. The report identified and counted contributions that the RAN1, RAN2, SA2, SA3, and CT1 working groups within the 3GPP standards body approved in 2007 and 2008.²¹⁶ The working groups were chosen to “most closely align[] with the patented technologies that a new entrant, in particular a device manufacturer, would need to license in order to enter the market with an LTE product.”²¹⁷ Signals Research Group chose the two-year period to include the working group meetings “during which a large majority of the work on the LTE standard was conducted.”²¹⁸ Although LTE has evolved since 2008, Signals Research Group identified that the majority of the implementation techniques currently associated with LTE were already in place by the end of 2008.²¹⁹

The use of approved contributions to allocate the surplus generated by the standard does not contradict my earlier argument that SEPs have only combinatorial value (versus incremental value). Rather, the analysis of approved contributions is an approach to evaluating a portfolio given the constraint that the incremental value of any individual SEP is zero. This approach is one basis for determining the share of the combinatorial value of all the SEPs in a standard that an individual SEP holder should receive as its royalties.

Signals Research Group identified 42,138 submitted contributions to the 3GPP working groups during the time period.²²⁰ Of those submissions, only

²¹³ *Id.* at 25.

²¹⁴ *Id.*

²¹⁵ *Id.*

²¹⁶ *Id.* at 21.

²¹⁷ *Id.*

²¹⁸ *Id.*

²¹⁹ *Id.*

²²⁰ *Id.* at 22.

about 55 percent (23,235) related to LTE.²²¹ Of the LTE-related submissions, only 3,683, or 15.9 percent, were approved by the applicable working groups.²²² The report found that Ericsson contributed the most approved submissions to the standard from 2007 to 2008, which amounted to 18 percent of all approved submissions.²²³ The next-highest contributor had 22 percent fewer submissions approved over that time period.²²⁴ Ericsson's approved contributions were more than double those of the third-most prolific contributor.²²⁵ (Signals Research Group did not identify the other companies.) Figure 6 shows approved submissions to LTE working groups by company.²²⁶

Signals Research Group concedes that not every approved contribution constitutes a patentable technology, but it also states that this caveat does not invalidate the overall conclusions of its study.²²⁷ It also concedes that the study's methodology could have a modest effect on specific findings. However, absent evidence that certain companies disproportionately submitted non-patented contributions (which seems improbable), a given company's relative share of approved contributions should approximate that company's relative share of patented contributions.²²⁸

The Signals Research Group report reaches the following four conclusions. First, most 3GPP submissions never get approved.²²⁹ Second, Ericsson was the largest single contributor to the development of the LTE standard.²³⁰ Third, companies frequently identified as major holders of LTE patents are not necessarily the leading contributors to the 3GPP standardization process.²³¹ Fourth, the low rate of submission approval casts doubt on the validity of patent-counting methods for valuing a given company's contribution to the standard.²³² Even if an SEP holder has the highest number of patents declared essential to the LTE standard, it does not necessarily follow that the SEP holder made the largest *meaningful* contribution to creating the LTE standard.

Other independent research is consistent with the Signals Research Group report's findings. ABI Research has also examined relative contributions of patent holders to the LTE standard. In a study not commissioned by any third party, ABI Research focused on approved contributions to multiple 3GPP

²²¹ *Id.* at 25.

²²² *Id.*

²²³ *Id.* at 25–26.

²²⁴ *Id.*

²²⁵ *Id.*

²²⁶ *Id.*

²²⁷ *Id.* at 23.

²²⁸ *Id.*

²²⁹ *Id.* at 25.

²³⁰ *Id.* at 26.

²³¹ *Id.* at 27. Signals Research Group does not identify the companies that comprise the top ten contributors to the LTE standardization process.

²³² *Id.*

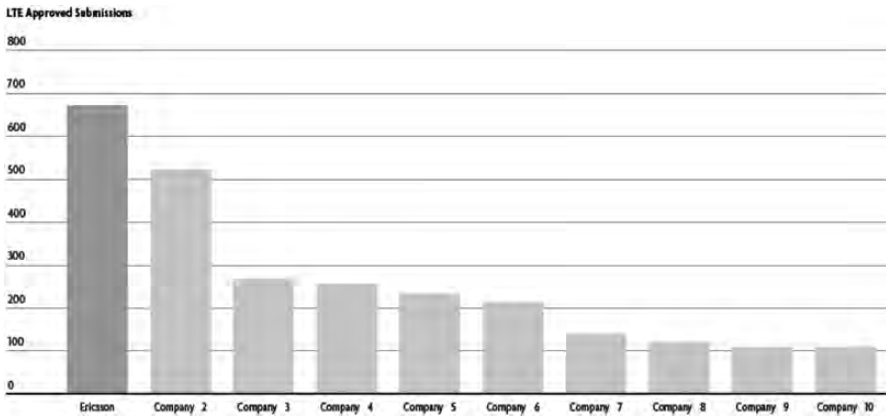


Figure 6. 3GPP approved submissions for LTE by company
 Source: SIGNALS RESEARCH GROUP, *supra* note 212, at 26.

specifications of the LTE standard from 2009 to 2012.²³³ ABI Research calculated contributions by examining the submissions to the LTE standard in 3GPP meetings that 3GPP actually accepted as part of the LTE standard.²³⁴

Consistent with the Signals Research Group study, the ABI Research study concluded that Ericsson is the largest single contributor to the LTE standard, with 6,891 approved contributions from 2009 to 2012, which was about 27 percent of the 25,745 total contributions submitted by the top 10 patent holders.²³⁵ Ericsson's contributions to the standard exceeded the second-place contributor (Huawei) by 50 percent.²³⁶ Therefore, the ABI Research findings for Ericsson's contribution to the LTE standard comport with the Signals Research Group report's results. Figure 7 shows the approved contributions to the LTE standard from 2009 to 2012.²³⁷

Such evidence on the relative contribution of a patent holder's SEPs to a standard is a significant input in determining the proper FRAND royalty for the patent holder's SEPs. Put differently, the SEP holder's share of the aggregate royalty burden for a standard should be proportional to the SEP holder's relative contribution to the standard. However, an SEP holder's relative contribution to the standard is *not* necessarily the same as the share of the aggregate royalty burden that the SEP holder should receive. Because of the prevalence of cross licensing, the SEP holder's share of the aggregate royalty paid per

²³³ Philip Solis & Peter Cooney, *Standards Leadership Within the 3GPP* (ABI Research June 19, 2013). The specifications are RAN (RAN1, RAN2, RAN3, RAN4, and RAN5), SA (SA1, SA2, SA3, SA4, and SA5), and CT (CT1, CT3, and CT4). *Id.* at 3.

²³⁴ *Id.* at 5–6.

²³⁵ *Id.* at 12.

²³⁶ *Id.*

²³⁷ *Id.*

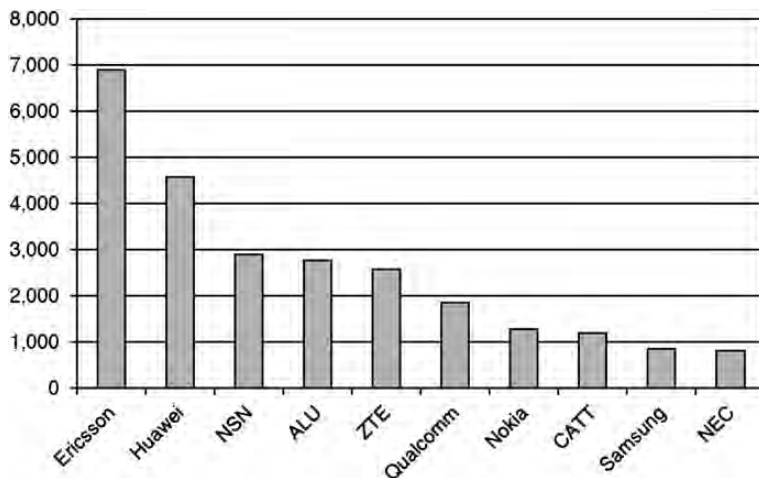


Figure 7. Approved contributions to the 3GPP LTE standard, 2009–2012
 Source: Solis & Cooney, *supra* note 233, at 12.

device will typically exceed the SEP holder's relative contribution to the standard.

Most of the manufacturers that produce standard-compliant devices hold portfolios of patents. When manufacturers enter into cross-licensing agreements, the offsetting values of the cross licenses lower the actual aggregate royalty burdens. Suppose that handset manufacturers hold 50 percent of the standard-essential patents for handsets (which I consider to be a conservative estimate). Then, the observed aggregate royalties on handsets for all LTE-standard-essential patents will be only 50 percent of the total value of the SEPs. The aggregate royalty burden thus includes paid royalties *plus* the value of cross licensing. If the total value of all the SEPs in the LTE standard amounted to \$100 per handset, after cross licensing, handset manufacturers would pay an aggregate royalty of only \$50 per handset. So Ericsson's 18-percent contribution to the LTE standard, for example, means that 18 percent of the total value of the SEPs in the LTE standard is attributable to Ericsson's SEPs. Thus, using the numerical example of \$100 per handset, \$18 represents the monetary value of Ericsson's relative contribution. After cross licensing, however, that \$18 equates to a 36-percent share of the aggregate LTE royalties paid (of \$50 per handset). Therefore, royalty rates can satisfy a FRAND commitment and still have a share of aggregate royalties that exceeds the patent holder's share of contributions to the standard. That relative contribution must be measured using rigorous methodologies, not by simply counting the number of declared-essential patents per patent holder.

Instead of using approved contributions to apportion the surplus generated by the standard, one could use the number of declared-essential patents. However, this alternative approach assumes, unrealistically, that all declared-essential

patents are equally valuable. The peer-reviewed approval process for approved contributions at least serves to check the acceptance of unnecessary contributions into the standard. In contrast, with only rare exceptions, for a declared-essential patent there is no review by the SSO to verify the accuracy of the patent holder's declaration of essentiality. Instead, the SSO member self-certifies its patent to be standard-essential. As a result, patent holders have an incentive to overdeclare their patents as being essential in the knowledge that the cost of verifying *ex ante* the fact of essentiality for every declaration would be prohibitive.

In short, though not a perfect method for allocating the surplus generated by the standard among SEP holders, approved contributions do have the virtues of having a relatively low cost and including a check on the validity of each contribution.

b. Schankerman's Distribution of the Value of Patents

In estimating the contribution of the patent holder's SEPs to the standard in *Innovatio*, Gregory Leonard used a crude version of a Lorenz curve when determining the value of *Innovatio*'s patents. To determine their value, Leonard relied on a 1998 article by Mark Schankerman that found that the top ten percent of all electronic (non-standard-essential) patents accounted for 84 percent of the value of all electronic patents.²³⁸ Leonard thus multiplied the profit margin on a Wi-Fi chip by 84 percent to identify the value attributable to the top 10 percent of the SEPs for the 802.11 standard. To identify the share of value attributable to *Innovatio*'s SEPs, Leonard then multiplied the obtained value by 23/300 (which represented the number of *Innovatio*'s SEPs in suit divided by ten percent of the total number of SEPs for the 802.11 standard).²³⁹

Leonard based his methodology on the generally accepted proposition that the value of SEPs implemented in a standard tends to be highly skewed. However, Leonard based his assessment of the value distribution of SEPs to a standard on data from an article published fifteen years earlier. Although the application of a non-uniform distribution curve is appropriate, the data provided by Mark Schankerman's analysis require some caveats when one uses them to determine the value of the 802.11 SEPs.²⁴⁰ The distribution curve upon which Leonard relied was computed based on data from 1970 to 1979.²⁴¹ Schankerman noted in 1998 that the distribution of the value of patents within industries has shifted over time.²⁴² Therefore, the distribution

²³⁸ RAND Opinion in *Innovatio*, *supra* note 4, at 84.

²³⁹ *Id.* Leonard suggested that 3000 is a reasonable estimate of the number of SEPs implemented in the 802.11 standard. *Id.* at 82.

²⁴⁰ Mark Schankerman, *How Valuable is Patent Protection? Estimates by Technology Field*, 29 RAND J. ECON. 77 (1998).

²⁴¹ *Id.* at 94.

²⁴² *Id.* at 91.

curve that Schankerman calculated in 1998 should be applied with considerable caution when assessing the value of patents within standards developed and commercialized decades later.

Further, Schankerman analyzed the relative value of patents in different industries and observed sharp differences among those industries.²⁴³ In other words, the distribution of patent values appears from Schankerman's study to be highly industry-specific. Moreover, Schankerman did not consider the value of SEPs. Therefore, he did not analyze whether the patent value distribution is uniform within different standards belonging to particular industries. His empirical findings, therefore, have limited applicability to the evaluation of SEPs and the calculation of FRAND royalties. Analysis resting on such findings runs the risk of not being sufficiently connected to the facts of the case to be admissible as expert testimony.²⁴⁴

In short, Judge Holderman based his analysis on the correct conceptual proposition—that the distribution of value of SEPs for a given standard is skewed, such that the top ten percent of SEPs contributes greater value to the standard than the bottom ten percent. Although Schankerman provided a robust methodology for his intended purposes, courts should not put too much weight on Schankerman's now-dated analysis, which does not focus specifically on the value of SEPs. Rather, courts should use recent data that are specific to SEPs for the standard at issue. As I explain later, reports such as those provided by ABI Research and Signals Research Group are particularly valuable for determining FRAND royalties for SEPs in the telecommunication sector.

D. Must a FRAND Royalty Disaggregate All of the Value of the Standard Itself?

Must the methodology for determining a FRAND royalty account for the risk of patent holdup? In his determination of the RAND royalty in *Microsoft v. Motorola*, Judge Robart emphasized that an SEP holder has the ability and incentive to hold up licensees, and he recommended that courts develop a royalty methodology that mitigates holdup risk.²⁴⁵ Judge Robart adopted an *ex ante* incremental value approach (a methodology whose deficiencies I addressed in Part IV), stating that “[r]ewarding the SEP owner with *any* of

²⁴³ *Id.* tbl.5 at 94.

²⁴⁴ *See, e.g.*, *Cornell Univ. v. Hewlett-Packard Co.*, 609 F. Supp. 2d 279, 288 (N.D.N.Y. 2009); *IP Innovation, LLC v. Red Hat, Inc.*, 705 F. Supp. 2d 687, 689–90 (E.D. Tex. 2010); *Uniloc USA, Inc. v. Microsoft Corp.*, 632 F.3d 1292, 1315–16 (Fed. Cir. 2011). Expert economic testimony that is correct as a matter of theory may nonetheless be deemed inadmissible if the theory is not applied to concrete facts in the controversy at hand. *See, e.g.*, *Concord Boat Corp. v. Brunswick Corp.*, 207 F.3d 1039, 1057 (8th Cir. 2000) (ruling expert economic testimony on antitrust damages inadmissible because the expert did not tie his use of the Cournot oligopoly model to the facts of the case).

²⁴⁵ *Microsoft Corp. v. Motorola Inc.*, No. C10-1823JLR, 2013 WL 2111217, at *10–12, *20, *44 (W.D. Wash. Apr. 25, 2013) (Robart, J.).

the value of the standard itself would constitute hold-up value and be contrary to the purpose behind the RAND commitment.”²⁴⁶ For Judge Robart, therefore, a royalty cannot be FRAND if it contains any holdup value. Judge Holderman expressed the similar view that “one of the primary purposes of the RAND commitment is to avoid patent hold-up.”²⁴⁷

Judge Davis’ approach to evaluating FRAND royalties in *Ericsson v. D-Link* in the Eastern District of Texas contradicts Judge Robart’s methodology.²⁴⁸ Rejecting holdup as a matter of theory, Judge Davis emphasized, in his order on post-trial motions following a jury verdict in Ericsson’s favor, that an SEP holder of Ericsson’s stature “is a sophisticated licensing entity” that has “an incentive to establish a reasonable licensing rate to maintain credibility in the licensing community.”²⁴⁹ He further said that “the money paid under” licensing agreements for FRAND-encumbered patents stipulated with other licensees “represents the market’s valuation of the . . . contributions of Ericsson’s patents.”²⁵⁰ Judge Davis rejected the defendant’s claim that the jury’s award of reasonable-royalty damages (which accounted for Ericsson’s FRAND obligation in light of Judge Davis’ explicit reference to that obligation in his jury instructions on damages) included excess value associated with holdup.

The conflicting approaches of Judge Robart and Judge Davis leave some uncertainty regarding the approach that courts will adopt to evaluate a FRAND royalty. For at least three reasons, however, patent holdup considerations should not receive weight in the determination of FRAND royalties. First, patent holdup is a conjecture, not a real-world fact. Little, if any, empirical evidence exists that SEP holders actually have engaged in patent holdup and caused lower production of standard-compliant downstream products. As Judge Davis concluded, licensees are sophisticated parties, aware of the existence of an SEP holder’s FRAND obligation during licensing negotiations. Consequently, it would be naïve to believe that voluntarily agreed-upon royalties in licenses subject to the FRAND obligation are inflated or excessive because of the licensee’s fear of holdup.

Second, one could question whether the FRAND commitment truly aims to address the risk of patent holdup, and therefore whether the parties and the court must identify and disaggregate the quantum of alleged holdup value when identifying a FRAND royalty. The FRAND commitment aims to ensure that implementers have access to the standard. The IPR policies of SSOs such as ETSI and the IEEE do not refer either to patent holdup or to the pricing of SEPs, provided only that such pricing not exclude an implementer of the standard. There is no indication in the ETSI or IEEE IPR policies that, by

²⁴⁶ *Id.* at *19 (emphasis added).

²⁴⁷ RAND Opinion in *Innovatio*, *supra* note 4, at 14.

²⁴⁸ Memorandum Opinion and Order, *Ericsson Inc. v. D-Link Sys., Inc.*, No. 6:10-cv-473 (E.D. Tex. Aug. 6, 2013).

²⁴⁹ *Id.* at 48.

²⁵⁰ *Id.* at 30.

requiring SEP holders to make a FRAND commitment, the SSOs aimed to dictate how an SEP holder and a licensee should set FRAND royalties or divide economic rents. The proposition that a FRAND royalty must disaggregate all holdup value is an assertion that is not found in the FRAND commitment.

Third, requiring zero holdup value—that is, zero value attributed to the adoption of the patented technology into the standard—for a royalty to be FRAND requires a peculiar assumption that is counterintuitive and implausible—namely, that the patent holder is not entitled to share any of the value generated by the standard. This assertion invites the question, who *is* entitled to reap the value of the standard? Only implementers? Why should holders of SEPs, without whose participation the SSO could not begin to achieve its intended purpose, be denied the right to capture any share of the value of the standard that they have helped to create? Depriving each SEP holder of any of the value associated with the adoption of its patented invention into the standard would give implementers the entire surplus generated by the standard and would fail to encourage the participation of inventors in standard setting. Because of that perverse incentive, such a royalty cannot be FRAND.

In short, the risk of patent holdup and the supposed need to disaggregate “holdup value” from other components of value are irrelevant to a proper determination of FRAND royalties.

E. Are Aggregate Royalties Too High?

The FRAND commitment and the fiduciary duty that SEP holders in an SSO have to one another exist to ensure that implementers are not denied access to a standard because the aggregate royalty burden to implement a standard is too high. In principle, a party’s FRAND royalty must account for its effect on the aggregate royalty that an implementer must pay to comply with the standard. As a matter of fact, however, have aggregate royalties been so high as to hinder the implementation of standards and the development of new standards and innovations? At least one district court highly experienced in patent litigation has expressed great skepticism: “The best word to describe [the] royalty stacking argument is theoretical.”²⁵¹ Below, I examine the case of aggregate royalties for 3G standards.

The first release of the 3G UMTS standard was in 1999.²⁵² In 2002, Nokia petitioned the industry to adopt a 5-percent cumulative royalty for WCDMA.²⁵³ However, a report from Credit Suisse First Boston released in

²⁵¹ *Id.* at 36.

²⁵² *Release 1999*, 3GPP, <http://www.3gpp.org/specifications/Releases/article/release-1999>.

²⁵³ Press Release, Nokia, Nokia Advocates Industry-wide Commitment to 5% Cumulative IPR Royalty for WCDMA, at 17 (May 8, 2002), <http://press.nokia.com/2002/05/08/nokia-advocates-industry-wide-commitment-to-5-cumulative-ipr-royalty-for-wcdma/> (“Under this proposal no manufacturer should pay more than 5% royalties covering all essential WCDMA patents from all patent holders.”).

2005—three years after Nokia’s unsuccessful appeal for a 5-percent cumulative royalty—estimated the cumulative royalties for WCDMA to be 17.3 percent of the net sales price.²⁵⁴ Despite the early suggestions for single-digit aggregate royalties, the estimated aggregate royalty rates for 3G following its release were much higher.

In 2011, ABI Research examined 2G, 3G, and 4G patents for mobile devices and estimated the total handset royalties for handsets practicing (1) GSM, (2) GSM/WCDMA, and (3) GSM/WCDMA/LTE standards.²⁵⁵ ABI Research found that, industry-wide, GSM-only handsets were declining in shipments and had the lowest royalty rates compared with handsets practicing more than one standard.²⁵⁶ In contrast, handsets practicing both GSM and WCDMA were growing in volume, royalty rates, and retail price. Handsets practicing all three standards (GSM, WCDMA, and LTE) had the highest royalty rates and commanded the highest handset prices but still exhibited relatively small volumes.²⁵⁷

ABI Research estimated aggregate royalties for the three categories of standards above. Its methodology involved discussions with industry companies and studies of the related patents to determine the strength of patent portfolios compared with the industry at large. Next, ABI Research ranked companies on a scale from having “weak portfolios” to “very strong portfolios.” Using company-weighted market shares, ABI Research derived average royalties paid by companies practicing the standards throughout the forecast period, from 2010 to 2016.²⁵⁸ Table 2 reproduces the estimates by ABI Research of the aggregate royalty rates for handsets practicing both the GSM and WCDMA standards.²⁵⁹

ABI Research estimated aggregate royalty rates between 3.8 percent and 17.5 percent in 2011 for handsets practicing the GSM and WCDMA standards based on portfolio strength. For companies with their own strong to very strong patent portfolios, the royalty rates for handsets practicing the GSM and WCDMA standards were between 3.8 and 6.6 percent, while a licensee with a weaker patent portfolios paid royalties between 13.1 and 17.5 percent. ABI Research’s estimates represent royalties being paid twelve years after the release of UMTS. Thus, it is expected that the aggregate royalty rates would have fallen to single-digit figures by 2011 for licensees having strong or very strong portfolios.

The ABI Research estimates are forward-looking. Cumulative royalties depend not only on the strength of the licensor’s portfolio, but also on the

²⁵⁴ Keith Mallinson, *A Compendium of Industry and Market Analysis Articles on Intellectual Property in Mobile Communications Standards: Response to FTC Request for Comments on the Practical and Legal Issues Arising from Incorporation of Patented Technologies in Collaborative Standards* (June 12, 2011) (citing Credit Suisse First Boston’s 3G Economics Report).

²⁵⁵ Solis & Carlaw, *supra* note 102, at 2.

²⁵⁶ *Id.* at 32–35.

²⁵⁷ *Id.*

²⁵⁸ *Id.* at 31–35.

²⁵⁹ *Id.* at 33.

Table 2. ABI Research estimates of GSM/WCDMA likely aggregate royalty rates paid by licensees, by licensee's patent portfolio strength, world market, 2011

Segment	Rate
No Portfolio	17.5%
Weak Portfolio	13.1%
Moderate Portfolio	11.2%
Strong Portfolio	6.6%
Very Strong Portfolio	3.8%

Note: GSM/WCDMA handsets include GSM, GPRS, EDGE, WCDMA, HSDPA, HSPA, and HSPA+.

Source: Solis & Carlaw, *supra* note 102, at 33.

strength of the licensee's portfolio, the volume of licensed product, and the novelty of the technology. Rudi Bekkers and Joel West studied the aggregate GSM and UMTS royalties in the context of the substantially larger number of UMTS patents compared with GSM. They compared patent portfolios for GSM and UMTS six years following standardization. They found that, "[a]fter six years, GSM had a total of 140 essential patents held by 23 organizations. For UMTS, the comparable figures are 1,227 essential patents (an eightfold increase) held by 72 organizations (a threefold increase)."²⁶⁰ Firms invest in R&D for the next generation of technology. Therefore, once a standard is released, firms will promptly declare any existing patents they consider essential to the standard. As the technology in question evolves, firms will continue to declare more patents, particularly as new standards build upon older ones. The eightfold increase in essential patents may account for the disparity in royalty rates that Bekkers and West found between the two standards. Each declared-essential patent that proves to be essential in fact to a standard has some royalty value. The more patents that are essential in fact to a standard, the greater the number of royalties associated with the standard, and therefore the larger the aggregate royalty rate.

A similar scenario should be expected with 4G standards. Although current estimated royalty rates for 3G standards may be in the observed range of 3.8 to 17.5 percent for the aggregate royalty burden for 3G handsets, the range was much wider immediately following the release of the standard. Double-digit aggregate royalties approaching 30 percent following the release of a standard for mobile handsets can be expected and would be reasonable.²⁶¹ Furthermore, the impact of 30-percent estimated aggregate royalties did not dampen the

²⁶⁰ Rudi Bekkers & Joel West, *IPR Standardization Policies and Strategic Patenting in UMTS*, presented at the 25th Celebration Conference on Entrepreneurship and Innovation: Organizations, Institutions, Systems and Regions (2009).

²⁶¹ See, e.g., Rudi Bekkers, René Bongard & Alessandro Nuvolari, *Essential Patents in Industry Standards: The Case of UMTS*, Proceedings of the 6th International Conference on Standardization & Innovation in Information Technology, at 12 (2009); Lemley & Shapiro, *supra* note 158, at 2026.

introduction and sale of 3G-compatible devices and therefore should not be considered prohibitively high. 3G-enabled handsets grew 25 percent to 40 percent year-over-year from 2005 to 2008, the early years following the release of the 3G standard.²⁶² Therefore, the observed aggregate royalties should be considered reasonable and should not raise concerns about stacking or holdup issues.

VI. THE FAIR AND REASONABLE DIVISION OF THE AGGREGATE ROYALTY BURDEN AMONG SEP HOLDERS

In this part, I consider methods of dividing the aggregate burden of FRAND royalties among the SEP holders contributing to the standard.

A. The Common-Pool Problem Analogy for Governing Behavior in SSOs

A common pool problem arises with respect to dividing the producer surplus arising from the total number of standard-essential patents necessary to manufacture a downstream product. The holder of any one patent that is genuinely standard-essential can block the creation of the joint producer surplus made possible by the commercial aggregation and exploitation of all the SEPs. It is therefore necessary for SEP holders to achieve an equilibrium of mutual forbearance from opportunistic behavior. This equilibrium, then, is an economic objective of the fiduciary duty that each SEP holder owes to each other SEP holder.

An alternative and inferior equilibrium would be one of mutual opportunism. If it takes a myopic view of profit maximization, each SEP holder has an incentive to extract the greatest possible share of the joint producer surplus by demanding higher royalties. A unit royalty or *ad valorem* running royalty becomes a marginal cost for manufacturers of the downstream products. As the marginal cost of royalties increases, the implementer's profit-maximizing output of the downstream product will decrease. This reduction in output could decrease total royalties to SEP holders in some situations. In the limit, excessive royalties could force the downstream manufacturer from the market completely. This, of course, is the royalty stacking conjecture. An SEP holder's opportunistic behavior thus not only makes it harder for other SEP holders to share in the joint producer surplus accruing to the standard, but also reduces the units of output on which the royalties will be based.

The foregoing is the received wisdom about patent holdup and royalty stacking. The current debate over the meaning of FRAND and the proper level of a FRAND royalty proceeds amid dystopian predictions of market failure because of the supposed intractability of the common-pool problem

²⁶² Dennis Wassung, Jr., *Mobile Handset Industry: To 3G or Not to 3G? That Is the Question*, Cabot Money Management (undated), available at http://www.ecabot.com/white-papers/3G_web.htm.

associated with allocating the value that SEPs combinatorially create. The received wisdom, however, unfolds at a level of theoretical abstraction that is removed from and ignores the lessons from the history of industrial development. Simply because smartphones are new does not mean that they pose legal and economic questions of common pools that are extremely novel.

In the 20th century, the oil and gas industry in the United States faced a similar problem of opportunism no less consequential and disruptive to consumer welfare than the current patent wars over smartphones and the current attempt to achieve a clearer definition of property rights associated with the FRAND commitment. The controversy concerned the “rule of capture,” which the Louisiana Supreme Court described as follows:

In the early days of the oil industry, [the] physical factors [of oil and gas deposits] were poorly understood. It was thought that oil flowed in underground rivers and an analogy was seen between the ownership of oil and the ownership of water and animals which traverse one’s property. Thus the “*rule of capture*” was adopted (and has been sustained within certain limitations even after the nature of reservoirs was better understood.) It has been defined

as a rule of law (sometimes called rule of convenience) arising from ownership of property, or the right to produce oil and gas, by virtue of which an operator who drills on his own land, or land held under an oil and gas lease or other instrument, acquires title to the oil which he legally produces from the well, whether or not drainage takes place from surrounding properties.

Needless to say, the period of oil and gas development that followed the adoption of such a rule was characterized by haste, inefficient operations, and immeasurable waste within the ground and above.²⁶³

The Texas Supreme Court similarly interpreted the rule of capture to mean “that since the gas in a continuous reservoir will flow to a point of low pressure the landowner is not restricted to the particular gas that may underlie his property originally but is the owner of all that which he may legally recover.”²⁶⁴

The controversy in the 20th century over the rule of capture has parallels to the FRAND controversy in the 21st century. The owner of a tiny tract of land (the analogue to the holder of an individual SEP) could in theory opportunistically extract all the oil from a reservoir underlying the surrounding acreage (the analogue to the share of the feasible aggregate royalty burden that would be available for all holders of SEPs to divide among themselves); meanwhile, a neighboring land owner (another SEP holder) would have no right to halt the driller’s operation on his own land (the first SEP holder). “It is an obvious result,” said the Texas Supreme Court in 1962, “that if in a common reservoir

²⁶³ *Nunez v. Wainco Oil & Gas Co.*, 488 So.2d 955, 960 (La. 1986) (emphasis in original) (quoting HARRIET S. DAGGETT, *MINERAL RIGHTS IN LOUISIANA* 419–21 (La. State Univ. Press 1949) (citation omitted)).

²⁶⁴ *Halbouty v. R.R. Comm’n*, 357 S.W.2d 364, 375 (Tex. 1962). See also Howard R. Williams, *Conservation of Oil and Gas*, 65 HARV. L. REV. 1155 (1952); Paula C. Murray & Frank B. Cross, *The Case for a Texas Compulsory Unitization Statute*, 23 ST. MARY’S L.J. 1099 (1992).

one tract owner is allowed to produce many times more gas than underlies his tract he is denying to some other landowner in the reservoir a fair chance to produce the gas underlying his land.”²⁶⁵

The Nash equilibrium under the rule of capture is not mutual forbearance, but rather mutual opportunism: each land owner extracts as much oil as possible, as quickly as possible, before his neighbors takes it. This uncoordinated extraction by many landowners reduces the aggregate value of the common reservoir for two reasons. First, it induces oversupply of oil, which depresses the market price for oil and thus the value of the remaining reserves in the common reservoir. Second, the multiple perforations of the reservoir resulting from the multitude of wells relieves pressure and thus raises the cost of extracting oil from the reservoir. However, there is at least one significant economic difference between oil and gas reservoirs subject to the perverse incentives created by the inappropriate definition of property rights according to the rule of capture and SEPs that are vulnerable to royalty stacking: standard-essential patents are complements, whereas the rival oil and gas wells situated above an expansive common reservoir are perfect substitutes.

Competing producers of oil and gas attempted to overcome the inefficiencies of the rule of capture and the collective action problem through self help. Essentially, they tried to use collective action to work around a defective definition of the relevant property rights. They agreed to limit extraction to avert the premature depletion of the reservoir, which had the predictable effect of raising the market price of petroleum products. But because they were horizontal competitors, the result was the most famous and incoherent price-fixing decision in American antitrust jurisprudence: *United States v. Socony-Vacuum Oil Co.*²⁶⁶ Eventually, states, clad in exemption from the antitrust laws, regulated oil production by rationing output among competing property owners, much as the private actors had attempted to do. For example, agencies regulated the spacing between wells to prevent excessive drilling, permitting no more than one oil well per forty acres.²⁶⁷ Through legislation, Texas in effect redefined property rights in a common resource and made a non-cooperative game into a cooperative one: a compulsory pooling statute now permits that state to compel drillers to pool their oil or gas among different small tracts.²⁶⁸

Participants in the current debate over royalty stacking and the FRAND commitment should take several lessons from the common-pool problem associated with the rule of capture. First, it is not realistic to suppose that SEP owners would not attempt, through private collective action, to avert excessive royalty stacking, were it to pose a serious risk of reducing the size of the joint

²⁶⁵ *Halbouty*, 357 S.W.2d at 374.

²⁶⁶ *United States v. Socony-Vacuum Oil Co., Inc.*, 310 U.S. 150 (1940).

²⁶⁷ *See R.R. Comm'n v. Bass*, 10 S.W.2d 586 (Tex. Civ. App. Austin 1928), *writ dismissed*, 51 S.W.2d 1113 (Tex. Comm'n App. 1932).

²⁶⁸ Mineral Interest Pooling Act, TEXAS NATURAL RESOURCE CODE § 103.011 (West 2009).

surplus created by the standard. As noted earlier, a number of SEP holders did in fact make voluntary announcements of what they believed the maximum height of the royalty stack should be for a new standard. The fact that the royalty stack turned out to be higher than initially advocated by prominent SEP holders is certainly not evidence that these SEP holders were oblivious or indifferent to the theoretical possibility of excessive royalty stacking.

Second, if excessive royalty stacking were empirically observed to occur, and if private collective action were insufficient to rectify the market failure caused by ill-defined property rights in the joint surplus created by the standard, then either the legislature or the judiciary would surely respond. Legislation would be enacted to resolve the problem (as in the case of the oil and gas industry in Texas and Louisiana). Or a court would use common law principles to fashion an efficient property right (as, for example, when an Illinois state court in 1926 devised injunctive rules that created property rights to prevent interference in the use of radio spectrum immediately before Congress enacted the Radio Act of 1927, which reflected essentially the same rules²⁶⁹). It is naïve and contrary to economic history to suppose that, if a serious market failure were to arise from the excessive stacking of royalties for SEPs, and if that market failure defied solution by private collective action, legislation or common law adjudication would not be promptly forthcoming.

Justice Holmes wrote that “a page of history is worth a volume of logic.”²⁷⁰ His admonition applies with no lesser force to economic theory than to abstract legal reasoning. The dystopian narrative of FRAND royalty stacking should be taken with a grain of salt.

B. The Fair and Reasonable Division of the Surplus as a Deterrent to Opportunism by SEP Holders

A challenge in determining FRAND royalties lies in dividing the producer surplus among SEP owners. The law of fiduciary duty and the principles of equity can guide courts in preventing opportunistic behavior that would jeopardize the value created when downstream products implement the standard.

1. Fiduciary Duty

If members of an SSO are joint venturers as a matter of law, then they may owe to one another fiduciary duties of loyalty and care, as in the famous opinion in *Meinhard v. Salmon*, authored by Justice Benjamin Cardozo.²⁷¹ Judge Posner explains:

²⁶⁹ See *Tribune Co. v. Oak Leaves Broadcasting Station Inc.* (Cir. Ct. Cook County, Ill. Nov. 17, 1926), reprinted in 68 CONG. REC. 216 (Dec. 10, 1926); Thomas W. Hazlett, *The Rationality of U.S. Regulation of the Broadcast Spectrum*, 33 J.L. & ECON. 133 (1990) (discussing *Oak Leaves*).

²⁷⁰ *New York Trust Co. v. Eisner*, 256 U.S. 345, 349 (1921) (Holmes, J.).

²⁷¹ *Meinhard v. Salmon*, 249 N.Y. 458, 164 N.E. 545 (1928).

A fiduciary, unlike an ordinary contract promisor, undertakes to treat the affairs of the promisee as if they were the promisor's own affairs. That is the practical content of all that high falutin' talk of utmost good faith and loyalty, full disclosure, the punctilio of an honor most sensitive, etc. . . . The promisor is to treat the promisee as well, as loyally, as considerately, as faithfully, as the promisor would treat himself.²⁷²

Viewed from an economic perspective, the fiduciary duty of loyalty prohibits (among other things) a joint venturer's individual expropriation of an opportunity belonging collectively to the joint venture. The equilibrium is one of mutual forbearance from opportunistic behavior, in the sense that Oliver Williamson defines opportunism—"self-interest seeking with guile."²⁷³ More precisely, the equilibrium consists of the mutual forbearance from the expropriation of the quasi rents of other members of the SSO. It is a small step (as we shall see) to conclude that the fiduciary duty of loyalty envisioned in *Meinhard v. Salmon* with greater force prohibits a joint venturer's destruction of a joint opportunity.

Fiduciary duties constrain one to act in another party's interest in the course of a business relationship. They include the duties of care, loyalty, and good faith. These duties are typically manifested in the relationship between an officer or director of a corporation and its shareholders, between partners in a business, and between members of a joint venture. The duty of care requires that the fiduciary make informed business judgments to the extent he reasonably believes appropriate under the circumstances. The fiduciary duty of loyalty requires that the fiduciary make a business judgment in good faith and without individual financial gain. For example, a corporate officer owes a duty to act in the best interests of the corporation's shareholders, primarily to maximize shareholder wealth. Parties in a partnership or joint venture are due fiduciary duties by the other partner(s) or joint venturer(s) concerning matters within the scope of the specific business endeavor, and thus these parties have an actionable claim for breach of a fiduciary duty.²⁷⁴

Joint venturers breach their fiduciary duty of loyalty when they compete with the joint venture.²⁷⁵ Justice Cardozo wrote in *Meinhard v. Salmon*:

Joint adventurers, like copartners, owe to one another, while the enterprise continues, the duty of the finest loyalty. Many forms of conduct permissible in a workaday world for those acting at arm's length, are forbidden to those bound by fiduciary ties. A trustee is held to

²⁷² *Olympia Hotels Corp. v. Johnson Wax Dev. Corp.*, 908 F.2d 1363, 1373 (7th Cir. 1990) (Posner, J.).

²⁷³ See Oliver E. Williamson, *Transaction-Cost Economics: The Governance of Contractual Relations*, 22 J.L. & ECON. 233, 234 n.3 (1979). For an analysis of relevance of the Williamsonian concept of opportunism to the meaning of the FRAND obligation, see F. Scott Kieff & Anne Layne-Farrar, *Incentive Effects from Different Approaches to Holdup Mitigation Surrounding Patent Remedies and Standard-Setting Organizations*, 9 J. COMPETITION L. & ECON. 1091 (2013); Spulber, *Innovation Economics*, *supra* note 182.

²⁷⁴ See, e.g., *Micromuse, Inc. v. Micromuse, PLC*, 304 F. Supp. 2d 202 (D. Mass. 2004).

²⁷⁵ See, e.g., *Vista Dev. Corp. v. Doral Terrace Assoc., Ltd.*, 878 So.2d 462 (Fla. D. Ct. App. 2004).

something stricter than the morals of the market place. Not honesty alone, but the punctilio of an honor the most sensitive, is then the standard of behavior. As to this there has developed a tradition that is unbending and inveterate. Uncompromising rigidity has been the attitude of courts of equity when petitioned to undermine the rule of undivided loyalty by the “disintegrating erosion” of particular exceptions. Only thus has the level of conduct for fiduciaries been kept at a level higher than that trodden by the crowd. It will not consciously be lowered by any judgment of this court.²⁷⁶

Meinhard and Salmon were engaged in a joint venture for the purpose of developing and leasing a property. As the lease approached expiration, Salmon was offered and, without informing Meinhard, accepted a new opportunity involving redevelopment of the same property. The court found that the duty of loyalty obligated Salmon to inform his joint venturer of the opportunity and to share the profits with the venture. Modern courts have further explored the duty of loyalty as it applies to joint ventures and have expressed the duty owed as an obligation not to interfere or compete with the interests of the joint venture. In *Denim North America Holdings, LLC v. Swift Textiles, LLC*, a firm breached its fiduciary duty—owed to a textile manufacturer under the terms of an agreement establishing a joint venture to manufacture and sell denim products—when the firm sold products that undercut the joint venture’s sales.²⁷⁷ The case illustrates that a joint venturer may breach his fiduciary duty of loyalty by exploiting an opportunity to compete with the joint venture. Courts call this particular application of the fiduciary duty of loyalty the corporate opportunity doctrine (though of course it is not limited to businesses that are organized as corporations).

The corporate opportunity doctrine is a common law doctrine that restricts a fiduciary from pursuing new business opportunities without first presenting them to the corporate entity to which the fiduciary duty is owed. As enunciated in 1900 in the seminal case of *Lagarde v. Anniston Stone & Lime Co.*, the doctrine derives from the duty of loyalty and applies whether or not the improper appropriation of a corporate opportunity harms the business association.²⁷⁸ The court in *Lagarde* stated that the doctrine applies when a fiduciary “has acquired property in which the corporation has an interest already existing or in which it has an expectancy growing out of an existing right, or when his interference will in some degree balk the corporation in effecting the purposes of its creation.”²⁷⁹ *Lagarde* requires two elements for the corporate opportunity doctrine to apply. First, the corporation must have an interest or expectancy in the agreement. Second, the fiduciary must have interfered with a corporate purpose.

²⁷⁶ *Meinhard v. Salmon*, 249 N.Y. at 463–64 (citation omitted).

²⁷⁷ *Denim North Am. Holdings, LLC v. Swift Textiles, LLC*, 857 F. Supp. 2d 1343 (M.D. Ga. 2012).

²⁷⁸ *Lagarde v. Anniston Lime & Stone Co.*, 28 So. 199 (Ala. 1900) (creating the so-called “interest and expectancy” test for finding an appropriation of a corporate opportunity).

²⁷⁹ *Id.* at 201.

Writing in his corporate law treatise in 1986, Robert Clark, former dean of Harvard Law School, provides an interpretation of *Lagarde* and the other early common law cases that is particularly salient to the FRAND commitment made to an SSO by an SEP holder.²⁸⁰ Clark stresses the fiduciary's access to asymmetric information: "Fiduciaries will often have better information than independent third parties do about the corporation's needs and vulnerabilities—its true demand curve—and may therefore be superior exploiters of market power against their corporation."²⁸¹ With access to this asymmetric information comes the fiduciary's duty of self restraint. A fiduciary "should not exploit the market power that third parties have over his corporation but which, for whatever reasons, they have so far failed to exploit."²⁸² This understanding of the appropriation of a corporate opportunity dovetails with the standard narrative of royalty stacking, which portrays the patent holder as threatening the standard's economic viability by demanding from implementers a royalty that exploits the incremental market power created when the SSO chose to incorporate into the standard the SEP holder's particular technology instead of an available alternative under consideration. Clark explains: "The fiduciary should not deliberately harm his corporation. He is not supposed to take steps to further his own interest that will rather clearly and directly thwart the corporation's interest."²⁸³ These constraints command self-restraint with respect to the common pool of value that the joint venture creates for its members. "In sum," writes Clark, "the gist of the interest or expectancy test is that it defines the concept of corporate property in light of the general principle that a fiduciary may not harm, compete with, or take advantage of his beneficiaries."²⁸⁴

Continuing with the characterization of an SSO as a joint venture, each member of the SSO owes a duty to each other individual member and to the interests of the SSO collectively not to jeopardize the existence and functioning of the standard and the SSO. Members of an SSO have a cognizable "interest" in seeing that other members comply with the SSO's standards. Members of an SSO also have a cognizable "expectancy" that each SEP holder will negotiate licensing agreements on FRAND terms. The SEP holder's breach of loyalty harms the SSO collectively because SEP holders and licensees will be less willing to participate in the SSO if they believe that in the future its members will disregard their FRAND licensing commitments. Thus, flouting the FRAND commitment amounts to interference with the SSO's essential "corporate purpose" of efficiently bringing standard-compliant products to market.

²⁸⁰ ROBERT C. CLARK, CORPORATE LAW 225–27 (Little Brown 1986).

²⁸¹ *Id.* at 226.

²⁸² *Id.*

²⁸³ *Id.*

²⁸⁴ *Id.* at 226–27.

It bears repeating that the extent of one's fiduciary duty depends on the scope of the business venture, which in the FRAND situation is the creation and commercial implementation of a successful standard. For example, the fiduciary duty owed within an SSO does not mean that two rival manufacturers of smartphones have a duty to disclose to one another confidential information about their competitive strategies on the (false) rationale that the good-faith negotiation of a FRAND license between the two of them requires sharing such information. To the contrary, such information exchange could raise antitrust concerns. Similarly, licensors and licensees have separate fiduciary duties to their investors. So the fiduciary duty that one SSO member owes to another cannot limit the first firm's ability to negotiate as favorable a license as possible, consistent with the firm's not jeopardizing the success of the standard. As noted earlier, the language of economics describes a FRAND framework as a situation of constrained (rather than unconstrained) profit maximization for an individual firm belonging to the SSO. But the constraint on profit maximization can be binding to different degrees. In the case of the constraint that a FRAND obligation places on a firm, as long as the negotiated royalty does not threaten the viability of the standard and the SSO, licensors and licensees have discretion in making royalty demands and offers. Subject to that constraint, each firm may still seek to maximize the profits it can individually earn from the standard, and indeed each has a fiduciary duty to its investors to try to do so.

2. *Using Equity to Prevent Unjust Enrichment and to Deter Opportunistic Behavior*

"Equity refuses to confine within the bounds of classified transactions its precept of a loyalty that is undivided and unselfish."²⁸⁵ To date, the contractual documentation surrounding the adoption of standards has failed to provide an economic definition of FRAND. The absence of an answer may speak volumes. One possible explanation is that the parties consciously or intuitively chose to leave the definition blank and rely on principles of equity to guide the determination of the ultimate royalty. This possibility is consistent with the characterization of SSO members as fiduciaries to one another with respect to the success of the standard. This possibility is also consistent with the Rawlsian depiction of standard setting as a process evolving from an original position of ignorance with respect to whether one will eventually be buying or selling patented technology, such that even an undefined price would be satisfactory *ex ante* as long as the SSO's members shared the common assurance that that price would be fundamentally fair.

Another possible explanation is that no mutually satisfactory answer exists to the question, "What is a FRAND royalty?" This interpretation has an important implication: the parties lack mutual assent. No meeting of the minds has occurred. A contract has not been formed. An essential element of

²⁸⁵ *Meinhard v. Salmon*, 249 N.Y. at 467.

contract formation—the unambiguous specification of a price—never occurred. That the parties subsequently disagree so vociferously about what FRAND means merely confirms that they never had a common understanding of price that they could reduce to an unambiguous written expression. If so, then a FRAND royalty commitment is not enforceable because mutual assent with respect to the contract’s price is absent.²⁸⁶

Curiously, this second interpretation could lead to the same destination as the first. When there is a failure of contract formation, equity will determine the monetary remedies necessary to place each party in the *status quo ante*. Of course, no one can undo the standard on that late day and pretend that smartphones do not exist. So a court’s task of preventing unjust enrichment would require infusing the setting of a reasonable royalty with special concern for achieving fairness.

The 1937 version of the Restatement of Restitution provided that a person unjustly enriched at another’s expense must make restitution to the other.²⁸⁷ The Restatement (Third) of Restitution and Unjust Enrichment of 2011 replaced the Restatement of Restitution of 1937 and defines unjust enrichment as “result[ing] from a transaction that the law treats as ineffective to work a conclusive alteration in ownership rights.”²⁸⁸ When a contract is rescinded or is deemed never to have been formed, a court orders the parties to make restitution of the wealth transfer—the enrichment—that the parties conferred upon one another. Therefore, if a court found that the FRAND commitment between the SEP holder and the SSO lacked a meeting of the minds over price and that this lacuna therefore prevented the formation of a contract by which implementers (including third-party beneficiaries) could license the SEP, then the court would invoke equity to restore the *status quo ante* among the parties. However, it would be impossible for the court to reverse the sunk costs that the parties would have incurred after the adoption of the standard. Therefore, that best that the court could do would be to try to determine the “just” level of enrichment for the implementer’s unauthorized use of the SEP.

²⁸⁶ Courts have found that a party’s licensing declaration to SSOs give rise to an enforceable contract. *See, e.g.,* Realtek Semiconductor Corp. v. LSI Corp., No. C-12-034512013 WL 2181717, at *5 (N.D. Cal. May 30, 2013) (“[t]here is no dispute . . . that defendants entered into a binding contract with the IEEE to license their declared standard-essential patents . . . on RAND terms”); *Microsoft Corp. v. Motorola, Inc.*, 696 F.3d 872, 878 (9th Cir. 2012).

²⁸⁷ RESTATEMENT OF RESTITUTION § 1 (1937). *See also* Warren A. Seavey & Austin W. Scott, *Restitution*, 54 L.Q. REV. 29 (1938). Seavey and Scott were the reporters of the 1937 Restatement of Restitution. They described unjust enrichment as “a postulate underlying the law of restitution, analogous to the postulates underlying tort law (a right against unjust harm) and contract law (a right against breach of promise).” *Id.* at 31–32. *Cf.* Peter Birks, *Unjust Enrichment and Wrongful Enrichment*, 79 TEX. L. REV. 1767, 1178 (2001) (describing unjust enrichment as an event and, more specifically, a causative event of the restitution); Andrew Kull, *Rationalizing Restitution*, 83 CAL. L. REV. 1191 (1995) (describing restitution and unjust enrichment as one subject).

²⁸⁸ RESTATEMENT (THIRD) OF RESTITUTION AND UNJUST ENRICHMENT § 1, comment b (2011). Andrew Kull is the reporter of the Restatement (Third) of Restitution.

C. Alternative Methods for Dividing the Joint Surplus Among SEP Holders

I consider now five alternative methods for allocating shares of the aggregate royalty among the SEP holders: (1) heuristic use of the Lorenz curve (2) the Shapley value, (3) bargaining theory and the ultimatum game, (4) patent counting, and (5) patent pools.

1. *The Heuristic Use of the Lorenz Curve*

In law and other disciplines, one might sometimes invoke a heuristic to use one's experience from other contexts to identify a satisfactory though admittedly nonoptimal method for answering a complex question.²⁸⁹ This reliance on rules of thumb or intuition or innate attitudes—which I argued earlier is embodied in a judge's concept of fairness in his exercise of equitable powers—finds its counterpart in economics and psychology in the writings of Nobel laureates Herbert Simon, Amos Tversky, and Daniel Kahneman.²⁹⁰ I propose here a heuristic for fairly apportioning the aggregate royalties of SEP holders in an unequal manner.

a. *The Lorenz Curve*

Empirical studies in a number of countries have shown that the distribution of the economic value of patents is highly skewed.²⁹¹ It is reasonable to expect that the economic value of patents reading on a standard is similarly skewed. That is, the presence of outliers, or extremely valuable patents, causes the mean value of the patents to be orders of magnitude above the median value. Trying to solve the indivisibility problem of SEPs by requiring equal sharing of the aggregate royalty earned from the downstream manufactured product would ignore the tendency for SEPs to have vastly different values. At the same time, it may be prohibitively costly to try to measure the incremental contribution that each individual SEP makes to the downstream product on which royalties are imposed. However, two intuitive shortcuts could produce equitable outcomes.

The first shortcut is a qualitative ranking of the SEPs or families of SEPs in a given standard in terms of their relative contribution to making the downstream product feasible to produce. Economists call this kind of ranking an “ordinal” ranking, as opposed to a “cardinal” ranking, which would measure the difference between any two rankings according to some established

²⁸⁹ See, e.g., HEURISTICS AND THE LAW (Gerd Gigerenzer & Christoph Engel eds., MIT Press 2007).

²⁹⁰ See, e.g., Herbert A. Simon, *A Behavioral Model of Rational Choice*, 69 Q.J. ECON. 99 (1955); Daniel Kahneman & Amos Tversky, *Prospect Theory: An Analysis of Decisions under Risk*, 47 ECONOMETRICA 263 (1979); Tversky & Kahneman, *Judgment Under Uncertainty: Heuristics and Biases*, *supra* note 105.

²⁹¹ See, e.g., Bronwyn H. Hall, Adam Jaffe & Manuel Trajtenberg, *Market Value and Patent Citations*, 36 RAND J. ECON. 16, 18 (2005).

metric.²⁹² As Paul Samuelson succinctly explained, an ordinal ranking “involve [es] ‘more’ or ‘less’ but not ‘how much.’”²⁹³ For simplicity, the ordinal ranking exercise would place SEPs (or, more likely, families of SEPs) in groups by increments of a fixed number of percentiles, such as deciles. One would assign all SEPs within each decile the same economic value. For example, all SEPs in the top 10 percent of the standard (which contribute the most to the standard) would have the same royalty. That royalty would differ from the royalty assigned to each SEP in the next 10 percent.

The second shortcut is to ask, how equal or unequal is the distribution of the marginal contributions of the SEPs to the standard? Economists use the Lorenz curve to represent the distribution of income among households in a country.²⁹⁴ The analogue in the patent context is to decide qualitatively the distribution of the various SEPs in a standard in terms of their relative contributions to the standard or to the downstream product implementing the standard.

Figure 8 shows a hypothetical Lorenz curve for depicting a country’s income distribution. The cumulative percentage of families is on the X-axis, and the cumulative percentage of income is on the Y-axis. The straight, 45-degree line represents perfect income equality, where, for example, 25 percent of households receive 25 percent of the nation’s income, 75 percent of households receive 75 percent of the nation’s income, and so forth. When one extends this framework to setting FRAND royalties, this 45-degree line represents the hypothetical scenario in which all SEPs in a standard are equally valuable. In the Lorenz curve in Figure 8, the bottom 25 percent of households earn less than 10 percent of the nation’s income, and the top 25 percent earn more than 50 percent of the nation’s income. In the context of FRAND royalties for SEPs, one would use a Lorenz curve to measure the cumulative percentage of economic value contributed to a standard (replacing the cumulative percentage of income) by the cumulative percentage of SEPs in the standard (replacing the cumulative percentage of families). Thus, in Figure 8, the bottom 25 percent of SEPs contribute less than 10 percent of the standard’s economic value, whereas the top 25 percent of SEPs contribute more than 50 percent of the standard’s economic value.

In the context of income distribution, one uses the Lorenz curve to calculate the Gini index of a country, a summary measure of the degree of income inequality in the country. A country’s Gini coefficient is the ratio of the area between the country’s Lorenz curve and the line of perfect equality to the total area below the line of perfect equality. (This ratio also equals twice the area

²⁹² See, e.g., LOUIS PHILIPS, *APPLIED CONSUMPTION ANALYSIS* 11–13 (Elsevier 1974); JAMES M. HENDERSON & RICHARD E. QUANDT, *MICROECONOMIC THEORY: A MATHEMATICAL APPROACH* 7–9 (McGraw-Hill 2d ed. 1971).

²⁹³ PAUL A. SAMUELSON, *FOUNDATIONS OF ECONOMIC ANALYSIS* 91 (Harvard Univ. Press 1947).

²⁹⁴ See, e.g., MARTIN BRONFENBRENNER, *INCOME DISTRIBUTION THEORY* 47–50 (Aldine 1971).

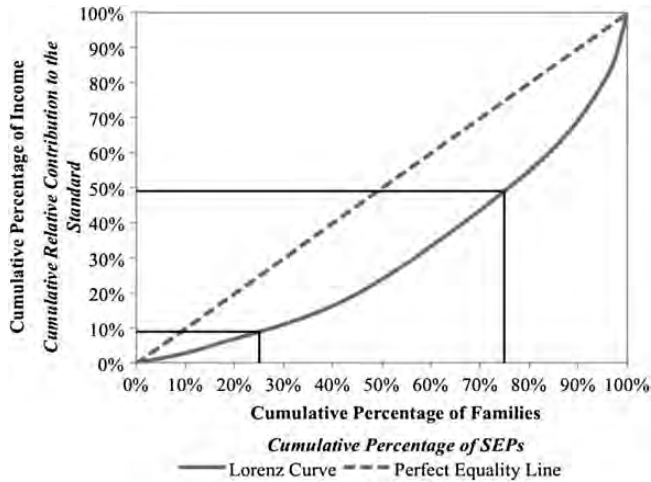


Figure 8. Lorenz curve depicting income inequality and the unequal distribution of the relative contributions of SEPs in a standard

between the country's Lorenz curve and the line of perfect equality, because the area below the 45-degree line of perfect equality is necessarily 0.5). The Gini coefficient ranges from zero (representing perfect equality) to 100 (representing perfect inequality). The closer the income distribution is to perfect equality, the smaller the Gini coefficient is. Thus, in the patent context, if a large number of SEPs in a standard contribute little value to the standard and a small number of SEPs contribute a large share of the standard's value, then the Gini coefficient for the standard would be relatively large. The Gini coefficient would represent what one might call the "economic inequality of technological contribution" of the various SEPs in the standard corresponding to the intuitive understanding of the technology.

b. Using the Lorenz Curve to Determine the Royalty for SEPs

One could thus use the Lorenz curve to estimate the FRAND royalty for a single SEP or for groups of SEPs according to their ranking by percentiles (such as deciles). The royalty therefore would reflect the economic contribution of the SEP to the standard relative to the economic contribution of all other (complementary) SEPs that read on the standard. Although the Lorenz curve in theory consists of an infinite number of points, in practice, one would need only to obtain a finite number of points to plot an approximate curve. For instance, the exercise could consist of deriving the relative contributions of SEPs by increments of a fixed number of percentiles, such as deciles. Suppose that when the SSO adopted the standard, there were 1,000 SEPs in a standard. Suppose further that subsequent technical testimony credibly establishes that the top 10 percent of the SEPs contribute 50 percent of the value of the

standard. Suppose further that the aggregate royalty burden for the standard constitutes 20 percent of the net revenue of a downstream product. The SEPs in the top 10 percent would together receive 50 percent of the aggregate royalty. One would then divide that share of the royalty evenly among the SEPs in the top 10 percent. Given that 100 SEPs belong to the top 10 percent, each individual SEP in the top 10 percent would receive $(50\% \times 20\%) / 100 = 0.1\%$ of the net revenue of the downstream product. If the next 10 percent of the SEPs contribute 20 percent of the value of the standard, then each SEP in that decile would receive $(20\% \times 20\%) / 100 = 0.04\%$ of the net revenue of the downstream product. Table 3 outlines the resulting royalty shares for the SEPs in the remaining deciles based on this hypothetical example. Figure 9 shows the distribution curve based on this example.

Under this method, the parties would present evidence and opposing argument over (1) the ordinal ranking of the SEPs and (2) the shape of the Lorenz curve approximated by a finite number of points. Once the finder of fact resolved these two questions, the relative shares of the downstream royalty base would emerge from the arithmetic exercise outlined above. If the data were available, empirical evidence to assess the degree of inequality across the SEPs would come from estimating a model of patent value based on information such as patent citations, patent counts, and the number of countries in which a patent is licensed—although, as I explained earlier, approved contributions are likely to be a more reliable and less biased indicator of the value of a given SEP portfolio.²⁹⁵ In addition, one could draw from other standard distributions as close approximations for the distribution of technological contribution. For example, the famous Pareto distribution, which is commonly found among observable phenomena,²⁹⁶ would predict that approximately 20 percent of SEPs contribute 80 percent of the total value that consumers attach to the downstream product.

As noted earlier, standard setting is a dynamic process, and the relative value of any given SEP may change over time. In particular, over time a noninfringing substitute may emerge for an SEP, causing the patent in suit no longer to be essential in the sense of its having no substitute. Consequently, the Lorenz curve and the Gini coefficient for a standard or downstream product may change over time.

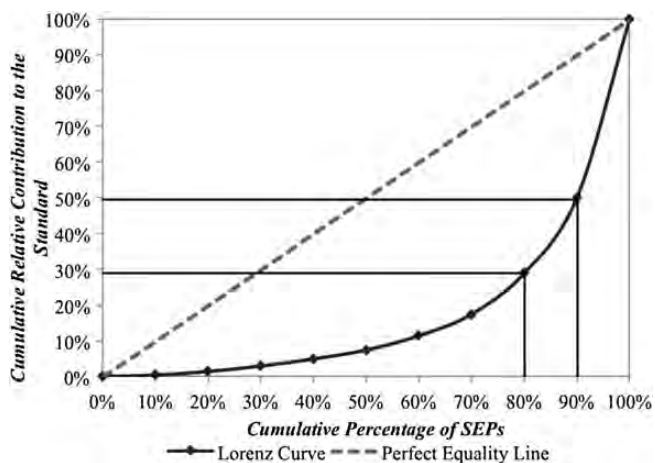
A limitation of this approach is that ranking the value of every SEP in a standard, either individually or within groups of percentiles, may be costly. For practical purposes, therefore, one could categorize SEPs into groups based on the relative economic significance of their technological contribution to the standard. For example, one could start by creating three groups for SEPs:

²⁹⁵ See, e.g., Manuel Trajtenberg, *A Penny for Your Quotes: Patent Citations and the Value of Innovations*, 21 RAND J. ECON. 172 (1990).

²⁹⁶ 2 WILLIAM FELLER, AN INTRODUCTION TO PROBABILITY THEORY AND ITS APPLICATIONS 50 (Wiley 1971).

Table 3. Hypothetical relative contributions to standard by deciles of SEPs under the assumption of 1,000 SEPs in standard

Ranking by Decile (from Highest to Lowest)	Hypothetical Contribution	% Royalty
1st Decile	50.00%	0.100%
2nd Decile	20.00%	0.040%
3rd Decile	12.50%	0.025%
4th Decile	6.00%	0.012%
5th Decile	4.00%	0.008%
6th Decile	2.50%	0.005%
7th Decile	2.00%	0.004%
8th Decile	1.50%	0.003%
9th Decile	1.00%	0.002%
10th Decile	0.50%	0.001%

**Figure 9.** Hypothetical Lorenz curve of the relative contributions of SEPs under the assumption of 1000 SEPs in a standard

SEPs that are essential to the creation and existence of the standard, SEPs that are practiced in the standard but that have substitutes that could have been adopted into the standard, and SEPs that are not actually practiced by any downstream manufacturer in implementing the standard. As one increases the number of different groups, the total error between the “true” value of the SEPs and their royalties will decrease, but the transactions costs of determining the royalties will increase.

Although this method is admittedly arbitrary, it is not capricious. This approach holds promise because it creates a theoretical approach to an otherwise intractable problem. With sufficient simplification, the method may be possible to implement and may be able to satisfy all parties concerned that rough justice has been done. In contrast, with a uniform royalty for a group of SEPs,

it is certain that some SEPs in each group will be undervalued and some will be overvalued.

c. *Using the Lorenz Curve to Determine SEP Holder's Royalty Rates for Their Portfolios*

Alternatively, one can use the Lorenz curve to estimate the appropriate royalty rate for each SSO member's *portfolio* of patents essential to a given standard. Indeed, the licensing of a firm's entire portfolio of patents essential to a given standard is the usual outcome of a litigation or negotiation over FRAND royalties. Such a portfolio license can be one-way or it can one-half of a cross license with the licensee, if the licensee has its own portfolio of SEPs for the same standard. In that case, the license can (but need not be) structured in terms of a net balancing royalty from one firm to the other. To be clear, in the discussion that follows, I am considering only a one-way running royalty rate.

As an example, consider the LTE standard used in the current generation of smartphones. As discussed earlier, ABI Research determined the number of contributions submitted by various holders of patents declared essential to the LTE standard that were approved by ETSI.²⁹⁷ Figure 7 in Part V.C shows the top ten patent holders in terms of approved contributions to the LTE standard. Suppose, for simplicity, that those ten contributors were the only holders of LTE SEPs. Instead of grouping all the LTE SEPs individually by deciles, one can place Ericsson's portfolio of LTE SEPs as constituting the top 10 percent of LTE SEPs, Huawei's portfolio as constituting the next 10 percent, and so forth. Figure 10 shows the Lorenz curve for the LTE standard based on the top ten contributors' number of approved contributions. (In reality, there are more than ten holders of patents declared essential to the LTE standard. Consequently, the Lorenz curve for the LTE SEPs will be an even sharper curve.)

ABI Research found that, on the basis of the number of approved contributions, Ericsson's portfolio contributed 27 percent of the LTE standard as of December 2012, Huawei's portfolio contributed 18 percent, and Nokia Siemens Networks (NSN) contributed 11 percent. Each patent holder's royalty rate would equal its relative share of contributions to the LTE standard multiplied by the aggregate royalty rate. If one were to assume an aggregate royalty rate for SEPs equal to 10 percent of the net retail price of the handset, then the FRAND royalty rates directly correlated with the relative value of each SEP holder's technology would be 2.7 percent for Ericsson, 1.8 percent for Huawei, and 1.1 percent for NSN.

²⁹⁷ Solis & Cooney, *supra* note 233, at 12. In *Innovatio*, Judge Holderman considered ABI Research to be a credible source of industry evidence. RAND Opinion in *Innovatio*, *supra* note 4, at 79.

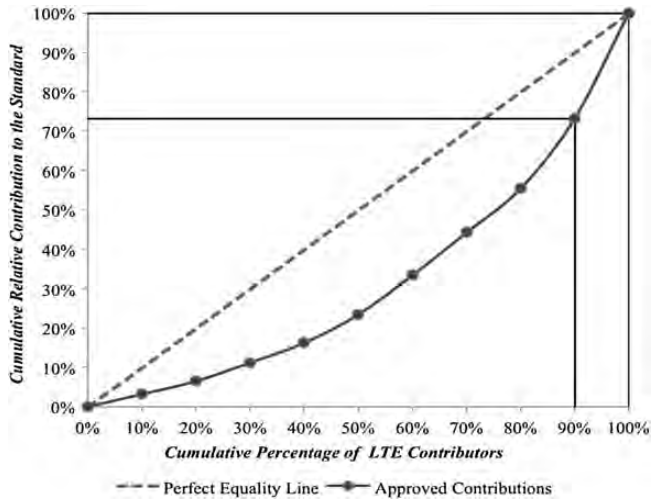


Figure 10. Lorenz curve of the approved contributions to the LTE standard

2. *The Relevance of the Shapley Value to FRAND Royalty Rates*

Economists have applied cooperative game theory to determining FRAND royalty rates in patent licensing negotiations.²⁹⁸ One such method is the Shapley value, developed by Nobel laureate Lloyd Shapley in 1953.²⁹⁹ Although the axioms of the Shapley value are consistent with the aim of FRAND licensing, practical application of the Shapley value would require two components: (1) complete market transparency with respect to the value of all patents and (2) additional refinement to eliminate “shirking”³⁰⁰ by players whose patents do not contribute to the value of the standard, which I explain below.

The Shapley value builds upon the theory of games developed by John von Neumann and Oskar Morgenstern.³⁰¹ It analyzes the value (rents) attributable to each player’s participation in a game.³⁰² In the FRAND context, participation in the game corresponds to participation in the standard-setting process—including participation of SEP holders and participation of implementers

²⁹⁸ See Layne-Farrar, Padilla & Schmalensee, *supra* note 161, at 671; Salant, *supra* note 161.

²⁹⁹ Lloyd S. Shapley, *A Value for n-Person Games*, in *THE SHAPLEY VALUE: ESSAYS IN HONOR OF LLOYD S. SHAPLEY* 31 (Alvin E. Roth ed., Cambridge Univ. Press 1988).

³⁰⁰ See Armen A. Alchian & Harold Demsetz, *Production, Information Costs, and Economic Organization*, 62 *AM. ECON. REV.* 777, 780 (1972) (“[S]ince costs must be incurred to monitor each other, each input owner will have more incentive to shirk when he works as part of a team, than if his performance could be monitored easily or if he did not work as a team.”).

³⁰¹ See Alvin E. Roth, *The Shapley Value as a von Neumann-Morgenstern Utility*, 45 *ECONOMETRICA* 657 (1977).

³⁰² Alvin E. Roth, *Introduction to the Shapley Value*, in *THE SHAPLEY VALUE: ESSAYS IN HONOR OF LLOYD S. SHAPLEY* 1 (Alvin E. Roth ed., Cambridge Univ. Press 1988).

seeking to license the SEPs. One aspect of game theory is to provide for each player a numerical value to playing the game, for each game or alternative among the potential universe of all players. As described by Alvin Roth, with whom Shapley shared the Nobel Prize in 2012, Shapley's insight was

to summarize the complex possibilities facing each player in a game in characteristic function form by a single number representing the 'value' of playing the game. Thus the value of a game with a set $N = (1, \dots, n)$ of players would be a vector of n numbers representing the value of playing the game in each of its n positions.³⁰³

This value became known as the Shapley value and is analogous to the concepts of consumer surplus and producer surplus in market-based analysis. The Shapley value, consumer surplus, and producer surplus each measure how much better off an agent is for having participated in some economic interaction, compared with the agent's outside alternative of zero, which would be the agent's payoff for not participating in the game. Applied to standard setting, the players of the game contribute to creating the joint surplus associated with a standard. These players consist of both those who participate in creating the standard (that is, SEP holders) and those who participate in implementing the standard (that is, licensees and implementers). Each participant can receive a positive Shapley value associated with its contribution to the joint value of the standard.

The Shapley value has three axiomatic attributes: symmetry, efficiency, and additivity.³⁰⁴ The symmetry axiom "states that the value is essentially a property of the abstract game"³⁰⁵—that is, the value attributed to any player is based only on that player's contribution to the game's overall value. Applying this axiom to a hypothetical FRAND patent-licensing negotiation implies that, if the patents owned by SEP holder *A* and SEP holder *B* contribute identical value to the standard, then *A*'s Shapley value equals *B*'s Shapley value.

One can view the second axiom—the efficiency axiom, also known as the carrier axiom³⁰⁶—as two separate axioms.³⁰⁷ The axiom states that "the value [of the game] represents a distribution of the full yield of the game."³⁰⁸ That is, "nothing is left over."³⁰⁹ So, the sum of the Shapley values of the individual SSO members (which includes SEP holders as well as implementers that do not own SEPs but nonetheless participate in the SSO) would equal the value of the game representing the standard-setting process. Consequently, a player that contributes nothing to the value of the game receives no payoff.³¹⁰ This effect represents the second part of this second axiom, called the "null player" axiom.

³⁰³ *Id.* at 4.

³⁰⁴ Shapley, *supra* note 299, at 33.

³⁰⁵ *Id.*

³⁰⁶ Roth, *Introduction to the Shapley Value*, *supra* note 302, at 5.

³⁰⁷ *Id.*

³⁰⁸ Shapley, *supra* note 299, at 33.

³⁰⁹ Layne-Farrar, Padilla & Schmalensee, *supra* note 161, at 624.

³¹⁰ *Id.*

Applied to patent-licensing negotiations, the null player axiom implies that a patent holder whose patents contribute nothing to the standard receives no royalty.

Finally, the third axiom, additivity, posits that, “when two independent games are combined, their values must be added player by player.”³¹¹ In other words, the value of each independent game, or standard, is based solely on the patents contained within the standard. Applied to FRAND licensing, this axiom implies that the Shapley value of a portfolio’s SEPs is equal to its payoff as if all of the standards on which the patent portfolio reads were combined into a single standard.

These three axioms are necessary and sufficient to provide a unique distribution of the value of a game to its players. None of the axioms is inherently inconsistent with common interpretations of a FRAND commitment. In addition, a result of the Shapley value is that the payoff to either player is based purely on the quality of the player’s SEPs and is completely unrelated to the player’s brand name, market share, or other qualities unrelated to the strength of its patent portfolio. Therefore, using the Shapley value of a standard is an attractive theoretical solution to distributing the surplus generated by a standard to the members of the SSO.

The formula of the Shapley value determines each player’s incremental contribution to the total of any subset of all possible games and produces a weighted average contribution of any one player to all possible coalitions that could contain that individual player.³¹² The Shapley value is therefore compatible with FRAND because it anticipates that each SEP holder will receive a payment equal to its marginal contribution to the standard. SEP holders that contribute more to the standard will receive a greater payout. Players that do not obtain positive payoffs from the game will not participate, and thus the Shapley value accounts for the position of SEP holders *ex ante*. Finally, the Shapley value accounts for increased competition among claimants to the standard’s rents as additional patents are declared essential to the standard: “the fraction of coalitions to which an IP owner has a large marginal contribution decreases, and its IP value measured by the average marginal contribution falls as well.”³¹³

When attempting to move from theory to practice, however, it becomes clear that at least three problems limit the feasibility of using the Shapley value in FRAND licensing.

First, the Shapley value depends on the ability of each player to have complete knowledge of the value of all essential patents for all SEP holders participating in the game, so that each player can identify each other player’s marginal contribution. David Salant observes that “application of the Shapley value in setting royalty rates or license fees would require measures of surplus created by each coalition, that is, of each patent and set of patents.”³¹⁴ This information

³¹¹ Shapley, *supra* note 299, at 33.

³¹² Salant, *supra* note 161, at 69.

³¹³ Layne-Farrar, Padilla & Schmalensee, *supra* note 161, at 701.

³¹⁴ Salant, *supra* note 161, at 70.

requirement underscores the fundamental difficulty with dividing the aggregate royalty burden of SEPs. The highest priority in setting a FRAND royalty for an SEP is to identify its marginal contribution to value of the downstream product. It is a secondary matter whether the division of that joint surplus can be performed in a universally fair manner, as opposed to some rough approximation of justice. In effect, the application of the Shapley value approach to FRAND royalties assumes unrealistically that one possesses the very information that is most valuable and most costly to acquire; based on the assumed possession of that precious information, the methodology then performs a calculation to divide the joint surplus in an intellectually elegant manner. However, the “fair and reasonable” component of FRAND does not primarily concern the division of the aggregate royalty burden among SEP holders; rather, this component primarily addresses the division of surplus between SEP holders and implementers. The division of joint surplus through Shapley values includes an apportionment of value to implementers that do not participate in the SSO, but it excludes patent holders that do not participate in the SSO, and therefore does not directly address the division of surplus between SEP holders and implementers. At present, the task of identifying the full set of SEPs in a standard is difficult. Further, securing perfect information about the value of each patent for each player (which can change over time) is so costly as to render the Shapley value virtually impossible to apply to patent-licensing negotiations or FRAND disputes.

The second problem with using the Shapley value to set royalties is that it is possible for SEP holders contributing nothing to the standard to receive a non-zero royalty.³¹⁵ The Shapley game considers the order in which a patent is introduced to the standard. The average marginal contribution calculated by the Shapley value is the average payoff for a given game taking the order of the players participating into consideration. In some orderings, a patent that is eventually excluded from the standard may be introduced before the patent that replaces it.³¹⁶ Consequently, the payoff to the patent ultimately excluded from the standard is non-zero—until the Shapley value is recalculated based on the new set of patents in the standard. Of course, adjusting every participant’s Shapley value—and thus royalties—every time a patent is added or removed from the standard further increases the cost of implementing the Shapley value (and the potential for erroneous assessments of patent value).

The third problem with using the Shapley value to set FRAND royalties appears not to have been recognized in the scholarly literature: If SEPs are genuinely essential to the standard, then the combinatorial nature value of their value causes the Shapley value to collapse to the trivial solution of numerical proportionality. Suppose that one has three SEPs, *A*, *B*, and *C*, with a total surplus of 1. The SEP have no value when used independently or in any

³¹⁵ Layne-Farrar, Padilla & Schmalensee, *supra* note 161, at 695–97.

³¹⁶ *Id.*

Table 4. Illustrative combinatorial value of SEPs causing the Shapley value to collapse to the trivial solution of numerical proportionality

Patent Added	Total Utility	Marginal Value
A	0	0
B	0	0
C	1	1

pairwise combination. Only a three-way combination of the SEPs has value. One possible three-way combination is listed in Table 4.

There are six possible combinations of the three SEPs.³¹⁷ All six combinations yield the same sequence of marginal contributions: 0,0,1. Averaging the marginal contribution of each SEP (*A*, *B*, *C*) across every one of the six possible combination of sequential orderings yields an average marginal contribution of 1/3 for each SEP.³¹⁸ Therefore, when the value of the marginal contributions is combinatorial, as in the case of SEPs, the Shapley value calculates royalties manifesting numerical proportionality. Economists have examined and disputed the soundness of using numerical proportionality—patent counting—to set FRAND rates. As I explained in Part VII.A.1, the underlying assumptions for patent counting are flawed, specifically because this method assumes that all SEPs in a standard are of equal value.

In short, one cannot reliably use the Shapley value to measure FRAND royalties without first correcting for the method's current deficiencies. Otherwise, a patent holder may believe that the value it can obtain from abstaining from the coalition will exceed the value it can achieve as a member. The limited experience with the Shapley value in a rate-setting proceeding for intellectual property is not encouraging. In 2007, an MIT-trained economic expert witness used the Shapley value to calculate the royalty in a proceeding before the Copyright Royalty Board to determine royalties for the distribution of recorded music over satellite digital audio radio services. The expert used the Shapley model to divide the surplus among the relevant inputs. The Board was skeptical. It concluded that “questionable assumptions coupled with concerns over the reliability of the data used in the [expert] analysis cause[d] [the Board] to regard the findings of the [expert] analysis as carrying little weight.”³¹⁹

3. *Bargaining Theory and the Ultimatum Game*

The ultimatum game is a type of bargaining game in which a player makes a single take-it-or-leave-it offer, rather than multiple offers and counteroffers

³¹⁷ They are (1) A,B,C, (2) A,C,B, (3) B,C,A, (4), B,A,C, (5) C,A,B, and (6) C,B,A.

³¹⁸ For example, for SEP *A*, the payoffs are as follows for each of the possible sequences: (1) 0/6 + (2) 0/6 + (3) 1/6 + (4) 0/6 + (5) 0/6 + (6) 1/6 = 2/6 = 1/3.

³¹⁹ Final Determination of Rates and Terms, Determination of Rates and Terms for Preexisting Subscription Services and Satellite Digital Audio Radio Services at 49, No. 2006-1 CRB DSTR (U.S. Copyright Royalty Board Jan. 10, 2008).

that occur in a typical bargaining game.³²⁰ In a typical bargaining game, the players divide some fixed asset or endowment.³²¹ By limiting the number of offers and counteroffers in a game, the strategy space for the players decreases. In an ultimatum game, negotiations will end in either an agreement of the unaltered terms of the first offer or no agreement at all.³²² If the second party rejects the offer, neither party benefits—the first party does not keep any portion of the asset but rather forfeits it all. Thus, both parties have an incentive to agree, and the division will depend on a fair offer.

In non-ultimatum negotiations, the process with unlimited possible offers and counteroffers allows the parties to ascertain information about the other's attitudes toward risk and time, informing each party's upper and lower boundaries. These boundaries delineate the most one party is willing to pay and the least the other is willing to accept. Many times these limitations are self-imposed or are functions of bargaining power. Such bargaining situations are most helpful in discovering the point that either party has decided will be an initial starting place based on one's own preference, time and risk pressures, and the possibility of not reaching an agreement at all.

In an ultimatum game, however, the offeror has less influence over the outcome of negotiations. He has one shot at making an offer that will be accepted by the other party. In many cases, the offeror must make a blind offer, uninformed as to the other party's preferences. Because the decision is uninformed, an offeror at a lesser bargaining position who is unwilling to risk the negotiation terminating without an agreement will make a risk-averse offer that he is certain the offeree will accept.

Consider, for example, an amount of money that is divided between two players. Player 1 chooses an amount to offer the second party and an amount to keep. Player 2 evaluates the offer, and decides whether to accept or reject the offer. The ultimatum game does not allow the offeror to obtain any additional information regarding the likelihood of negotiations achieving a successful outcome, and the offeror is aware in the ultimatum game that the likelihood of an agreement depends on the probability that the offer exceeds the Player 2's minimum willingness to accept. If Player 2 accepts, the parties agree to receive the predetermined offer. If Player 2 rejects, negotiations cease without the anticipated exchange. Player 1 can make an offer that is more favorable (F) or more unfavorable (U) to Player 2, and Player 2 can either accept (A) or reject (R) the offer.

Finding the Nash equilibrium of a two-player ultimatum game is straightforward. A Nash equilibrium describes a set of actions such that each player in

³²⁰ See, e.g., Richard H. Thaler, *Anomalies: The Ultimatum Game*, 2 J. ECON. PERSP. 195 (1988); Ariel Rubinstein, *Perfect Equilibrium in a Bargaining Model*, 50 ECONOMETRICA 97 (1982).

³²¹ See, e.g., Rubinstein, *supra* note 320, at 100.

³²² Paul Pecorino & Mark Van Boening, *Fairness in an Embedded Ultimatum Game*, 53 J.L. & ECON. 263 (2010).

a game cannot improve his payoff by choosing another action. That is, each player is maximizing his payoff given the actions of the other players.³²³ Nash equilibria are the most commonly used solution concept in game theory, and finding Nash equilibria to predict the outcome of strategic interactions is commonly used in many areas of microeconomic theory, including the analysis of imperfect competition, voting models, and bargaining, among others. (The Nash equilibrium of a bargaining game and the Nash bargaining solution are separate concepts, as Nash bargaining is a special case of more general bargaining analysis and Nash equilibrium is a general solution concept in all games.³²⁴)

Consider the following example, represented in extensive form by Figure 11. Assume ten units of exchange, given to Player 1 by a neutral third party on a condition that Player 1 and Player 2 agree to a division of the money.³²⁵ In this example, Player 1 can offer \$4 to Player 2 (represented in the extensive form game by strategy *F* (more favorable)) or \$1 to Player 2 (represented by strategy *U* (more unfavorable)).

There are two pure strategy Nash equilibria in this game:³²⁶

- (1) Player 1 offers \$4 and Player 2 accepts all offers ($U; A|F, A|U$); and
- (2) Player 1 offers \$1 and Player 2 accepts an offer of \$4 and rejects an offer of \$1 ($F; A|F, R|U$).³²⁷

However, only ($U; A|F, A|U$) is a subgame perfect Nash equilibrium.³²⁸ The other Nash equilibria will require Player 2 to play some strictly dominated strategy in at least one subgame. Therefore, the strategy ($U; A|F, A|U$) is the expected outcome of the game, and Player 1, the offeror, will have received a more favorable result (of \$9) compared with Player 2 (who receives \$1).

³²³ See, e.g., TIROLE, *supra* note 164, at 206.

³²⁴ See John F. Nash, Jr., *The Bargaining Problem*, 18 *ECONOMETRICA* 155 (1950); John Nash, *Non-Cooperative Games*, 54 *ANNALS MATH.* 286 (1951).

³²⁵ BINMORE, *supra* note 1, at 68; Thaler, *supra* note 320, at 195–96.

³²⁶ A pure strategy is a specific action for a player, compared with a mixed strategy, which represents a set of probabilities that a player will take each possible action. A pure strategy can be viewed as a special case of a mixed strategy where a player takes a specific action with probability of 1 and the remaining actions with probability 0. In a pure strategy Nash equilibrium, each player's actions are characterized as pure strategies.

³²⁷ Strategies for Player 2 are listed as an action for Player 2 conditional on an action by Player 1. So ($A|F, R|U$) means that Player 2 will accept given the more favorable offer (\$4) by Player 1 and reject given the unfavorable offer (\$1) by Player 1.

³²⁸ Subgame perfect Nash equilibria are a subset of Nash equilibria intended to eliminate “non-credible” threats. In the above example, for Player 2 to reject an offer of \$1 may be viewed as non-credible because it requires Player 2 to choose a payoff of \$0 over a payoff of \$1 after Player 1 makes an unfavorable offer. In layman's terms, an equilibrium is a subgame perfect Nash equilibrium only if no player could improve his payoff from unilaterally deviating at *any* point in the game. A strategy that requires Player 2 to play *R* after Player 1 plays *U* does not satisfy this criterion because Player 2 could increase his payoff by playing *A* after Player 1 plays *U*. See, e.g., DAVID M. KREPS, *A COURSE IN MICROECONOMIC THEORY* 421–25 (Princeton Univ. Press 1990).

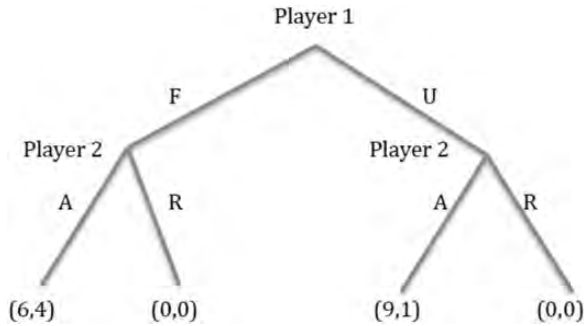


Figure 11. Extensive form ultimatum game

Theoretically, ultimatum games are expected to have two results: (1) Player 1 will make an offer that approaches zero and (2) Player 2 will accept any positive offer.³²⁹ However, experiments have shown that both parties act differently from what is expected.³³⁰ Observed outcomes do not necessarily align with the subgame perfect Nash equilibrium strategy. In fact, offering a low amount of money can be risky.³³¹ Even though Player 2 would be better off by accepting the unfavorable offer, experiments show several cases where Player 2 rejects an unfavorable offer.³³² In most experimental situations, Player 2 will end up with an amount that is less than but close to 50 percent of the total sum.³³³ This result is similar to the second Nash equilibrium of the game in Figure 11. Conditional on Player 2 rejecting a low offer from Player 1, it is a best response for Player 1 to offer a more equitable division of the endowed amount. Likewise, conditional on Player 1 offering the more equitable division, it is a best response for Player 2 to reject lower payments and accept the higher payment. Thus, although the experimental results do not reflect play of a subgame perfect Nash equilibrium, the outcome can still be a Nash equilibrium.

Ultimatum games are interesting in analyzing the FRAND commitment not because FRAND represents an ultimatum game, but because the results of experiments on ultimatum games shed light on which sort of bargains players would characterize as fair or reasonable. Without a FRAND commitment, the SEP holder could essentially play the role of Player 1 in an ultimatum game, making a take-it-or-leave-it offer to the implementer. Game theory suggests that this offer would be a royalty rate close to the implementer's maximum willingness to pay, such that nearly all of the surplus generated by

³²⁹ BINMORE, *supra* note 1, at 68; Pecorino & Van Boening, *supra* note 322, at 263.

³³⁰ Thaler, *supra* note 320, at 197.

³³¹ *Id.* at 196.

³³² *Id.* at 197.

³³³ BINMORE, *supra* note 1, at 68.

the standard would flow to SEP holders. This scenario is commonly called “holdup” in the literature on FRAND.³³⁴

Conversely, using the flawed *ex ante* incremental value approach, the bargaining would produce results similar to an ultimatum game in which the implementer makes the take-it-or-leave-it offer. In that case, the offer would be close to zero, and nearly all of the surplus would flow to the implementers. Proponents of the *ex ante* incremental value approach present *ex ante* negotiations as being similar to ultimatum games and derive results where the SEP holder is offered royalties close to zero.³³⁵ Essentially, the *ex ante* analysis assumes that competing technologies exist and that the implementer can play an ultimatum game with a patent holder, reserving virtually the entire surplus generated by the standard for implementers.³³⁶ As a result, royalty rates under the *ex ante* approach are very low.

In contrast to the theory of ultimatum games, the surprising experimental results of ultimatum games suggest two implications for the determination of a FRAND royalty. First, even if viewed as one of the above ultimatum-game-like settings, the expected bargaining outcome is not likely to be so extreme as the ultimatum-game subgame perfect Nash equilibrium suggests, where one player captures nearly all the surplus. As a result, it is plausible that (1) parties would agree that fair and reasonable terms reserve some of the surplus generated by the standard to SEP holders and (2) that holdup by SEP holders (or reverse holdup by implementers) is less likely to occur in practice than theory would suggest.

Second, the *ex ante* incremental value approach is conceptually analogous to the situation where the SEP holder has not made a FRAND commitment. The only difference is which party is Player 1 and which party is Player 2. In both cases, the bargaining power is concentrated in a single party. In both cases, the outcome reserves nearly the entire surplus for only one of the bargaining parties. If it is not fair and reasonable to set royalties based on an ultimatum game where the SEP holder makes the take-it-or-leave-it offer, then it is also not fair and reasonable to set royalties based on an ultimatum game where the implementer makes the take-it-or-leave-it offer.

In experiments of ultimatum games, the outcomes do not correspond to the lopsided outcomes that the theory of the ultimatum game predicts. Evidently, the theory of ultimatum games needs to catch up to the experimental results. Because the parties to a FRAND contract will have beliefs at the time of

³³⁴ See, e.g., Lemley & Shapiro, *supra* note 158.

³³⁵ See, e.g., HAL R. VARIAN, JOSEPH FARRELL & CARL SHAPIRO, *THE ECONOMICS OF INFORMATION TECHNOLOGY: AN INTRODUCTION* 81 (Cambridge Univ. Press 2005) (“If the participants in the standard-setting organization are aware of the relevant patent(s) early on, they can pick an alternative specification that does not infringe on the patent or they can negotiate acceptable license terms with the patent holder(s), perhaps even a royalty-free license.”).

³³⁶ *Id.*

contracting about what range of royalties would be fair and reasonable, it is reasonable to expect that those beliefs also do not correspond to the extreme values suggested by the patent-holdup theory and the *ex ante* incremental value methodology.

4. Patent Counting—and Its Greater Possible Justification in the Context of Cross Licensing of Patent Portfolios

The “patent-counting” method for determining FRAND royalties prices SEPs by dividing the aggregate royalty stack for a standard by the number of patents that have been declared essential to that standard. The underlying assumption for this method is that all SEPs have equal value. The assumption is problematic. First, not all declared-essential patents are essential in fact. As I explained in Part III.C, patent holders may have an incentive to overdeclare their patents as standard-essential, especially if patent holders come to expect that patent counting will determine the magnitude of their FRAND royalties. Second, patents cover technologies and inventions, which are differentiated goods, and the royalty for a patent reflects the particular value of the technology it covers.³³⁷ Otherwise, there would be no need to negotiate the royalties paid on different patents and portfolios—there would be a single price for every patent or every broad category of patents.

The economics literature recognizes that patent counting is neither a realistic nor an accurate method for determining the value of an individual patent in a standard due to the underlying assumption that all SEPs have equal value.³³⁸ The courts recognize this problem. Judge Holderman held in *Innovatio* that “it is not appropriate to determine the value of the non-asserted standard-essential patents based merely on numbers. If a patent holder owns ten out of a hundred patents essential to a given standard, it does not automatically mean that it contributes 10% of the value of the standard.”³³⁹ Instead of engaging in strict patent counting, some scholars recommend that patent pool members implement *value*-proportional rules, such that the members of the pool negotiate royalties based on the quality or strength of each member’s contributed technology.³⁴⁰ Such an arrangement is predicated on the proposition

³³⁷ See, e.g., Layne-Farrar, Padilla & Schmalensee, *supra* note 161, at 675.

³³⁸ See, e.g., *id.* at 682–85; F.M. Scherer & Dietmar Harhoff, *Technology Policy for a World of Skew-Distribution Outcomes*, 29 RES. POL’Y 559 (2000); Mark Schankerman & Ariel Pakes, *Estimates of the Value of Patent Rights in European Countries During the Post-1950 Period*, 96 ECON. J. 1052 (1986) (finding that the distribution of the value of patents in the United Kingdom, France, and Germany is sharply skewed); Teece, Grindley & Sherry, *supra* note 138, at 19 (“there is no reason to believe that the value of different patents (or portfolios of patents) is proportional to the number of patents in the portfolio, even for ‘essential’ patents.”).

³³⁹ RAND Opinion in *Innovatio*, *supra* note 4, at 18–19.

³⁴⁰ See, e.g., Claudia Tapia Garcia, *Realities of Patent Pools in the Telecommunication Sector*, in PROCEEDINGS OF THE 7TH STANDARDIZATION & INNOVATION IN INFORMATION TECHNOLOGY CONFERENCE (STIIT 2011) 233 (Knut Blind & Kai Jacobs eds., Mainz 2011).

that not all patents have equal value. For these reasons, any expert economic testimony on FRAND royalties that rested on patent counting would face a significant risk in the United States of being ruled inadmissible at the *Daubert* stage of federal district court litigation.³⁴¹

Patent counting can be particularly misleading because a firm can inflate its number of SEPs to exaggerate the true strength of its patent portfolio. For example, the firm can file for patents over the same technology in many different countries, fragment a patent over the same technology into many continuation patents, or overdeclare more patents to be standard-essential. Furthermore, the number of issued patents is a trailing indicator of a patent portfolio's strength, whereas the number or share of approved contributions is a leading indicator. It can take years for a patent application to be granted. Thus, by including patent applications in the patent-counting exercise, one will exaggerate the portfolio's patent strength. In contrast, it generally takes a few months for a contribution to be approved and voted into the standard by SSO members. Most approved contributions correspond to inventions for which patents will eventually be granted. Consequently, a firm's number of approved contributions is an intellectually sound proxy for the strength of that firm's patent portfolio. Because approved contributions are peer-reviewed by the SSO's own members, those approvals are less susceptible to gaming by SSO members than is the process of unilaterally declaring one's patents to be essential to the standard. Obviously, a legal rule that relied on simple patent counting to infer the strength of a firm's portfolio of SEPs for purposes of determining a FRAND royalty would create a powerful incentive for SSO members to inflate their declarations of SEPs.

One approach to determining a FRAND royalty would be to treat patent counting, or the assumption that all declared-essential patents are equally valuable, as the presumption, which a party could overcome with evidence showing an unequal distribution of values among SEPs. However, no empirical evidence indicates that it is more probable than not that all SEPs in a standard are of equal valuable. Therefore, the patent-counting method could be misleading and bias the FRAND royalty determination. Without adequate empirical evidence to support or refute the use of patent counting to determine the FRAND royalties for the patent in suit, a court's wiser course would be to refrain from using patent counting whenever a more rigorous method is available.

To an economist, the notion that all SEPs are (by remarkable coincidence) equally valuable is hard to defend. In practice, patent holders and implementers do not license individual SEPs. The cost of setting a price for each SEP would be prohibitive. If the licensing of SEPs were like the recurring

³⁴¹ *Daubert v. Merrill Dow Pharmaceuticals, Inc.*, 509 U.S. 579 (1993). For a discussion of how economic analysis can inform a judge's determination of the admissibility of expert testimony on patent royalties, see J. Gregory Sidak, *Court-Appointed Neutral Economic Experts*, 9 J. COMPETITION L. & ECON. 359 (2013).

transactions of selling “boxes” of rough diamonds among wholesale diamond merchants, it would be easier to accept that, over many transactions over time, the exceedingly good values would offset the exceedingly bad values, such that an individual measurement of value would not be efficient to undertake for each individual transaction. Roy Kenney and Benjamin Klein studied the wholesale diamond-trading mechanism used by De Beers and found that diamond sellers and buyers do not bother determining a price for every rough diamond (unless it is large enough to warrant doing so). One simple solution to reduce the transaction costs of measuring the value of every diamond is to set an average price for “a group of goods of individually uncertain and difficult-to-measure quality.”³⁴² However, in a box of diamonds, some diamonds will be of lower quality, and, without perfect information on the exact value of every diamond in the box, the seller will set an average price that over-values the lower-quality diamonds and undervalues the higher-quality diamonds.³⁴³ Consequently, the buyer has an incentive to search for and reject the lower-quality diamonds, as well as select the higher-quality diamonds. If the seller expects that the buyer will identify and exclude lower-quality diamonds, then the seller will also invest in searching for lower-quality diamonds itself and sorting the diamonds into more finite classifications.³⁴⁴ The lower-quality diamonds that would be left over would need to be grouped and given a lower average price, but then the same round of search for and selection of lower-quality diamonds would continue with each new batch.³⁴⁵ Even though the sellers would not intend to do so, they would essentially end up trying to set a price for each diamond. Such duplicative search would waste resources.

To avoid oversearching, a mechanism is necessary to induce buyers to pay for the over-valued diamonds. According to Kenney and Klein, De Beers achieved this outcome by assigning each “sight” of diamonds to a preselected buyer, and “by pricing in such a way that buyers on average are earning rents the present discounted value of which is greater in almost all cases than the short-run profit that can be achieved by rejecting the sights of lower than average quality” diamonds.³⁴⁶ If the buyer rejects a sight, the buyer loses those rents and is “terminated from the list of invited buyers.”³⁴⁷ Under this mechanism, the *seller* “pays a premium to its *buyers* by selling diamonds at less than (costless-search) market-clearing prices.”³⁴⁸ That premium from seller to buyer “encourage[s] the buyer to take low-quality goods occasionally.”³⁴⁹

³⁴² Roy W. Kenney & Benjamin Klein, *The Economics of Block Booking*, 26 J.L. & ECON. 497, 500 (1983).

³⁴³ *Id.* at 503.

³⁴⁴ *Id.* at 505.

³⁴⁵ *Id.*

³⁴⁶ *Id.* at 506.

³⁴⁷ *Id.*

³⁴⁸ *Id.* (emphasis added).

³⁴⁹ *Id.*

Furthermore, for the seller, the premium, or lower price, is “offset by savings in marketing costs, that is, the avoidance of oversearching.”³⁵⁰ The repeat-play game results in implicit settling up through offsetting errors.

Similarly, by cross licensing SEPs in portfolios, patent holders can avoid the transactions cost of evaluating each of their patents, and they can offset the cost of errors through repeated transactions. When patent holders expect repeat transactions, they need not invest in searching for the exact value of each of their SEPs, because the errors will be evenly distributed between the parties over the repeated transactions. Overpayments cancel out underpayments, and the cost of determining the true value of every SEP—in terms of the monetary cost and the cost of delayed transactions—should outweigh any remaining cost of errors. Patent holders, of course, are not likely to cross-license patent portfolios as frequently as diamond traders exchange boxes of diamonds, but the interactions of SEP holders and implementers are nonetheless recurring and bilateral. Just as it is the efficiency norm for diamond trading to sell sights of diamonds of varying quality, it is no surprise that cross licensing of an entire patent portfolio (or an entire subset of patents regarding a particular standard) is the efficiency norm for patent holders. The hypothetical negotiation over the royalty for an individual SEP is largely a legal fiction. For the purpose of determining reasonable-royalty damages for an infringed SEP, using the one-way FRAND royalty for the portfolio containing the infringed SEP would be a reasonable starting point.

5. *Patent Pools*

In a patent pool, member patent holders share their patents with the pool, and a single license covers all patents in the pool. Thus, a licensee obtains the right to implement the patents available in the pool without conducting bilateral negotiations with each pool member. The pool collects the royalty revenues and distributes them among its members according to a predetermined formula. Do patent pools offer any guidance on how one would develop a distribution of the value of SEPs in a standard? Do they indicate how one could rigorously divide the aggregate royalties associated with a standard among SEP holders?

One-Blue is a patent pool consisting of patents “essential to any of the optical standards used for Blu-ray Disc products.”³⁵¹ Those standards include Blu-ray standards, DVD standards, and CD standards.³⁵² In distributing royalties among its members, One-Blue distinguishes (1) between parent patents and continuation patents, as well as (2) between physical format inventions

³⁵⁰ *Id.*

³⁵¹ Ruud Peters, *One-Blue: A Blueprint for Patent Pools in High Tech*, 2011 INTELLECTUAL ASSET MGMT. 38, 38 (2011).

³⁵² See *Patent Coverage*, ONE-BLUE, <http://www.one-blue.com/patent-coverage/>.

and application format inventions.³⁵³ Parent patents receive higher royalties than continuation patents; likewise, physical format patents receive higher royalties than application format patents, based on the premise that “more costly research is needed for a physical format invention—the real hardcore technology.”³⁵⁴ The royalty for a Blu-ray Disc player is \$9 per unit, whereas the royalties for Blu-ray Disc software range from \$1.25 to \$3.³⁵⁵ One-Blue’s categorization of its patents provides an example of a simple method for differentiating royalties based on the value of categories of SEPs.

Unlike One-Blue, most patent pools establish participants’ royalties using the patent-counting method.³⁵⁶ Consequently, as Anne Layne-Farrar and Josh Lerner observe, “firms with higher value patent portfolios are less likely to join a numeric proportional pool,” wherein the royalty revenues that the pool collects are divided among the members based on their relative share of patents.³⁵⁷ Similarly, Judge Holderman noted in *Innovatio* that “patent holders with valuable patents will not contribute their technology to the pool” but “will instead attempt to license their patents bilaterally, where they often can obtain higher rates.”³⁵⁸

The use of equal or proportional sharing may explain why there currently are few working patent pools for wireless communications standards, where the distribution of the value of SEPs is likely skewed.³⁵⁹ Judge Holderman noted that this relative lack of success of pools suggests that the offered compensation is “too low to give patent holders a reasonable return on their technology.”³⁶⁰ The largest contributors to the standard—in terms of the value of their SEPs rather than the number of their declared essential patents—are unlikely to join a pool, so the only patent holders willing to join the pool would have less valuable SEPs, making the pool less attractive to implementers of the standard. According to ABI Research,³⁶¹ as of October 2013 only one of the top ten contributors to the LTE standard, ZTE, was part of the Via LTE

³⁵³ Peters, *supra* note 351, at 41.

³⁵⁴ *Id.*

³⁵⁵ *Royalty Rates*, ONE-BLUE (July 1, 2011), <http://www.one-blue.com/royalty-rates/>.

³⁵⁶ *Microsoft Corp. v. Motorola Inc.*, No. C10-1823JLR, 2013 WL 2111217, at *74 (W.D. Wash. Apr. 25, 2013) (Robart, J.); Josh Lerner & Jean Tirole, *Public Policy Toward Patent Pools*, in 8 *INNOVATION POLICY AND THE ECONOMY* 157, 171 (Univ. of Chicago Press 2008).

³⁵⁷ Anne Layne-Farrar & Josh Lerner, *To Join or Not To Join: Examining Patent Pool Participation and Rent Sharing Rules*, 29 *INT’L J. INDUS. ORG.* 294, 296 (2011). See also *Microsoft v. Motorola*, 2013 WL 2111217 at *80 (“Another problem with using patent pools as the *de facto* RAND royalty rate is that the patent-counting royalty allocation structure of pools does not consider the importance of a particular SEP to the standard or to the implementer’s products[.]”). See also Anne Layne-Farrar & Gerard Llobet, *Payments and Participation: The Incentives to Join Cooperative Standard Setting Efforts*, presented at the Research Roundtable on Innovation and Technology Standards (2013); Llanes & Poblete, *supra* note 183, at 12.

³⁵⁸ RAND Opinion in *Innovatio*, *supra* note 4, at 70.

³⁵⁹ See, e.g., Goodman & Myers, *supra* note 86.

³⁶⁰ RAND Opinion in *Innovatio*, *supra* note 4, at 70.

³⁶¹ Solis & Cooney, *supra* note 233, at 12.

patent pool,³⁶² and only one entity, the China Academy of Telecommunication Technology, was part of the Sisvel LTE patent pool.³⁶³ Layne-Farrar and Lerner examined nine patent pools in high-technology sectors, one of which was a pool for the WCDMA standard. Among the nine pools, the WCDMA pool had the lowest firm participation rate (at 29 percent) and the lowest rate of patents covered by the pool (at 10 percent).³⁶⁴ The pool lasted only three years.³⁶⁵

Generally speaking, patent pools are not useful benchmarks for determining FRAND royalties because pools often use patent counting. Patent pools are ill-suited to measuring the distribution of the value of SEPs in a standard or dividing aggregate royalties in a way that would encourage participation by patent holders with the largest contributions to a standard. Further empirical research is needed on patent pools, such as One-Blue, that distinguish between patents based on their technical merit and distribute royalties based on the patent holder's relative contributions to the standard.

VII. CONCLUSION

In articulating a framework for determining FRAND royalties for standard-essential patents, it is important that courts adopt an approach that favors neither net infringers nor net licensors. Unfortunately, Judge Robart's RAND ruling in *Microsoft v. Motorola*, if widely accepted by courts, would shift the risk associated with investing in standard-setting largely to patent holders. It is not clear that Judge Robart accounted in his incremental value approach for the infringer's cost of lawfully acquiring the next-best alternative—a factor crucial for ensuring the correct identification of the next-best alternative and thus the correct calculation of the incremental value of the patent in suit. Setting the hypothetical negotiation between the SEP holder and the infringer at the time of standard adoption fails to compensate the inventor for its contribution to the standard. The FRAND royalty should not be set according to Judge Robart's understanding of the *ex ante* incremental value of the SEP. Judge Holderman's opinion in *Innovatio* corrects some of these problems in Judge Robart's approach and thus significantly advances the nascent jurisprudence on FRAND toward a more neutral footing.

My framework has endeavored to show the compatibilities and incompatibilities among the many differing views on how to measure FRAND royalties. The combinatorial value of SEPs shows that the value associated with SEPs in a standard is shared among all the SEPs. Thus, the starting point for setting a FRAND royalty is the task of dividing the surplus that SEP holders collectively earn on the downstream product generated by the standard. The next question

³⁶² *Licensors, VIA LICENSING*, <http://www.vialicensing.com/licensecontent.aspx?id=1514>.

³⁶³ *LTE Patent Owners, SISVEL*, <http://www.sisvel.com/index.php/lte/patent-owners>.

³⁶⁴ Layne-Farrar & Lerner, *supra* note 357, at 299.

³⁶⁵ *Id.*

is what share of the aggregate royalties to that standard a given patent holder should receive. The facts of the case, particularly the relative contribution of the patent holder's SEPs to the standard, dictate the answer to that question. Ultimately, FRAND royalties should be set to maximize the joint surplus resulting from the creation of the standard and the commercial exploitation of the combined contribution of all SEPs. Maximizing that surplus requires that patent holders and implementers alike are properly dissuaded from acting opportunistically. Instead, the legal and economic principles underlying the determination of FRAND royalties should induce SEP holders and implementers to choose an equilibrium of mutual forbearance from opportunism. Implementers should be able profitably to manufacture downstream products that read on standard-essential patents. And SEP holders should receive royalties sufficient to ensure their continued participation in setting open standards. A FRAND royalty that satisfies the individual-rationality constraint for both the patent holder and the implementer will encourage participation in the standard and discourage opportunistic behavior.

The second part of this article, to be published separately, will analyze the extent to which the FRAND commitment limits, under various sources of law, a patent holder's right to seek an injunction against the infringer of a standard-essential patent. That analysis will also address the anterior question of what constitutes good-faith negotiation to set a FRAND royalty before the SEP holder may seek an injunction.

THE MEANING OF FRAND, PART II: INJUNCTIONS

*J. Gregory Sidak**

ABSTRACT

Under what conditions may the holder of standard-essential patents (SEPs) seek to enjoin an infringing implementer without breaching the SEP holder's contract with the standard-setting organization (SSO) to provide access to those SEPs on fair, reasonable, and nondiscriminatory (FRAND) terms? I show that the SEP holder's contractual obligations still permit it to seek an injunction. A FRAND commitment requires the SEP holder to offer a license for the SEPs on FRAND terms (or otherwise to grant implementers access to the SEPs). Extending an offer containing a price within the FRAND range discharges the SEP holder's contractual obligation. Thereafter, the SEP holder may seek to enjoin an implementer that has rejected a FRAND offer. This analysis indicates the imprudence of categorically banning injunctions for the infringement of SEPs, as some scholars have advocated and as one of the world's most significant SSOs—the Institute of Electrical and Electronics Engineers (IEEE)—actually did in 2015 in amendments to its bylaws. Such a ban would invite opportunism by implementers and is unnecessary. Courts already can prevent opportunism by SEP holders by conditioning an injunction on the implementer's actual or constructive rejection of a FRAND offer.

JEL: K00; K12; K21; K41; L12; L63; O34

I. INTRODUCTION

A patent holder that joins a standard-setting organization (SSO) typically agrees to license its standard-essential patents (SEPs) on fair, reasonable, and nondiscriminatory (FRAND) terms to future implementers of the standard. In the United States, a court “may grant injunctions . . . to prevent the violation of any right secured by patent.”¹ However, an SEP holder's right to enjoin implementers that infringe FRAND-committed patents is a controversial topic in

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¹ 35 U.S.C. § 283.

patent law and competition policy throughout the world.² In this article, I analyze whether, and under what conditions, an SEP holder may seek and enforce an injunction against an implementer without breaching the SEP holder's FRAND contract with the SSO—including the SEP holder's commitments to the contract's third-party beneficiaries (namely, implementers of the standard).³

Some commentators have suggested that an SEP holder should never be allowed to seek or enforce an injunction after it has committed to offer to license its SEPs on FRAND terms. Mark Lemley and Carl Shapiro are leading proponents of this view and argue that an SEP holder's use of an injunction facilitates patent holdup.⁴ According to Lemley and Shapiro, an SEP holder's mere threat to exclude an implementer's products from the market, even if only for a limited period of time, could enable the SEP holder to extract licensing fees from implementers that exceed the SEP's genuine economic value.⁵ Lemley and Shapiro urge courts to deny injunctions to SEP holders.

Citing these theoretical conjectures, some implementers of SEPs have sought to amend an SSO's bylaws to impose a categorical ban on injunctions for infringement of SEPs. On February 8, 2015 one of the world's most

² See, e.g., *Apple Inc. v. Motorola, Inc.*, 757 F.3d 1286, 1331–32 (Fed. Cir. 2014); *On Claim Against Samsung Electronics for Obstruction of Business Operations* [삼성전자의 사업활동 방해행위 심의 결과에 대한 건], Fair Trade Commission, Republic of Korea (Feb. 26, 2012), http://www.ftc.go.kr/news/ftc/reportView.jsp?report_data_no=5542 (Korea); *Intex Tech. Ltd. v. Telefonaktiebolaget LM Ericsson*, Case No. 76 of 2013, ¶ 6, Competition Comm'n of India (Jan. 16, 2014) (India); *Guangdong Gaoyuan Shenjie Huawei Gongsi yu Meiguo IDC Gongsi Lanyong Shichang Diwei Longduan Jiufen An* [广东高院审结华为公司与美国IDC公司滥用市场地位垄断纠纷案] (Guangdong High Court's Decision on Abuse of Market Power in Huawei v. IDC Case) (Nov. 1, 2013) (China), http://www.gdcourts.gov.cn/ecdomain/framework/gdcourt/monehpcnabjcbboekklboafjdjkbjmc/cohhkcaabjdbboekklboafjdjkbjmc.do?isfloat=1&disp_template=pchllmiaebdbboeljhjhkjkkgbjje&fileid=20131101104516982014&moduleIDPage=cohhkcaabjdbboekklboafjdjkbjmc&siteIDPage=gdcourt&infoChecked=0&keyword=&dateFrom=&dateTo=.

³ In a predecessor to this article, I have analyzed the law and economics of FRAND royalties. See J. Gregory Sidak, *The Meaning of FRAND, Part I: Royalties*, 9 J. COMPETITION L. & ECON. 931 (2013).

⁴ See, e.g., Mark A. Lemley & Carl Shapiro, *Patent Holdup and Royalty Stacking*, 85 TEX. L. REV. 1991, 1991–92 (2007) [hereinafter Lemley & Shapiro, *Patent Holdup and Royalty Stacking*]; Carl Shapiro, *Injunctions, Hold-Up, and Patent Royalties*, 12 AM. L. & ECON. REV. 280, 280–82 (2010).

⁵ Lemley & Shapiro, *Patent Holdup and Royalty Stacking*, *supra* note 4, at 2009 (“In the real world, it is common for patent defendants to settle cases for more money than the patentee could have won in damages and license fees, simply to avoid the threat of an injunction.”); Shapiro, *supra* note 4, at 302 (discussing patent holdup when the SEP holder does not itself compete in the downstream market). For critiques of the Lemley-Shapiro thesis that patent holders are systematically overcompensated, see John M. Golden, “*Patent Trolls*” and *Patent Remedies*, 85 TEX. L. REV. 2111 (2007) (criticizing the method and data that Lemley and Shapiro use to show that patent holders are systematically overcompensated); 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 (2008) (explaining the methodological flaws of the Lemley-Shapiro model of patent law and assessing the factors that bias the results of their study).

significant SSOs, the Institute of Electrical and Electronics Engineers (IEEE) ratified amendments to its bylaws to diminish the rights of SEP holders in various ways, including categorically banning the SEP holder's right to an injunction. (The IEEE has promulgated, among other important standards, the 802.11 and subsequent standards for Wi-Fi.) Draft 39 of the IEEE Standard Board Bylaws defines the new term "Prohibitive Order" to "mean an interim or permanent injunction, exclusion order, or similar adjudicative directive that limits or prevents making, having made, using, selling, offering to sell, or importing a Compliant Implementation."⁶ The significance of the IEEE's new definition of a Prohibitive Order becomes clear when one examines how the IEEE then defines another new term, "Reasonable Rate," to mean:

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 IEEE Standard. In addition, determination 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 licenses are otherwise sufficiently comparable to the circumstances of the contemplated license.⁷

For a patent holder to have its patented technology adopted into an IEEE standard, the patent holder must provide an Accepted Letter of Assurance (LOA), which, under the IEEE's amendments to its bylaws, requires that the patent holder waive its right to seek an injunction against an infringer. The patent holder's licensing assurance must either contain a general waiver of enforcement or

[a] statement that the Submitter will make available a license for Essential Patent Claims to an unrestricted number of Applicants on a worldwide basis without compensation or under Reasonable Rates, with other reasonable terms and conditions that are demonstrably free of any unfair discrimination to make, have made, use, sell, offer to sell, or import any

⁶ IEEE Draft 39 IEEE Standards Board Bylaws § 6.1, at 1 (2014) [hereinafter IEEE Draft 39 IEEE Standards Board Bylaws], *available at* http://grouper.ieee.org/groups/pp-dialog/drafts_comments/SBBylaws_100614_redline_current.pdf; *see also* IEEE Draft IEEE-SA Patent Policy FAQs: Understanding Patent Issues During IEEE Standards Development, Draft 14 (Dec. 3, 2014) [hereinafter Draft IEEE-SA Patent Policy FAQs], *available at* http://grouper.ieee.org/groups/pp-dialog/drafts_comments/Patent_Policy_FAQ_031214_redline.pdf; *see also* Press Release, IEEE, IEEE Statement Regarding Updating of Its Standards-Related Patent Policy (Feb. 8, 2015), https://www.ieee.org/about/news/2015/8_february_2015.html?WT.mc_id=std_8feb.

⁷ Draft 39 IEEE Standards Board Bylaws, *supra* note 6, § 6.1, at 2.

Compliant Implementation that practices the Essential Patent Claims for use in conforming with the IEEE Standard. An Accepted LOA that contains such a statement signifies that *reasonable terms and conditions, including without compensation or under Reasonable Rates, are sufficient compensation for a license to use those Essential Patent Claims and precludes seeking, or seeking to enforce, a Prohibitive Order except as provided in this policy.*⁸

In informal accompanying documents, the IEEE describes the SEP holder's forced waiver of its right to an injunction as voluntary: "An Accepted Letter of Assurance defines the circumstances in which the Submitter has *voluntarily agreed not to seek or seek to enforce a Prohibitive Order*, even if otherwise permitted in a specific jurisdiction."⁹ The IEEE deems a patent holder's request for an injunction an "explicit threat," and it deems even the mention of the availability of an injunction during negotiations an "implicit threat":

A patent holder's request that a court issue a Prohibitive Order against an implementer, who does not have a license, would be an example of an *explicit threat*. A patent holder's reminder to an implementer that a Prohibitive Order might be available if the implementer does not agree to the requested rate would be an example of an *implicit threat*.¹⁰

The IEEE directly connects the patent holder's forced waiver of the right to an injunction to the determination of reasonable rates for SEPs because, in the calculation of such rates, "the [proposed] policy recommends consideration of license agreements obtained *without explicit or implicit threat of a Prohibitive Order*."¹¹ In other words, the analysis of comparable licenses for purposes of determining a FRAND royalty may consider only licenses for which the SEP holder had relinquished the right to seek and enforce an injunction against an unlicensed implementer. The IEEE's amendments would allow an SEP holder to seek an injunction only after it had successfully litigated claims against the unlicensed implementer to conclusion in a court of appeals, which could take years.¹² The updated IEEE-SA Patent Policy is retroactive to

⁸ *Id.* § 6.2, at 3 (emphasis added).

⁹ Draft IEEE-SA Patent Policy FAQs, *supra* note 6, ¶ 56, at 15 (emphasis added).

¹⁰ *Id.* ¶ 47, at 13–14 (emphasis added).

¹¹ *Id.* ¶ 48, at 14 (emphasis added).

¹² The IEEE amended its statement of policy to provide:

The Submitter of an Accepted LOA who has committed to make available a license for one or more Essential Patent Claims agrees that it shall *neither seek nor seek to enforce a Prohibitive Order* based on such Essential Patent Claim(s) in a jurisdiction *unless the implementer fails to participate in, or to comply with the IEEE*, [sic] *the outcome of, an adjudication, including an affirming first-level appellate review*, if sought by any party within applicable deadlines, in that jurisdiction by one or more courts that have the authority to: determine Reasonable Rates and other reasonable terms and conditions; adjudicate patent validity, enforceability, essentiality, and infringement; award monetary damages; and resolve any defenses and counterclaims.

Draft 39 IEEE Standards Board Bylaws, *supra* note 6, § 6.2, at 4 (emphasis added). The IEEE's bylaws prohibiting an SEP holder from seeking an injunction against an unlicensed implementer will reduce the value of SEPs to below their current market-disciplined level and ultimately harm investment in R&D and contributions to the IEEE. Whatever static

January 1, 2015.¹³ The updated policy thus applies to SEP holders that have submitted a letter of assurance on or after January 1, 2015.¹⁴

Before the IEEE proposed this radical amendment of its bylaws that categorically bans injunctions for FRAND-committed SEPs, some scholars had argued that, by making a FRAND commitment, an SEP holder already has waived its statutory right to seek an injunction.¹⁵ Lemley and Shapiro argue that a court may conclude that an SEP holder that has made a FRAND commitment thereby declares that monetary damages are an adequate remedy at law for the infringement of its SEPs and that the SEP holder will suffer no irreparable harm from that infringement.¹⁶ In addition, some implementers have invoked the doctrine of equitable estoppel as a defense in patent-infringement suits brought by SEP holders.¹⁷ Finally, some enforcement agencies

benefits from lower prices might flow to consumers from downstream manufacturers in the short run surely would be more than offset by forgone consumer surplus in future periods because of reduced innovation and diminished dynamic efficiency. See J. Gregory Sidak & David J. Teece, *Dynamic Competition in Antitrust Law*, 5 J. COMPETITION L. & ECON. 581 (2009).

Apart from raising these particular concerns regarding their categorical ban on injunctions, the IEEE's amendments to its bylaws present other significant problems. First, the evident lack of adherence to procedural safeguards in the formation of the IEEE's amendments raises serious antitrust concerns of oligopsonistic collusion. See J. Gregory Sidak, *Patent Holdup and Oligopsonistic Collusion in Standard-Setting Organizations*, 5 J. COMPETITION L. & ECON. 123 (2009). Second, the amendment to preclude an SEP holder and an implementer from relying on comparable licenses to set a FRAND rate if such licenses were supposedly obtained "under an explicit or implicit threat" of an injunction would exclude relevant market-based data for the valuation of patents. See Sidak, *The Meaning of FRAND, Part I: Royalties*, *supra* note 3, at 1000–09. Third, the requirement that a reasonable royalty rate be measured against the "smallest saleable compliant implementation that practices an Essential Patent Claim" is unsound on both legal and economic grounds. See J. Gregory Sidak, *The Proper Royalty Base for Patent Damages*, 10 J. COMPETITION L. & ECON. 989 (2014). Fourth, the accounting for all SEPs so as to set a proportional cap on the value of a single SEP or a single portfolio of SEPs will arbitrarily limit the returns to patents that contribute disproportionately greater value to a given IEEE standard. See Sidak, *The Meaning of FRAND, Part I: Royalties*, *supra* note 3, at 963–66. Fifth, the exclusion from the FRAND royalty of any value from standardization reveals that the amendments seek to appropriate all the rewards from the process of standardization for the benefit of implementers, to the detriment of SEP holders. See *id.* at 1022; J. Gregory Sidak, *Mandating Final-Offer Arbitration of FRAND Royalties for Standard-Essential Patents*, 18 STAN. TECH. L. REV. (forthcoming 2015), available at <http://www.criterioneconomics.com/lemley-shapiro-baseball-arbitration-frand-royalties-seps.html>.

¹³ Draft IEEE-SA Patent Policy FAQs, *supra* note ¶ 85, at 21–22.

¹⁴ *Id.* ¶ 86, at 22.

¹⁵ See, e.g., Joseph S. Miller, *Standard-Setting, Patents, and Access Lock-in: RAND Licensing and the Theory of the Firm*, 40 IND. L. REV. 351, 358 (2007).

¹⁶ Mark A. Lemley & Carl Shapiro, *A Simple Approach to Setting Reasonable Royalties for Standard-Essential Patents*, 28 BERKELEY TECH. L.J. 1135, 1144 (2013) [hereinafter Lemley & Shapiro, *A Simple Approach*].

¹⁷ See, e.g., *Qualcomm Inc. v. Broadcom Corp.*, 548 F.3d 1004, 1022–24 (Fed. Cir. 2008); *Hynix Semiconductor Inc. v. Rambus Inc.*, 645 F.3d 1336, 1348 (Fed. Cir. 2011); *Apple*,

assert that an SEP holder's request for an injunction, after the SEP holder has committed to license its SEPs on FRAND terms, constitutes anticompetitive conduct or an act of unfair competition, actionable under antitrust law.¹⁸

In this article, I analyze how a FRAND commitment affects an SEP holder's ability to enforce its patent rights. In Part II, I examine the FRAND contract. I explain that a primary purpose of a FRAND commitment is to grant implementers *access* to the patented technology.¹⁹ As a result, a FRAND commitment contractually restricts some of the SEP holder's statutory rights. By entering into a FRAND contract, an SEP holder gives up its right to exclude from the use of the SEPs any implementer willing to pay FRAND compensation. However, the duty to make a FRAND offer does not ensure that a licensing agreement with a specific implementer will eventuate. The FRAND commitment does not transform an SEP holder into a guarantor of contract formation. An SEP holder discharges its FRAND obligation when it makes a FRAND offer to the requesting implementer. Thereafter, if the SEP holder commences a negotiation, it does not do so because the FRAND commitment obligates it to negotiate. The negotiation still might fail. For

Inc. v. Motorola Mobility, Inc., No. 11-cv-178-bbc, 2012 WL 5416941, at *16 (W.D. Wis. Oct. 29, 2012).

¹⁸ See, e.g., Complaint, Motorola Mobility, L.L.C., No. 121-0120 (F.T.C. Jan. 3, 2013); Press Release, European Commission, Antitrust: Commission Opens Proceedings Against Samsung (Jan. 31, 2012), http://europa.eu/rapid/press-release_IP-12-89_en.htm [hereinafter European Commission Opens Proceedings Against Samsung].

¹⁹ In *The Meaning of FRAND, Part I: Royalties*, *supra* note 3, at 933, I said that a FRAND royalty should ensure the implementer's access to the *standard*. I now believe that this proposition overstates the scope of the duties that the FRAND obligation could feasibly impose on any single SEP holder. No single SEP holder can guarantee the success of the implementer's business strategy. Judge Richard Taranto's opinion for the Federal Circuit in *Aqua Shield v. Inter Pool Cover Team*, No. 2014-1263, 2014 WL 7239738 (Fed. Cir. Dec. 22, 2014), forcefully explains, in the context of the hypothetical negotiation generally, why a court cannot set the reasonable royalty due a licensor according to a residual calculation intended to ensure the licensee's profitability:

Another hypothetical assumption, bearing particularly on the anticipated-profits inquiry, abstracts away from the particular infringer's degree of efficiency. An especially inefficient infringer—e.g., one operating with needlessly high costs, wasteful practices, or poor management—is not entitled to an especially low royalty rate simply because that is all it can afford to pay without forfeiting or unduly limiting its profit if it uses the patented technology rather than alternatives. Thus, the royalty the particular infringer could profitably pay by going about its business in its particular way does not set the market value that the hypothetical negotiation aims to identify.

Id. at *4. The same reasoning applies to the mistaken proposition that the FRAND obligation makes an individual SEP holder the guarantor of the implementer's profit margin on the downstream product practicing the standard. "Ensuring access to the SEP holder's standard-essential *technology*" therefore more realistically and accurately describes the meaning of an individual SEP holder's FRAND commitment to the SSO and to implementers as third-party beneficiaries.

example, the implementer might not be willing or able to pay a FRAND royalty for the use of the SEPs. Under those circumstances, even though the SEP holder has discharged its contractual duty arising from the FRAND commitment, there will be no licensing agreement with the specific implementer. My analysis indicates the imprudence of categorically banning injunctions for infringement of SEPs, as the IEEE has amended its bylaws to require. Such a ban would invite opportunism by implementers and is unnecessary. Courts already can prevent opportunism by SEP holders by conditioning an injunction on the implementer's actual or constructive rejection of a FRAND offer.

In Part III, I analyze the potential legal restrictions on an SEP holder's right to seek an injunction after having committed to license its SEPs on FRAND terms. I make three main points. First, as a matter of contract law, a FRAND contract typically does not waive an SEP holder's right to an injunction. Second, principles of equitable estoppel generally do not constrain an SEP holder's right to request an injunction. Third, there is no reason to presume that an SEP holder that has committed to license its SEPs on FRAND terms will not suffer irreparable harm and consequently will not be able to meet the legal criteria required to obtain an injunction.²⁰ None of the presented theories supports an automatic extinguishment of the SEP holder's right to seek and receive an injunction. Under U.S. law, a court's determination of whether to enjoin an infringer of SEPs properly turns on application of the Supreme Court's *eBay* factors to the facts of the case.²¹

In Part IV, I analyze the risks associated with both a court's grant and a court's denial of an injunction against an infringer of SEPs. Some commentators have argued that permitting injunctions might allow an SEP holder to pressure an implementer opportunistically to agree to exploitative licensing terms. However, denying injunctions in cases that involve the infringement of FRAND-committed patents would invite opportunism in the opposite direction—by implementers. Absent the threat of an injunction, implementers will have little incentive to negotiate sincerely and to agree promptly to FRAND licensing terms. Limiting an SEP holder's ability to obtain an injunction might encourage freeriding on the SEP holder's invention and decrease the implementer's incentives to negotiate the licensing terms in good faith.²² Limiting an SEP holder's ability to obtain an injunction could also prolong litigation, rather than facilitate voluntary licensing agreements between the parties.²³ A

²⁰ See, e.g., *Apple Inc. v. Motorola, Inc.*, 757 F.3d 1286, 1332 (Fed. Cir. 2014).

²¹ *eBay Inc. v. MercExchange, L.L.C.*, 547 U.S. 388, 391 (2006).

²² See, e.g., Damien Geradin, *The European Commission Policy Towards the Licensing of Standard-Essential Patents: Where Do We Stand?*, 9 J. COMPETITION L. & ECON. 1125, 1129 (2013); James Ratliff & Daniel L. Rubinfeld, *The Use and Threat of Injunctions in the RAND Context*, 9 J. COMPETITION L. & ECON. 1, 9 (2013).

²³ See, e.g., *The International Trade Commission and Patent Disputes: Hearing Before the Subcomm. on Intellectual Property, Competition, and the Internet of the H. Comm. on the Judiciary*, 112th Cong.

categorical prohibition on injunctions would in turn reduce the SEP holder's willingness to invest in innovation and contribute its future inventions to SSOs.²⁴

In Part V, I identify the steps a court should follow when ruling on a request for an injunction against an infringer of a FRAND-committed patent. An SEP holder should be able to request an injunction only if it has made a FRAND licensing offer. The absence of any licensing offer, or the extension of an offer that lies outside the FRAND range, indicates that the SEP holder is not willing to license its SEPs on FRAND terms. Conversely, when the SEP holder has made a FRAND offer, the court's evaluation should focus on whether the implementer has rejected that offer, either explicitly or constructively. An implementer that rejects a FRAND offer should not be exempt from an injunction. Rather, the court should grant an injunction against that implementer if it finds that the *eBay* criteria are met. My proposed methodology disfavors the party that acts in bad faith during the negotiation of FRAND terms and thus discourages opportunistic practices *by either party*. This approach will stimulate voluntary licensing agreements on FRAND terms and will strike a balance between the need to ensure that implementers have access to the patented standard-essential technology and the need to ensure that SEP holders are adequately compensated for their inventions.

Finally, in Part VI, I examine the theories that would subject an SEP holder to potential liability under antitrust law for requesting an injunction against an infringer of the SEP holder's FRAND-committed patent. Despite the concerns expressed by antitrust agencies, an SEP holder's use of an injunction will not necessarily harm competition (or consumer welfare) in the relevant market. A request for an injunction should neither automatically trigger the application of section 2 of the Sherman Act²⁵ or section 5 of the Federal Trade Commission (FTC) Act,²⁶ nor should such a request necessarily constitute an abuse of a dominant position in violation of Article 102 of the Treaty on the Functioning of the European Union (TFEU).²⁷

II. THE FRAND CONTRACT

By virtue of its membership in an SSO, an SEP holder typically must declare during the standardization process whether it is willing to license its SEPs on FRAND terms to implementers of the standard. Although commentators have

10 (2012) (statement of Bernard J. Cassidy, Executive Vice President & General Counsel, Tessera Technologies, Inc.).

²⁴ *Id.*

²⁵ 15 U.S.C. § 2.

²⁶ *Id.* § 45.

²⁷ Consolidated Version of the Treaty on the Functioning of the European Union art. 102, Oct. 26, 2012, 2012 O.J. (C 326) 47 [hereinafter TFEU].

discussed various questions related to the meaning of FRAND, the exact obligations arising from a FRAND contract between an SEP holder and the SSO have remained remarkably unclear.²⁸ To clarify the matter, I analyze the purpose of the FRAND contract and the duties that the contract imposes on SEP holders.

A. The Purpose of the FRAND Contract

Industry standards often include technologies that patent rights protect. When an SSO adopts a patented technology in a standard, access to the patent becomes essential to those implementing the standard. By definition, it is not technically possible to make a product that complies with a standard without infringing the patents essential to that standard. The patent's essentiality, of course, depends on its claims; the patent could include some claims that are essential to the standard and other claims that are not.²⁹

One of the primary purposes of a FRAND contract is to ensure an implementer's access to the patented standard-essential technology. If it refused to license its SEPs, the SEP holder could render the standard impracticable. Manufacturers that do not have access to an SEP cannot produce goods compliant with the standard. In such circumstances, the SSO would need to revise the standard to bypass the technology covered by the SEP in question and make the standard accessible to the interested implementers. To obviate revising its standard (as well as the related costs and delays), SSOs typically require a participant in the standardization process to declare the existence of its SEPs—as early as possible—and to declare further whether it will license those SEPs on FRAND terms.³⁰ By requiring a FRAND commitment, an SSO prevents the SEP holder from refusing to license its SEPs and thereby denying implementers access to those standardized technologies, after the patented technology has been implemented into the standard.

An SSO, however, cannot compel a participant in the standard-setting process to offer its intellectual property rights (IPR) on FRAND terms. The rules of the European Telecommunications Standards Institute (ETSI), for example, clarify that if the SEP holder, before the publication of the standard, informs ETSI that it is not prepared to license its IPR on FRAND terms, “the General Assembly shall review the requirement for that STANDARD or TECHNICAL SPECIFICATION and satisfy itself that a viable alternative

²⁸ See, e.g., Christine Graham, Jeremy Morton, Chris Watson & David Healey, *Standard Setting, Competition Law and FRAND Licensing in Europe and the United States*, in NICOLAS FOX, *INTELLECTUAL PROPERTY IN ELECTRONICS AND SOFTWARE: A GLOBAL GUIDE TO RIGHTS AND THEIR APPLICATIONS* 31, 38 (Globe Law & Business 2013).

²⁹ See Sidak, *The Meaning of FRAND, Part I: Royalties*, *supra* note 3, at 958.

³⁰ See, e.g., European Telecommunication Standards Institute [ETSI], *ETSI Intellectual Property Rights Policy*, Annex 6, § 4.1–4.3 (Nov. 19, 2014) [hereinafter *ETSI IPR Policy*], available at <http://www.etsi.org/images/files/IPR/etsi-ipr-policy.pdf>.

technology is available.”³¹ If no alternative is available, ETSI rules provide that the Director-General of ETSI should “request [a] MEMBER to reconsider its position.”³² If “that MEMBER . . . decides not to withdraw its refusal to license the IPR,” it should inform the Director-General of its decision and provide a written explanation, and the Director-General should then “send the MEMBER’s explanation . . . to ETSI Counselors for their consideration.”³³ ETSI’s IPR policy confirms that ETSI cannot force a participant to grant a license on FRAND terms; rather, it confirms that agreeing to FRAND licensing terms is a *voluntary* commitment made by the SEP holder.

Courts have recognized that an SEP holder’s voluntary commitment to license its SEPs on FRAND terms constitutes a binding contract with the SSO.³⁴ The SEP holder and the SSO are parties to the contract, whereas the implementer of the standard (the licensee) is a third-party beneficiary. The SSO benefits from adopting the patented technology into the standard because the higher the quality of the adopted technology, the higher the quality of the standard. High-quality standards are more likely to be implemented by downstream firms and are more likely to encourage continuing investment in new generations of the standard. If a standard is commercially successful, the SEP holder will benefit from widespread implementation of its patented technology. Finally, an implementer of the standard benefits from the FRAND contract, which gives it lawful access to the patented standard-essential technology on reasonable terms and increases its ability to implement the standard. The implementer also benefits from the success of a standard; a product that is compatible with a widely adopted standard and, consequently, with a large network of devices, is typically more valuable to consumers than is an incompatible product.³⁵

As with any other contract, a FRAND contract imposes duties on the parties. The extent of those duties, however, provokes significant controversy. Does a FRAND contract impose on an SEP holder a duty to license? Does the contract impose on an SEP holder a duty of good faith that supersedes the general duty of good faith in contract law? In the next part, I analyze in detail the duties that a FRAND contract imposes on an SEP holder.

My analysis proceeds on the assumption that the SEP is valid and standard-essential. It is worth noting that this assumption will not always hold.³⁶ First, an

³¹ *Id.* § 8.1.1.

³² *Id.* § 8.1.2.

³³ *Id.*

³⁴ See, e.g., *Realtek Semiconductor Corp. v. LSI Corp.*, 946 F. Supp. 2d 998, 1005 (N.D. Cal. 2013) (“There is no dispute . . . that defendants entered into a binding contract with the IEEE to license their declared standard-essential patents . . . on RAND terms.”); see also *Microsoft Corp. v. Motorola, Inc.*, 696 F.3d 872, 878 (9th Cir. 2012).

³⁵ See, e.g., Mark A. Lemley, *Intellectual Property Rights and Standard-Setting Organizations*, 90 CAL. L. REV. 1889, 1896 (2002).

³⁶ See Sidak, *The Meaning of FRAND, Part I: Royalties*, *supra* note 3, at 956–60.

SEP might be found invalid—for example, because the patent application is eventually not granted or because the issued patent is later found to be invalid. Second, patent holders can declare their patents to be standard-essential when in fact they are not.³⁷ Empirical evidence shows that only a portion of the patents that are declared to be standard-essential describes technologies that are in fact necessary for compliance with the standard.³⁸ The SSO does not make this determination. As in the case of validity and infringement, any disagreement with respect to the essentiality of an SEP is conclusively resolved only through litigation. If a court declares a patent to be inessential to the standard, the implementer need not implement the patented technology to be able to comply with the standard, but neither is the patent holder subject to an obligation to license the patent in question on FRAND terms.³⁹

Several scholars,⁴⁰ as well as antitrust authorities⁴¹ and courts,⁴² have asserted that the *raison d'être* of a FRAND contract is to prevent patent holdup. A FRAND commitment may indeed enable the implementer to avoid excessive royalties. An implementer that believes that the offered licensing terms are not FRAND has the option to sue the SEP holder for breach of contract and seek adjudication of a FRAND royalty in court. Given this ready alternative available to the implementer, patent holdup is improbable, if not impossible. However, from the perspective of contract interpretation, the supposition that the primary purpose of a FRAND commitment is to prevent patent holdup is devoid of factual evidence.

The SSOs' IPR policies clearly state that one purpose of the FRAND commitment is to ensure *access* to the standardized technology. The IPR policy of the International Telecommunication Union (ITU), for example, explicitly states that securing access to SEPs is the “*sole objective of the code of*

³⁷ *Id.* at 958.

³⁸ David J. Goodman & Robert A. Myers, *3G Cellular Standards and Patents*, 2005 IEEE WIRELESSCOM § VI (June 13, 2005), available at <http://eeweb.poly.edu/dgoodman/wirelesscom2005.pdf>.

³⁹ See, e.g., Commission Decision, Case No. COMP/M.6381, *Google/Motorola Mobility*, 2012 O.J. (C 1068) 1, ¶¶ 58–59 [hereinafter *Google/Motorola Mobility*, Case No. COMP/M.6381].

⁴⁰ See, e.g., Joseph Farrell, John Hayes, Carl Shapiro & Theresa Sullivan, *Standard Setting, Patents, and Hold-Up*, 74 ANTITRUST L.J. 603 (2007); Jorge L. Contreras, *Fixing FRAND: A Pseudo-Pool Approach to Standards-Based Patent Licensing*, 79 ANTITRUST L.J. 47 (2013).

⁴¹ See, e.g., Analysis of Agreement Containing Consent Orders to Aid Public Comment at 4, Robert Bosch GmbH, Dkt No. C-4377 (F.T.C. Apr. 24, 2013); Press Release, European Commission, Antitrust: Commission Sends Statement of Objections to Motorola Mobility on Potential Misuse of Mobile Phone Standard-Essential Patents—Questions and Answers (May 6, 2013), http://europa.eu/rapid/press-release_MEMO-13-403_en.htm.

⁴² See, e.g., *Microsoft Corp. v. Motorola, Inc.*, 696 F.3d 872, 876 (9th Cir. 2012); *Microsoft Corp. v. Motorola, Inc.*, No. C10–1823JLR, 2013 WL 2111217, at *11 (W.D. Wash. Apr. 25, 2013); *InterDigital Commc'ns, Inc. v. ZTE Corp.*, No. 1:13-cv-00009-RGA & No. 1:13-cv-00010-RGA, 2014 WL 2206218, at *1 (D. Del. May 28, 2014).

practice.”⁴³ Similarly, ETSI states that the purpose of its policy is to reduce the risk that the “investment in the preparation . . . of [standards] could be wasted as a result of an [essential] IPR . . . being unavailable.”⁴⁴ By including a FRAND commitment in their IPR policies, SSOs seek to prevent an SEP holder from refusing to license its SEPs on reasonable terms and from thereby denying implementers access to the patented standard-essential technology.

At the same time, a FRAND commitment aims to ensure that an SEP holder will be fairly compensated for its contribution to the standard.⁴⁵ Technologies that have contributed to a standard are not costless; their development requires significant investments in research and innovation. Further, once a technology has been invented, a patent holder has the option to monetize that invention through exclusive use rather than by contributing it to a standard. SSOs recognize that, without an adequate royalty, technology owners might have insufficient incentives to continue to contribute their technologies to SSOs. A FRAND commitment addresses this problem: the SEP holder agrees to contribute its technology to the SSO and forgo the technology’s exclusive use in exchange for the assurance that the SEP holder will receive fair and reasonable compensation.

The IPR policies of several of the most prominent SSOs—including ETSI, the ITU, and the Joint Electron Device Engineering Council (JEDEC), and, until February 2015, the IEEE—have not dictated how economic rents should be divided between the SEP holder and the implementer.⁴⁶ For example, the SSOs’ internal rules do not state that an SEP holder’s compensation should not capture any part of the value created by the standard. The IPR policies also do not state that a FRAND royalty should be calculated to approximate the *ex ante* incremental value of patented technology, evaluated at the moment of standard selection. The analysis of the SSOs’ internal rules suggests that SSOs are less concerned with how actual FRAND royalties are negotiated—as long as the resulting royalties do not prevent implementers access to the standard-essential technologies.

In 2014, the IEEE published on its website a series of documents proposing amendments to the IEEE’s patent policy. Draft 39 of the IEEE Standard Board Bylaws proposed that a reasonable royalty should appropriately compensate the SEP holder but should “exclud[e] the value, if any, resulting from the inclusion of that Essential Patent Claim’s technology in the IEEE Standard.”⁴⁷ Without examining here the merits and demerits of this now-ratified amendment, it is worth emphasizing that the IEEE patent policy is the

⁴³ Int’l Telecomm. Union [ITU], Common Patent Policy for ITU-T/ITU-R/ISO/IEC [hereinafter ITU Patent Policy] (emphasis added), *available at* <http://www.itu.int/en/ITU-T/ipr/Pages/policy.aspx>.

⁴⁴ ETSI IPR Policy, *supra* note 20, § 3.1.

⁴⁵ *See, e.g., id.* at § 3.2 (“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.”).

⁴⁶ *See Sidak, The Meaning of FRAND, Part I: Royalties, supra* note 3, at 1021.

⁴⁷ Draft 39 IEEE Standards Board Bylaws, *supra* note 6, § 6.1, at 2.

first and only SSO policy to announce the remarkable proposition that an SEP holder may not obtain any of the value created by the standard.⁴⁸

In sum, the main goals of a FRAND commitment are generally to ensure access to the technology covered by the SEP and to ensure proper compensation of the SEP holder. The interpretation of a FRAND commitment, including the decision to grant or deny an SEP holder an injunction, must account for those goals. An interpretation which focuses on the risk of patent holdup but which disregards that a FRAND commitment aims to facilitate access to the patented technology and to ensure adequate compensation to the SEP holder not only would fail as a matter of contract interpretation, but also would create an imbalance in the standardization process. In the absence of fair compensation, an SEP holder will have no incentive to contribute its technologies to an SSO. The decreased participation of patent owners would in turn decrease the quality of standards, to the ultimate detriment of consumers. Therefore, a correct interpretation of a FRAND commitment must account for all the goals that such a commitment pursues, including the goals of assuring access to the patented standard-essential technology and providing adequate compensation to the SEP holder for its contribution to the standard.

B. The SEP Holder's Contractual Duties

A FRAND commitment imposes duties on the SEP holder that circumscribe by contract the rights that the patent system has statutorily awarded the SEP holder. In this part, I analyze the extent of that circumscription. First, I explain that a FRAND contract generally imposes a duty on an SEP holder to offer a

⁴⁸ The China IPR blog reported in November 2014 that the Ministry of Industry and Information Technology's IP Center had suggested that Chinese SSOs adopt internal rules that provide a more detailed definition of FRAND compensation. In particular, the MIIT reportedly has recommended that FRAND compensation be determined by considering the following factors, among others:

- (1) The value contributed to a Compliant Portion by the Necessary Claim shall be assessed against the smallest component or device that is compliant with the Final Standard and that practices the relevant Necessary Claims;
- (2) A reasonable royalty shall also take into account the total aggregate royalties that may apply if other owners of intellectual property demand similar terms;
- (3) The degree of innovativeness of the Necessary Claims in the standard, the technical area of the standard, the nature of the standard, the implementation scope of the standard, relevant licensing terms and other factors.

Mark Cohen, *Some Comments on MIIT's Template for IP Policies in Industry Standard Organizations*, CHINA IPR (Nov. 28, 2014), <http://chinaipr.com/2014/11/28/some-comments-on-miits-template-for-ip-policies-in-industry-standards-organizations/>. The MIIT also reportedly has recommended that the SSO's policy provide that "[t]he royalties shall not take into account the value, if any, associated with inclusion of the Necessary Claims in the Final Standard." *Id.*; see also MINISTRY OF INDUSTRY AND INFORMATION TECHNOLOGY, HANGYE BIAOZHUNHUA, ZUZHI ZHISHI CHANQUAN ZHENGCE MOBAN (行业标准化组织知识产权政策模板) [TEMPLATE FOR IP POLICIES FOR INDUSTRY STANDARDIZATION ORGANIZATION] (2014).

license on FRAND terms—a duty to deal that otherwise does not exist for a patent holder. Second, I explain that an SEP holder will normally have a duty to act in good faith, not only in performing a contract to which it is a party, but also in negotiating licensing terms with a potential implementer.

1. *The Duty to Offer a License on FRAND Terms*

Outside the context of SEPs, a patent holder “has the exclusive right to manufacture, use, and sell its invention.”⁴⁹ A patent holder may exclude third parties from using its invention and may retain the exclusive right to use the invention itself. If a patent holder decides to license its patent, it has the right to select its licensees.⁵⁰ In other words, it is a patent holder’s right to grant a license to one company and not to another, or not to grant any license at all.⁵¹

By entering into a FRAND contract, an SEP holder agrees to refrain from exercising some of its statutory rights. The exact duties that arise from a contract between an SEP holder and an SSO are determined by the nature of the specific FRAND commitment and by the IPR policies of the SSO, which may differ depending on the SSO. However, for most SSOs, a voluntary FRAND commitment means that the SEP holder that elects to enforce its SEPs undertakes a duty *to offer* to license its SEPs on FRAND terms. For example, the IEEE currently requires an SEP holder to assure that licenses for SEPs “will be made available to an unrestricted number of applicants . . . under reasonable . . . terms . . . that are . . . free of any unfair discrimination.”⁵² Similarly, the ETSI requires that the SEP holder confirm that it is “prepared to grant irrevocable licenses on [FRAND] terms and conditions” to the manufacturers of standard-compliant goods.⁵³ By making a voluntary FRAND commitment, the SEP holder agrees to offer access to its SEPs on FRAND terms to interested implementers (not merely members of the SSO). The duty to *offer* to license SEPs on FRAND terms aims to ensure the main objective of a FRAND commitment—that is, to prevent the SEP holder from denying *access* to the patented technology to implementers that are willing to pay FRAND compensation.

A FRAND commitment, however, does not impose on the SEP holder a duty to license its SEPs to implementers at every level of the value chain. An

⁴⁹ *Zenith Radio Corp. v. Hazeltine Research, Inc.*, 395 U.S. 100, 135 (1969) (citing *Bement v. Nat’l Harrow Co.*, 186 U.S. 70, 88–89 (1902)).

⁵⁰ *Id.* at 135–36 (citing *Waterman v. Mackenzie*, 138 U.S. 252, 255 (1891)).

⁵¹ *Cataphote Corp. v. De Soto Chem. Coatings, Inc.*, 450 F.2d 769, 774 (9th Cir. 1971).

⁵² IEEE, IEEE-SA Standards Board Bylaws, § 6.2.b (2014), available at <http://standards.ieee.org/develop/policies/bylaws/sect6-7.html#>. The IEEE imposes a duty to offer a license on FRAND terms “from the date of the standard’s approval to the date of the standard’s transfer to inactive status.” *Id.* § 6.2.

⁵³ ETSI IPR Policy, *supra* note 30, § 6.1. Rather than refer to SEPs, ETSI refers to “essential IPR,” which it defines as “any intellectual property right conferred by statute law including applications therefor other than trademarks” and excluding “rights relating to get-up, confidential information, trade secrets or the like.” *Id.* § 15, def. 7.

SEP holder may elect, for example, to license its SEPs to the downstream level, but not to implementers in the upper levels of the value chain. That licensing practice would not violate a FRAND obligation as long as the SEP holder grants access to its SEPs to implementers in the upper level of the value chain. A FRAND commitment requires the SEP holder to grant access to its SEPs, but that access need not be granted through a license.

The duty to offer a license on FRAND terms also affects an SEP holder's right to determine certain licensing conditions freely. An SEP holder may not set unreasonable royalties that would create a constructive refusal to license. A FRAND commitment also precludes an SEP holder from imposing discriminatory licensing terms. Although a patent holder is generally free to license its patents to different parties on different terms, the FRAND commitment limits that freedom with respect to SEPs. SSOs do not typically define "discriminatory" or "nondiscriminatory" licensing. The requirement to set nondiscriminatory licensing terms is, however, strictly related to the need to ensure *access* to the patented technology subject to the FRAND commitment. The prohibition on discriminatory terms is a common component of access remedies.⁵⁴ However, the requirement of nondiscrimination does not require an SEP holder to license its SEPs under the same licensing terms to all implementers.⁵⁵ Outside the context of SEPs, courts have clarified that nondiscriminatory licensing terms need not be identical.⁵⁶ The same reasoning applies to SEPs. An SEP holder may charge different royalties to different implementers if the circumstances of the case justify such differentiation. For example, a patent holder may grant a lower net royalty rate in a cross license with an implementer that has a valuable patent portfolio, compared with the royalty rate in a one-way license.

Although an SEP holder has the duty to make a FRAND offer, this duty does not guarantee that a license with the specific implementer will eventuate. An SEP holder agrees to offer a license for its SEPs on FRAND terms; it does not agree to license its SEPs for free or for less than a FRAND rate. SSOs emphasize that the SEP holder should be "adequately and fairly" rewarded for the use of its standard-essential technology.⁵⁷ Hence, a FRAND commitment does not obligate the SEP holder to license its SEPs to companies that are not willing or able to pay compensation for the use of the technology that rises to the level of being fair and reasonable. Therefore, even if an SEP holder complies with its FRAND commitment and makes a FRAND offer to the

⁵⁴ See, e.g., European Parliament and Council Directive 2009/73/EC, art. 13(1b), 2009 O.J. (L 211).

⁵⁵ See Sidak, *The Meaning of FRAND, Part I: Royalties*, *supra* note 3, at 996–97.

⁵⁶ See, e.g., Case T-201/04, *Microsoft Corp. v. Comm'n*, 2007 E.C.R. II-3601, at 811 ("[N]on-discriminatory does not mean that Microsoft must impose the same conditions on every undertaking seeking such licenses.").

⁵⁷ See, e.g., ETSI IPR Policy, *supra* note 30, § 3.2.

interested implementer, there is no assurance that the parties will achieve a meeting of the minds and enter into a mutually satisfactory license.

2. *The Duty to Negotiate in Good Faith*

The FRAND commitment is part of a contract. According to the Restatement (Second) of Contracts, “[e]very contract imposes upon each party a duty of good faith and fair dealing in its performance and its enforcement.”⁵⁸ Less clear is whether contract *formation* (such as the negotiation of a license for a portfolio of SEPs) carries the same duty of good faith and fair dealing. The Restatement merely says that bad faith during negotiation and formation may be subject to sanctions.⁵⁹

Several U.S. courts have said that an SEP holder has a duty to negotiate a FRAND license in good faith. In *Apple v. Samsung*, for example, the district court for the Northern District of California observed, “both parties agree that Samsung’s contractual obligation arising from its FRAND declarations to ETSI at the very least created a duty to negotiate in good faith with Apple regarding FRAND terms.”⁶⁰ The Western District of Washington made a similar point in *Microsoft v. Motorola*.⁶¹ Microsoft alleged that Motorola breached its FRAND contract with the IEEE and ITU by offering to Microsoft a “blatantly unreasonable” royalty.⁶² In evaluating Microsoft’s argument, the court applied the rules of Washington State law (without, however, discussing its choice of law).⁶³ Consistent with the Washington Supreme Court’s decision in *Badgett v. Security State Bank*,⁶⁴ the court in *Microsoft v. Motorola* reasoned

⁵⁸ RESTATEMENT (SECOND) OF CONTRACTS § 205 (American Law Institute 1981). American courts recognize this implied covenant in contracts. *See, e.g.,* Seidenberg v. Summit Bank, 791 A.2d 1068, 1074 (N.J. Super. 2002); Commercial Credit Corp. v. Nelson Motors, Inc., 147 S.E.2d 367, 484 (S.C. 1966) (“[T]here exists in every contract an implied covenant of good faith and fair dealing.”); *see also* RESTATEMENT (SECOND) OF CONTRACTS § 205 cmt. a (American Law Institute 1981).

⁵⁹ RESTATEMENT (SECOND) OF CONTRACTS § 205 cmt. c (American Law Institute 1981). Some legal scholars have attempted, with limited success, to define good faith during contract negotiations. *Compare* Robert S. Summers, “Good Faith” in *General Contract Law and the Sales Provisions of the Uniform Commercial Code*, 54 VA. L. REV. 195, 201 (1968), with Steven J. Burton, *Breach of Contract and the Common Law Duty to Perform in Good Faith*, 94 HARV. L. REV. 369, 369 (1980), and Steven J. Burton, *More on Good Faith Performance of a Contract: A Reply to Professor Summers*, 69 IOWA L. REV. 497 (1984). *See also* E. Allan Farnsworth, *Precontractual Liability and Preliminary Agreements: Fair Dealing and Failed Negotiations*, 87 COLUM. L. REV. 217, 281 (1987).

⁶⁰ *Apple Inc. v. Samsung Elecs. Co.*, No. 11-cv-01846, 2012 WL 1672493, at *12 (N.D. Cal. May 14, 2012) (emphasis omitted).

⁶¹ *Microsoft Corp. v. Motorola Inc.*, 864 F. Supp. 2d 1023 (W.D. Wash. 2012).

⁶² *Id.* at 1036.

⁶³ *Id.* at 1033. *But see* *Apple v. Samsung*, 2012 WL 1672493, at *10–11 (holding that French law was applicable to the ETSI-related breach of contract claim).

⁶⁴ *Badgett v. Security State Bank*, 116 Wash. 2d 563 (Wash. 1991) (“There is in every contract an implied duty of good faith and fair dealing. This duty obligates the parties to cooperate with each other so that each may obtain the full benefit of performance.”).

that any offer “(be it an initial offer or an offer during a back-and-forth negotiation) must comport with the implied duty of good faith and fair dealing inherent in every contract.”⁶⁵ Therefore, the court construed a FRAND contract to impose on the SEP holder a duty to negotiate the FRAND terms in good faith.

An SEP holder must make a FRAND offer in good faith. Nevertheless, the duty to negotiate the licensing terms in good faith does not require that an SEP holder that has already made a FRAND offer continue to negotiate licensing terms with an implementer. By making a FRAND offer, an SEP holder has fulfilled its FRAND commitment—any further negotiation is solely at the discretion of the SEP holder. It appears that some commentators have failed to recognize this conclusion, and thus they have misinterpreted the duties that a FRAND commitment imposes on an SEP holder. After an SEP holder has made an offer within the FRAND range, it has no further obligation that arises from the FRAND commitment. If the SEP holder nonetheless decides to negotiate further the licensing terms with the implementer, the SEP holder needs to negotiate such terms in good faith.

However, the duty to negotiate in good faith is not limited to the SEP holder.⁶⁶ When an implementer and an SEP holder commence negotiations for a bilateral patent licensing agreement, the implementer has a similar common law duty to negotiate in good faith. The implementer need not be a member of the SSO or a party to the FRAND contract. Rather, the implementer may be merely a third-party beneficiary of the FRAND contract, such that the FRAND contract cannot bind the implementer to its contractual obligation to negotiate in good faith. Nonetheless, when an implementer is negotiating a bilateral license agreement with an SEP holder, and if U.S. law applies, the implementer is bound by the common law duty to negotiate in good faith. It would be anomalous, to say the least, to apply an asymmetric rule whereby the SEP holder was obliged to negotiate a bilateral license agreement in good faith while the counterparty to the negotiation—the implementer—was excused from any reciprocal duty.⁶⁷

From the moment that an SEP holder and an SSO enter into a FRAND contract, the SEP holder has the duty to offer its SEPs to the implementer on FRAND terms. An SEP holder discharges that duty when it makes an offer to the implementer on terms that are FRAND. After an SEP holder has made an

⁶⁵ *Microsoft v. Motorola*, 864 F. Supp. 2d at 1038.

⁶⁶ See *Ericsson Inc. v. D-Link Sys., Inc.*, No. 6:10-cv-00473, 2013 WL 4046225, at *87 (E.D. Tex. Aug. 6, 2013), *aff'd in part, rev'd in part, and vacated in part*, 773 F.3d 1201 (Fed. Cir. 2014).

⁶⁷ With respect to contract performance and enforcement, the Restatement says that “[e]very contract imposes upon each party a duty of good faith and fair dealing” RESTATEMENT (SECOND) OF CONTRACTS § 205 (American Law Institute 1981) (emphasis added). It is not clear why this symmetry of obligations should give way to asymmetry of obligations at the stage of contract formation, assuming that a court is inferring that the common law duty of good faith and fair dealing encompasses contractual negotiations.

offer within the FRAND range, it has no further obligation *that arises from its FRAND commitment*. At this point, it is for the implementer to accept or reject the offer, or to make a counteroffer (which, as a general rule in contract law, would constitute an implicit rejection of the offer).⁶⁸ Whether the implementer's behavior at this point in the negotiations adheres to the standard of good faith will depend ultimately on how quickly the implementer seeks to close the bid-ask spread and converge on an agreement.

The obligation to negotiate in good faith does not prevent a party from seeking the best possible deal during the negotiation. Judge Posner has written that there is only "a limited duty of good faith at the contract-formation stage."⁶⁹ For example, the case in which "a knowledgeable buyer took advantage of an ignorant seller to obtain a valuable good at a below-market price" would not constitute bad-faith negotiations.⁷⁰ The duty to bargain in good faith does not require a party to subordinate its interests to those of the other party.⁷¹ The duty to negotiate in good faith does not prohibit parties from "profit[ing] from asymmetry of information."⁷² The Seventh Circuit has said that "[i]n a business transaction both sides presumably try to get the best of the deal. That is the essence of bargaining and the free market . . . So one cannot characterize self-interest as bad faith."⁷³ By this reasoning, an SEP holder does not breach the common law duty to negotiate in good faith if it seeks to obtain a higher royalty that is still within the FRAND range, nor does an implementer breach the same duty if it seeks to obtain a lower royalty that is still within the FRAND range.

III. WHAT LAW CONSTRAINS THE SEP HOLDER'S RIGHT TO AN INJUNCTION?

I analyze now the constraints that a FRAND commitment imposes on an SEP holder's ability to demand an injunction against infringers of FRAND-committed SEPs. I evaluate whether contract law or equitable estoppel limits an SEP holder's right to seek an injunction against infringers of FRAND-committed patents. I then analyze whether, after entering into a FRAND contract, the SEP holder is any longer able to meet the legal requirement needed

⁶⁸ See, e.g., RESTATEMENT (SECOND) OF CONTRACTS § 39(2) (American Law Institute 1981) ("An offeree's power of acceptance is terminated by his making of a counteroffer, unless the offeror has manifested a contrary intention or unless the counteroffer manifests a contrary intention of the offeree.").

⁶⁹ Richard A. Posner, *Let Us Never Blame a Contract Breaker*, 107 MICH. L. REV. 1349, 1360 (2009).

⁷⁰ *Id.*

⁷¹ *Id.* at 1358.

⁷² *Id.*

⁷³ *Feldman v. Allegheny Int'l, Inc.*, 850 F.2d 1217, 1223 (7th Cir. 1988) (Coffey, J.); see also *A/S Apothekernes Laboratorium for Specialpraeparater v. I.M.C. Chem. Group, Inc.*, 873 F.2d 155, 159 (7th Cir. 1989) (Coffey, J.).

to obtain an injunction. I explain that, even after undertaking a FRAND commitment, the SEP holder still might be able to meet the *eBay* requirements to obtain an injunction. There is consequently no valid reason to proscribe categorically the use of injunctions for FRAND-committed patents. It bears emphasis that the analysis in this part concerns the SEP holder's right merely to *seek* an injunction—not to *obtain* an injunction. The significance of that distinction will become clear.

A. Contract

Some commentators have argued that SEP holders are contractually precluded from seeking an injunction against infringers of FRAND-committed SEPs.⁷⁴ According to this view, a FRAND commitment represents a contractual waiver of the right to seek an injunction, such that an SEP holder's request for an injunction breaches the FRAND contract. However, a detailed analysis of the contractual provisions of a FRAND commitment does not support this interpretation. In fact, there is no indication that a FRAND contract provides either an explicit or an implicit waiver of the right to seek an injunction.

In the United States, seeking an injunction is one of the statutory remedies available to a patent holder for infringement of its patents.⁷⁵ Other jurisdictions provide similar remedies.⁷⁶ Nevertheless, an SEP holder may agree by contract to forbear from exercising its statutory rights. An SSO and an SEP holder could agree that, by concluding a FRAND contract, the SEP holder forgoes its right to seek an injunction against an infringing manufacturer of standard-compliant goods. In that case, the FRAND contract would include an explicit waiver of the right to seek an injunction (as the IEEE's 2015 bylaw amendments illustrate). Should the SEP holder subsequently request an injunction against the manufacturer, the SEP holder would breach its FRAND contract.

In practice, however, SSOs' contractual agreements typically do not prohibit seeking injunctions for infringement of FRAND-committed SEPs. In other words, a contract between an SEP holder and an SSO does *not* provide that, by entering into the FRAND contract, the SEP holder waives its right to seek an injunction. For example, the IPR policy of ETSI, one of the largest SSOs in the field of telecommunications, is silent on the question of injunctive relief.⁷⁷ The language of a typical FRAND contract therefore supports neither the assertion that entering into a FRAND contract represents a

⁷⁴ See, e.g., Miller, *supra* note 15, at 358 (“[T]he core meaning of the RAND promise [is] an irrevocable waiver of injunctive relief and other extraordinary remedies.”).

⁷⁵ 35 U.S.C. § 283.

⁷⁶ See, e.g., European Parliament and Council Directive 2004/48/EC, art. 9, 2004 O.J. (L 195) (“Member States shall ensure that the judicial authorities may, at the request of the applicant: (a) issue against the alleged infringer an interlocutory injunction intended to prevent any imminent infringement of an intellectual property right.”).

⁷⁷ See, e.g., ETSI IPR Policy, *supra* note 30.

waiver by the SEP holder of the right to seek an injunction nor the assertion that requesting an injunction violates the SEP holder's duties under the FRAND contract.

There is also no evidence that, as a matter of contract interpretation, the FRAND contract includes an *implicit* waiver of an SEP holder's right to seek an injunction. As a general principle of legal interpretation, the waiver of a statutory right must be clear and unambiguous.⁷⁸ Consequently, an implicit waiver of rights originating from public law should be disfavored as a matter of contract interpretation concerning the SEP holder's FRAND obligations. There is no indication that, in a typical FRAND contract, either the SSO or the SEP holder intended to include an implicit waiver of the SEP holder's right to seek an injunction. Certainly, the IEEE's proposed bylaw amendments are evidence to the contrary. Furthermore, members of ETSI discussed the possibility of implementing in the ETSI IPR policy a waiver of the right to seek an injunction. The Interim IPR policy adopted in 1993 contained, among other provisions, an explicit restriction on the SEP holder's request for an injunction.⁷⁹ However, ETSI excluded this restriction from the policy that it adopted in 1994,⁸⁰ and ETSI has not adopted such a policy since. Thus, it cannot plausibly be argued that ETSI decided to exclude that provision from its policy, but nonetheless considers that the SEP holder's waiver of its right to an injunction is an implicit part of the FRAND contract. In the absence of clear evidence of a waiver, a court cannot properly construe a FRAND contract to preclude the SEP holder from seeking an injunction.

⁷⁸ The Supreme Court has said (in labor law) that it "will not infer from a general contractual provision that the parties intended to waive a statutorily protected right unless the undertaking is 'explicitly stated.' More succinctly, the waiver must be clear and unmistakable. . . . [T]o waive a statutory right the duty must be established clearly and unmistakably." *Metropolitan Edison Co. v. NLRB*, 460 U.S. 693, 708–09 (1983) (quoting *Mastro Plastics Corp. v. NLRB*, 350 U.S. 270, 283 (1956)).

⁷⁹ ETSI/GA15 TD 25, § 13 ("The Signatory hereby undertakes not to seek an injunction against a Party in respect of any Essential IPR in respect of [enumerated situations]."); see Roger G. Brooks & Damien Geradin, *Taking Contracts Seriously: The Meaning of the Voluntary Commitment to Licence Essential Patents on "Fair and Reasonable" Terms*, in *INTELLECTUAL PROPERTY AND COMPETITION LAW: NEW FRONTIERS* 389 (Steven Anderman & Ariel Ezrachi eds., Oxford Univ. Press 2011).

⁸⁰ Karl Rosenbrock, former director at ETSI, testified in 2012:

I am not aware of any background discussions within ETSI in which it was agreed that ETSI Members are stopped from seeking a court order to prevent infringement of their ETSI essential patents. Early drafts of the ETSI IPR Policy included a provision that limited an essential patent holder's ability to seek injunctive relief for its essential patents, but this proposal was dropped from the Interim ETSI IPR Policy that was adopted in 1994.

Declaration of Karl Heinz Rosenbrock in Support of Samsung's Opposition to Apple's Motion for Partial Summary Judgement ¶ 42, at 12, *Apple, Inc. v. Samsung Elecs. Co.*, No. 11-cv-01846-LHK (N.D. Cal. Apr. 2, 2012), ECF No. 847 attachment 49.

The scope of the rights of a third-party beneficiary is defined in the contract “between the promisor and the promisee.”⁸¹ In accordance with the canon of construction *nemo dat quod non habet*, one cannot transfer what one does not have.⁸² The FRAND contract between an SEP holder and an SSO delineates the implementer’s rights, as a third-party beneficiary of the FRAND contract, to receive access to the SEP holder’s standard-essential technology. The implementer does not have more contractually enforceable rights *vis-à-vis* the SEP holder than the rights that the SEP holder granted to the implementer in the FRAND contract.⁸³ Theoretically, implementers could derive additional rights from the SSO’s constitutional documents, such as the SSO’s articles of incorporation or bylaws. But, again, such additional rights would rest on a theory that the implementer is the third-party beneficiary of those extrinsic documents (as well as on the dubious theory that the FRAND contract did not fully integrate the agreement between the SEP holder and the SSO regarding the granting of access to a member’s SEPs to implementers on FRAND terms⁸⁴). Again, the implementer’s rights can in no event encompass more or broader rights than what the SEP holder initially granted to the SSO for the benefit of the implementer. In other words, an SSO cannot confer on the implementer immunity from an injunction for patent infringement unless the SSO’s contract with the SEP holder contains an explicit waiver by the SEP holder of its preexisting right under public law to enjoin one who infringes its patents. If the implementer is claiming a right more powerful than any right conveyed to him as a third-party beneficiary of the SEP holder and the SSO, then the implementer needs to identify the source of that claimed right and prove the extent of its authority.

Several U.S. courts have implicitly confirmed such an approach by determining that SEP holders’ requests for injunctions did not violate the contractual obligations of the SEP holder arising from a FRAND commitment.⁸⁵ The Federal Circuit said in *Apple v. Motorola* that it is incorrect to apply a *per se* rule that injunctions are unavailable for SEPs.⁸⁶ Even Judge Posner’s district court opinion in the case—considered by some as rejecting the right of an SEP holder that has made a FRAND commitment to seek an injunction—does not

⁸¹ See RESTATEMENT (SECOND) OF CONTRACTS § 309 cmt. b (American Law Institute 1981); see also 4 ARTHUR L. CORBIN, CORBIN ON CONTRACTS §§ 811, 819 (West 6th ed. 1951).

⁸² *Mitchell v. Hawley*, 83 U.S. 544, 549–50 (1872).

⁸³ See RESTATEMENT (SECOND) OF CONTRACTS § 309 cmt. b.B (American Law Institute 1981).

⁸⁴ See *id.* § 209(3) (“Where the parties reduce an agreement to a writing which in view of its completeness and specificity reasonably appears to be a complete agreement, it is taken to be an integrated agreement unless it is established by other evidence that the writing did not constitute a final expression.”).

⁸⁵ See, e.g., *Apple, Inc. v. Samsung Elecs. Co.*, No. 11-cv-01846, 2012 WL 1672493 (N.D. Cal. May 14, 2012); *Realtek Semiconductor Corp. v. LSI Corp.*, 946 F. Supp. 2d 998, 1007 (N.D. Cal. 2013) (“[A]n injunction may be warranted where an accused infringer of a standard-essential patent outright *refuses* to accept a RAND license.”) (emphasis in original).

⁸⁶ *Apple Inc. v. Motorola, Inc.*, 757 F.3d 1286, 1331 (Fed. Cir. 2014).

specify that *seeking* an injunction constitutes a breach of contract.⁸⁷ As the Western District of Wisconsin reasoned in a separate *Apple v. Motorola* case,

[a]lthough Judge Posner concluded that Motorola was not entitled to injunctive relief, he did not state explicitly that Motorola's act of seeking injunctive relief constituted a *breach of its contract* with ETSI or IEEE. He did not purport to interpret the terms of the ETSI or IEEE contracts or make any rulings with respect to Motorola's contractual obligations under the ETSI and IEEE policies. In fact, he never refers to the ETSI or IEEE policies as "contracts."⁸⁸

Therefore, Judge Posner's opinion in *Apple v. Motorola* does not hold that seeking an injunction in itself violates the contract between an SSO and an SEP holder, although he did note that the court might reject the SEP holder's request for an injunction on other grounds.

The amendments to the IEEE Patent Policy ratified on February 8, 2015 are an exception to the general approach that SSOs adopt toward the SEP holder's ability to request an injunction. Draft 39 of the IEEE Standards Board Bylaws proposed that, by making a FRAND commitment, an SEP holder would agree that a FRAND license is "sufficient compensation" for the use of its SEPs and that a FRAND commitment would "preclud[e] seeking, or seeking to enforce, a Prohibitive Order" except for cases specifically provided by the IEEE policy.⁸⁹ The IEEE patent policy would allow the SEP holder to request an injunction on two occasions. First, if "the implementer fails to participate in, or to comply with the outcome of, an adjudication, including an affirming first-level appellate review," an SEP holder may request an injunction.⁹⁰ Second, "[i]n jurisdictions where the failure to request a Prohibitive Order in a pleading waives the right to seek a Prohibitive Order at a later time," an SEP holder may "conditionally plead the right to seek a Prohibitive Order to preserve its right to do so later" if the conditions for a Prohibitive Order are met.⁹¹ The amended IEEE patent policy is the first and only SSO policy to require the SEP holder to accept a contractual waiver of its right under public law to seek an injunction.⁹²

In sum, the question of whether the FRAND contract represents a waiver of the SEP holder's right to seek an injunction needs to be evaluated primarily

⁸⁷ *Apple, Inc. v. Motorola, Inc.*, 869 F. Supp. 2d 901, 914 (N.D. Ill. 2012), *aff'd in part, rev'd in part, vacated in part, and remanded*, 757 F.3d 1286 (Fed. Cir. 2014).

⁸⁸ *Apple, Inc. v. Motorola Mobility, Inc.*, No. 11-cv-178-bbc, 2012 WL 5416941, at *14 (W.D. Wis. Oct. 29, 2012) (emphasis in original).

⁸⁹ Draft 39 IEEE Standards Board Bylaws, *supra* note 6, § 6.2.

⁹⁰ *Id.*

⁹¹ *Id.*

⁹² The China IPR blog reported in November 2014 that the MIIT IP Center had suggested that Chinese SSOs adopt a similar policy. The MIIT reportedly suggested that SSOs request that an SEP holder not seek an injunction against the infringer "unless the potential Licensee is not subject to the jurisdiction of, fails to participate in, or fails to comply with the outcome of, an independent adjudication of FRAND licensing terms." Cohen, *supra* note 48.

according to the language of the document manifesting the FRAND commitment and only secondarily (if at all) in light of the constitutive (but still inherently contractual) documents of the SSO in question. In general, the provisions in an SSOs' policy on FRAND licensing provide neither an explicit nor an implicit waiver of an SEP holder's right to an injunction. Therefore, the SEP holder's contractual obligations arising from its FRAND commitment generally do not preclude the SEP holder from requesting an injunction in case of an infringement of its FRAND-committed SEPs.

B. Equitable Estoppel

In defense of a claim of patent infringement, the alleged infringer can equitably estop the patent holder from enforcing its patent rights if the alleged infringer proves (1) that the patent holder engaged in misleading conduct that led the infringer reasonably to infer that the patent holder did not intend to enforce its patent against the infringer, (2) that the infringer relied on the patent holder's misleading conduct in practicing the patent (which conduct may include specific statements, action, inaction, or silence where there was an obligation to speak), and (3) that, due to its reliance on the misleading conduct, the infringer will be materially prejudiced if the patent holder is allowed to proceed with its infringement claim.⁹³ Lemley has observed that an infringer can typically invoke estoppel only when a patentee has "induced others to believe it will not enforce the patent."⁹⁴ It is unlikely that an alleged infringer could prove these three requirements with respect to SEPs.

The first of these three prerequisites is clearly absent from the SEP situation. As Lemley observes, an SEP holder that has made a FRAND promise "has not induced others to believe it will not enforce the patent: far from it."⁹⁵ By making a FRAND commitment, an SEP holder promises to license its SEPs on FRAND terms. It does *not* promise to license its SEPs for free or to forgo the enforcement of its patent rights against those who do not accept its offer of a license on FRAND terms. In making a FRAND commitment, the SEP holder has not made any misleading statement from which one could deduce that the SEP holder will not enforce its patents or will not seek an injunction against a licensee that is not willing to agree to a FRAND royalty. The initiation of a lawsuit for infringement and the request for an injunction against an infringer that is unwilling to pay a FRAND royalty are therefore compatible with the SEP holder's FRAND commitment.

The second necessary element for equitable estoppel—the infringer's reliance on the patent holder's misleading statement—is also absent. No infringer

⁹³ See, e.g., *A.C. Aukerman Co. v. R. L. Chaides Constr. Co.*, 960 F.2d 1020, 1028 (Fed. Cir. 1992).

⁹⁴ See Lemley, *Intellectual Property Rights and Standard-Setting Organizations*, *supra* note 35, at 1923.

⁹⁵ *Id.*

could reasonably believe that the SEP holder will not enforce its patent rights (and will not seek an injunction) if the infringer does not or cannot pay a FRAND royalty. To the contrary, ETSI expressly recognizes that an SEP holder should be fairly compensated for contributing its technology to the standard.⁹⁶ That proposition in ETSI's IPR policy would be meaningless if, among implementers and inventors alike, the commercially reasonable expectation did not exist that the royalty that a licensee would pay for access to SEPs would need to exceed some minimal threshold to be FRAND. An implementer that will not or cannot agree to pay FRAND compensation for its use of an SEP must expect to be sued by an SEP holder for infringement and possibly to be enjoined from using the patent in suit.

Absent evidence that the first and second requirements for equitable estoppel are present, it would be unlikely that the infringer could prove the third requirement—that, due to the reliance on the patent holder's commitment, the infringer would be materially prejudiced if the patent holder were allowed to proceed with its infringement claim. In sum, the infringer will rarely, if ever, be able to equitably estop the SEP holder from enforcing its FRAND-committed patents.

C. *eBay* and the FRAND Commitment

In *eBay*, the Supreme Court of the United States held that the issuance of an injunction is not automatic upon the finding of patent infringement.⁹⁷ To obtain an injunction against a patent infringer in the United States, an SEP holder must prove

- (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.⁹⁸

Some scholars argue that, after making a FRAND commitment, an SEP holder cannot meet *eBay*'s requirements to obtain an injunction. For example, Lemley and Shapiro argue that, by making a FRAND commitment, an SEP holder has conceded that damages would suffice to compensate the SEP holder for the infringement of its SEPs.⁹⁹ They say that “the court may well not grant an injunction” if it concludes that, given the availability of monetary damages, the SEP holder will not suffer irreparable harm from the infringement of its SEPs.¹⁰⁰

⁹⁶ See, e.g., ETSI IPR Policy, *supra* note 30, § 3.2.

⁹⁷ *eBay Inc. v. MercExchange, L.L.C.*, 547 U.S. 388, 391 (2006).

⁹⁸ *Id.*

⁹⁹ See, e.g., Lemley & Shapiro, *A Simple Approach*, *supra* note 16, at 1144.

¹⁰⁰ *Id.*; see also Brief for the Fed. Trade Comm'n as Amicus Curiae, Supporting Neither Party at 15, *Apple Inc. v. Motorola, Inc.*, 757 F.3d 1286 (Fed. Cir. 2014) (Nos. 12–1548, 12–1549);

However, the Lemley-Shapiro interpretation of a FRAND commitment contradicts *eBay* on the availability of injunctions. The Court ruled on whether a company that is not active in the downstream market, but which instead monetizes its invention by licensing it to operating companies, should be precluded from obtaining an injunction. The Court criticized the district court's interpretation that the "plaintiff's willingness to license its patents' and 'its lack of commercial activity in practicing the patents' would be sufficient to establish that the patent holder would not suffer irreparable harm if an injunction did not issue."¹⁰¹ The Court held that "traditional equitable principles do not permit such broad classifications."¹⁰² The Court said that even patent holders that prefer to license rather than use their technology exclusively may be able to meet the four-factor test to obtain an injunction, and the Court "[saw] no basis for categorically denying them the opportunity to do so."¹⁰³

The Federal Circuit confirmed that *eBay*'s rationale applies to SEPs. In *Apple Inc. v. Motorola, Inc.*,¹⁰⁴ the Federal Circuit rejected a categorical ban on committed patents: "While . . . FRAND commitments are certainly criteria relevant to its entitlement to an injunction, we see no reason to create . . . a separate rule or analytical framework for addressing injunctions for FRAND-committed patents."¹⁰⁵ The Federal Circuit said that "[t]he framework laid out by the Supreme Court in *eBay* . . . provides ample strength and flexibility for addressing the unique aspects of FRAND committed patents and industry standards in general."¹⁰⁶ It added that, although "[a] patentee subject to FRAND commitments may have difficulty establishing irreparable harm[,] . . . an injunction may be justified [in some circumstances]."¹⁰⁷ The Federal Circuit thus rejected the interpretation that a FRAND commitment categorically precludes the SEP holder from obtaining an injunction. The fact that an SEP holder has expressed its willingness to license its SEPs on FRAND terms does not imply that the SEP holder cannot meet *eBay*'s four-factor test.

1. Is the Harm from the Infringement of a FRAND-Committed Patent Irreparable?

An SEP holder may suffer irreparable harm because of the infringement of its SEPs. Injunctions play an important role in stimulating an expedited licensing

Brief for Professors Thomas F. Cotter, Shubha Ghosh, A. Christal Sheppard & Katherine J. Strandburg as Amici Curiae Supporting Plaintiff-Appellant Apple, Inc., and Affirming Motorola, Inc.'s Cross-Appeal at 16, *Apple Inc. v. Motorola, Inc.*, 757 F.3d 1286 (Fed. Cir. 2014) (Nos. 12-1548, 12-1549).

¹⁰¹ *eBay*, 547 U.S. at 393 (quoting *MercExchange, L.L.C. v. eBay, Inc.*, 275 F. Supp. 2d 695, 712 (E.D. Va. 2003)).

¹⁰² *Id.*

¹⁰³ *Id.*

¹⁰⁴ 757 F.3d 1286 (Fed. Cir. 2014).

¹⁰⁵ *Id.* at 1332.

¹⁰⁶ *Id.*

¹⁰⁷ *Id.*

negotiation. Without the threat of an injunction, an implementer might have little incentive to agree promptly upon FRAND licensing terms.¹⁰⁸ Although the infringement of an individual implementer and its failure to negotiate licensing terms in good faith might not seem to inflict irreparable harm on the SEP holder, the severity of the harm is magnified when such behavior becomes the industry norm. When the largest implementers systematically infringe SEPs and fail to negotiate licensing terms in good faith, it becomes far costlier for the SEP holder to enforce its SEPs effectively. Such a scenario could be defined as “reverse royalty stacking,” whereby the aggregate litigation costs that implementers impose on the SEP holder by infringing its SEPs is too high to allow the SEP holder to remain a viable market participant. In such circumstances, the SEP holder could suffer irreparable harm from the infringement of its SEPs.

Judge Bo Vesterdorf, the former president of the Court of First Instance (now the General Court) at the European Court of Justice (now the Court of Justice of the European Union), has provided the following analogy to illustrate the SEP holder’s harm from infringement:

Compare . . . [a] situation where an Aston Martin stops outside a jeweler’s shop and the owner of the Aston enters the shop, picks up a Piaget gold watch with a price tag of £25,000, puts £20,000 on the desk, and leaves with the watch saying “I am a willing buyer but your price is too high; this is my price, sue me in court if you want the remaining £5,000 and, if the court says I must pay £23,000 or £25,000, I’ll accept that.” We would be somewhat surprised if the shop owner were told that he cannot go to the police but must wait for a judge to tell him whether his price was fair or unfair.¹⁰⁹

Indeed, the legal system should not allow the behavior of the Aston Martin’s owner to become a common practice. The shop owner could be easily driven out of business and suffer irreparable harm if all buyers were to emulate the Aston Martin’s owner behavior. In that case, it would be too burdensome for the shop owner to bring a legal action against every buyer. Similarly, if the implementers systematically infringed SEPs, did not negotiate licensing terms in good faith, and forced the SEP holder to enforce its rights in court, the SEP holder would suffer irreparable harm.

The determination of monetary damages for the violation of a FRAND-committed patent suffers from great uncertainty. The FRAND cases decided to date confirm that a serious risk of irreparable harm exists, for the simple reason that the measure of FRAND royalties used by judges or jurors varies widely. From an economic perspective, one reason that a court might consider harm to be ir-

¹⁰⁸ See, e.g., *Certain Wireless Devices with 3G and/or 4G Capabilities and Components Thereof* at 114, USITC Inv. No. 337-TA-868 (June 13, 2014) (initial determination) [hereinafter *USITC Inv. No. 337-TA-868 Initial Determination*].

¹⁰⁹ Bo Vesterdorf, *Antitrust Enforcement and Civil Rights: SEPs and FRAND Commitments*, 8 *COMPETITION POL’Y INT’L* 1, 8 (2014).

reparable is that no one can accurately measure it.¹¹⁰ In general, claims that the harm from patent infringement cannot be measured deserve skepticism, because economists have developed rigorous techniques to assess damages from infringement activities. Those methods improve over time, as courts become more comfortable with sophisticated economic methods for assessing causation and the magnitude of harm.¹¹¹ Nevertheless, two lingering sources of uncertainty contribute to a court's difficulty in determining the correct monetary damages for the infringement of a FRAND-committed patent.

The first source of uncertainty arises from the fact that almost no guidance exists in the current case law concerning the proper determination of a FRAND royalty. As of January 2015, U.S. courts had determined what constitutes a FRAND royalty only in a few cases—*Microsoft v. Motorola*,¹¹² *Innovatio IP Ventures*,¹¹³ *Ericsson v. D-Link*,¹¹⁴ and *CSIRO v. Cisco*.¹¹⁵ Those decisions apply different methodologies to calculate a FRAND royalty—and some of those methodologies contain fundamental errors of economic reasoning, if not also legal reasoning, with respect to measurement of the SEP holder's harm.¹¹⁶ Some FRAND decisions contain lofty discussions of abstract principles, but then calculate a FRAND royalty that does not actually rely on those principles. For example, Judge Robart first emphasizes that the *ex ante* incremental value approach should define the hypothetical negotiation between the licensor and the licensee to set a RAND rate,¹¹⁷ but later in his opinion he uses data from a patent pool (not from any actual bilateral negotiation for the licensing of SEPs) to extrapolate the RAND range for Motorola's SEPs.¹¹⁸

Further, some methodologies adopted to calculate FRAND royalties are difficult to reconcile with the Federal Circuit's most recent decisions concerning the calculation of a reasonable royalty. For example, the top-down approach adopted in *Innovatio IP Ventures*—which bases the calculation of a FRAND royalty on “the average profit that a chipmaker earns on the sale of

¹¹⁰ For an explanation of different economic interpretations of “irreparable harm,” see J. Gregory Sidak, Inaugural Address for the Ronald Coase Professorship of Law and Economics, Tilburg University: Is Harm Ever Irreparable? 21 (Sept. 16, 2011), available at http://www.criterioneconomics.com/docs/is_harm_ever_irreparable1.pdf.

¹¹¹ *Id.* at 22.

¹¹² *Microsoft Corp. v. Motorola, Inc.*, No. C10-1823JLR, 2013 WL 2111217 (W.D. Wash. Apr. 25, 2013) (Robart, J.).

¹¹³ *In re Innovatio IP Ventures, L.L.C. Patent Litigation*, MDL No. 2303, 2013 WL 5593609 (N.D. Ill. Oct. 3, 2013).

¹¹⁴ *Ericsson Inc. v. D-Link Sys., Inc.*, No. 6:10-cv-00473, 2013 WL 4046225 (E.D. Tex. Aug. 6, 2013), *aff'd in part, rev'd in part, and vacated in part*, 773 F.3d 1201 (Fed. Cir. 2014).

¹¹⁵ *Commonwealth Scientific & Indus. Research Org. v. Cisco Sys., Inc.*, No. 6:11-cv-00343, 2014 WL 3805817 (E.D. Tex. July 23, 2014).

¹¹⁶ See Sidak, *The Meaning of FRAND, Part I: Royalties*, *supra* note 3, at 979–88.

¹¹⁷ *Microsoft Corp. v. Motorola, Inc.*, No. C10-1823JLR, 2013 WL 2111217, at *13 (W.D. Wash. Apr. 25, 2013).

¹¹⁸ *Id.* at *82.

each chip”¹¹⁹ used in a mobile device—seems inconsistent with the Federal Circuit’s subsequent decision in *Aqua Shield v. Inter Pool Cover Team*.¹²⁰ In the latter case, the Federal Circuit, in an opinion by Judge Richard Taranto, emphasized that the infringer’s profit earned during the period of infringement cannot be treated as a royalty cap when calculating a reasonable royalty, let alone the profit earned by the *manufacturer of a smaller salable patent-practicing component*.¹²¹ The Federal Circuit said that “[a]n especially inefficient infringer—*e.g.*, one operating with needlessly high costs, wasteful practices, or poor management—is not entitled to an especially low royalty rate simply because that is all it can afford to pay without forfeiting or unduly limiting its profit.”¹²² The Federal Circuit emphasized that the “royalty the particular infringer could profitably pay . . . does not set the market value that the hypothetical negotiation aims to identify.”¹²³ Such a methodology “incorrectly replaces the inquiry into the parties’ anticipation of what profits would be earned *if a royalty . . . were to be paid* with an inquiry into what profits were earned *when [the alleged infringer] was charging prices without accounting for any royalty*.”¹²⁴ Extending Judge Taranto’s reasoning, one should thus question whether computing a FRAND royalty based on an average chipmaker’s profit (rather than on the basis of the price paid for the downstream mobile device incorporating the chip) is any longer a reliable and admissible methodology for calculating FRAND compensation.

A related matter is the institutional competence of judges to define the economic methodology for calculating a FRAND royalty. If a judge invents his own economic methodology to compute a FRAND rate, why is that methodology necessarily “reliable” in the precise sense that Rule 702 of the Federal Rules of Evidence¹²⁵ and *Daubert*¹²⁶ would require if an expert economic witness instead were the author of the identical methodological innovation? Federal judges are appointed for their expertise in law, not economics. Moreover, in the scholarship of industrial organization, theory is plentiful and empiricism scarce.¹²⁷ It is therefore not surprising to find in patent litigation

¹¹⁹ *In re Innovatio IP Ventures, L.L.C. Patent Litigation*, MDL No. 2303, 2013 WL 5593609, at *38 (N.D. Ill. Oct. 3, 2013).

¹²⁰ No. 2014–1263, 2014 WL 7239738 (Fed. Cir. Dec. 22, 2014).

¹²¹ *Id.* at *5.

¹²² *Id.* at *4.

¹²³ *Id.*

¹²⁴ *Id.* at *5 (emphasis in original).

¹²⁵ An expert witness “may testify in the form of an opinion or otherwise if . . . (c) the testimony is the product of reliable principles and methods; and (d) the expert has reliably applied the principles and methods to the facts of the case.” FED. R. EVID. 702 (c), (d).

¹²⁶ *Daubert v. Merrill Dow Pharm., Inc.*, 509 U.S. 579 (1993); *see also* *General Elec. Co. v. Joiner*, 522 U.S. 136 (1997); *Kumho Tire Co. v. Carmichael*, 526 U.S. 137 (1999).

¹²⁷ For one Nobel laureate’s expression of this criticism, see Ronald H. Coase, *The Institutional Structure of Production* 3 (1991), available at http://chicagounbound.uchicago.edu/cgi/viewcontent.cgi?article=1033&context=occasional_papers.

and other high-stakes commercial disputes that expert economic witnesses commonly are called upon to develop novel theories for quantifying damages that are intellectually rigorous at the level of theory. Yet it is also common that many of those novel theories end up in the dust bin, never to be used in direct testimony before a jury (and never, therefore, even to be advanced in expert reports exchanged before trial) for the simple reason that the data do not exist for the expert economic witness to connect his theoretical methodology for calculating damages to the facts of the case to the scrupulous degree that *Daubert* requires. Put differently, it is unclear why in a case of first impression a judge, writing *sua sponte*, should be held by the appellate court to a less sedulous standard of theoretical and empirical rigor when introducing a novel theory for measuring FRAND royalties than would an expert economic witness who submitted testimony subject to the *Daubert* standard on the same question. The problem at hand is not the duping of a jury by an expert witness—the usual gatekeeper rationale imputed to Rule 702 and *Daubert*.¹²⁸ The problem fundamentally relates to due process. It is the propagation of a legal rule on damages—a rule having actual or *de facto* precedential effect—that rests on unreliable economic principles or methods, or on an insufficient empirical connection to the facts and data of the case.

It should be clear, then, that a second source of uncertainty regarding the adequacy of damages for infringement of SEPs concerns the paucity of information with which to calculate a FRAND royalty, whichever analytical model one ultimately chooses to use. Most of the critical information relevant to determining a FRAND royalty is proprietary. Much of it belongs to third parties, rather than to the SEP holder and the implementer that are involved in litigation (or arbitration). Furthermore, by definition, evidence regarding the comparability of a FRAND offer for an entirely new standard (such as licenses for SEP portfolios that read on the LTE (or 4G) standard for smartphones circa 2014) will not even exist if the SEP holder has not yet negotiated a FRAND license for that standard with any other implementer.

In sum, measuring damages for the infringement of a FRAND-committed patent has proven to be a daunting task. By the beginning of 2015, the federal courts had not yet adopted, and did not inspire confidence that they soon will adopt, a significantly rigorous methodology to determine FRAND royalties that will ensure that the SEP holder will suffer no irreparable harm due to the infringement of its FRAND-committed patents.¹²⁹ At the same time, even if one favors a particular methodology for measuring FRAND royalties, the

¹²⁸ *Apple, Inc. v. Motorola, Inc.*, 757 F.3d 1286, 1314 (Fed. Cir. 2014) (reasoning that a judge should exclude expert testimony “if it is based upon unreliable principles or methods, or legally insufficient facts and data”).

¹²⁹ The most encouraging development is the Federal Circuit’s decision in *Ericsson Inc. v. D-Link Sys., Inc.*, 773 F.3d 1201 (Fed. Cir. 2014), which affirmed in significant part the opinion by Chief Judge Leonard Davis in *Ericsson Inc. v. D-Link Sys., Inc.*, No. 6:10-cv-00473, 2013 WL 4046225 (E.D. Tex. Aug. 6, 2013).

unavailability of relevant information may make it impossible to compute accurately the amount of damages necessary to provide the SEP holder an adequate remedy at law. Therefore, it is incorrect to assume and premature to conclude that the SEP holder will suffer no irreparable harm from the infringement of its SEPs.

2. *Does the FRAND Commitment Implicitly Concede That Monetary Damages Suffice to Compensate Harm?*

Given the FRAND cases publicly decided by courts as of January 2015, an SEP holder (certainly an SEP holder making *recent* contributions to SSOs) would be justifiably skeptical that court-determined monetary compensation would be an adequate remedy at law for infringement of its SEPs. It is consequently implausible to assume that, by making a FRAND commitment, the SEP holder has implicitly recognized—as Lemley and Shapiro argue¹³⁰—that the prospect of receiving monetary damages would be sufficiently high in expected value, and sufficiently small in its variance, to compensate the SEP holder adequately for the harm arising from the infringement.

By making a FRAND commitment, an SEP holder recognizes that it is willing to license its SEPs for FRAND royalties determined through a voluntary, bilateral negotiation with the implementer. To date, courts have not credibly replicated that bargaining outcome. Courts should consequently aim to encourage voluntary agreements on FRAND terms, rather than litigation. I explain in Part IV that it is necessary to allow an SEP holder to seek and obtain an injunction against an unwilling licensee if a negotiation is to have any chance of occurring and any chance of yielding a voluntary agreement.

IV. THE OPPOSING RISKS OF OPPORTUNISTIC BEHAVIOR

Although a FRAND commitment does not preclude the SEP holder from obtaining an injunction, the issuance of an injunction might not always be desirable. Most critics have focused on the possibility of opportunistic behavior by the SEP holder. Courts and commentators frequently conjecture that patent holdup will result from the asymmetric bargaining power that the availability of an injunction supposedly would give an SEP holder during license negotiations. However, a categorical ban on injunctions for infringement of SEPs would open the door to opportunism by infringers. In the absence of any threat of an injunction, an infringer can behave opportunistically by engaging in reverse patent

¹³⁰ See Lemley & Shapiro, *A Simple Approach*, *supra* note 16, at 1144 (“The court may well conclude that an SSO participant who has made a FRAND commitment has already declared that royalties are sufficient to compensate it for infringement by compliant products, so that the SSO participant will suffer no irreparable harm from infringement of its standard-essential patents.”).

holdup. I therefore examine here the risks associated with both allowing and denying an SEP holder to seek an injunction against an infringer.

A. Risks from Allowing the SEP Holder to Seek an Injunction

A common conjecture is that allowing an SEP holder to seek an injunction against the implementer of a FRAND-committed patent would result in patent holdup. According to the patent-holdup narrative, an SEP holder would use the threat of seeking an injunction to extract a royalty exceeding the SEP's intrinsic value. Lemley and Shapiro argue that the risk of patent holdup is even greater when the infringing patent is only a small part of a valuable, complex technology.¹³¹ This theory, however, has serious holes. At least three reasons suggest that the SEP holder's request for an injunction will not necessarily result in patent holdup.¹³²

First, a large body of legal and economic literature disputes the plausibility of the patent-holdup conjecture.¹³³ Scholars have emphasized that holdup is a conjecture, not a real-world fact.¹³⁴ Dennis Carlton and Allan Shampine observe that holdup is particularly unlikely when the implementer has the legal right to challenge the offered licensing terms in court if it believes that the licensing terms offered by the SEP holder are not FRAND.¹³⁵ As Carlton and Shampine observe, the implementer's ability to go to court affects the negotiation and safeguards the implementer against unreasonable terms.¹³⁶ When the implementer has the legal right to enforce the FRAND commitment in court, patent holdup is improbable.

Empirical evidence confirms that patent holdup rarely occurs in practice. Commissioner Joshua Wright of the Federal Trade Commission emphasized in 2013 that, “[d]espite the amount of attention patent hold-up has drawn from policymakers and academics, there have been relatively few instances of litigated patent hold-up among the thousands of standards adopted.”¹³⁷ He observed that

¹³¹ Lemley & Shapiro, *Patent Holdup and Royalty Stacking*, *supra* note 4, at 1993.

¹³² See Sidak, *The Meaning of FRAND, Part I: Royalties*, *supra* note 3, at 1007–08.

¹³³ See, e.g., Damien Geradin & Miguel Rato, *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); Elyse Dorsey & Matthew R. McGuire, *How the Google Consent Order Alters the Process and Outcomes of FRAND Bargaining*, 20 GEO. MASON L. REV. 979 (2013).

¹³⁴ See, e.g., Gregor Langus, Vilen Lipatov & Damien Neven, *Standard-Essential Patents: Who Is Really Holding Up (and When)?*, 9 J. COMPETITION L. & ECON. 253 (2013); Ratliff & Rubinfeld, *supra* note 22, at 9; Sidak, *The Meaning of FRAND, Part I: Royalties*, *supra* note 3, at 1021–22.

¹³⁵ Dennis W. Carlton & Allan Shampine, *Identifying Benchmarks for Applying Non-Discrimination in FRAND*, 8 COMPETITION POL'Y INT'L 1, 5 (2014).

¹³⁶ *Id.*

¹³⁷ Joshua D. Wright, Comm'r, Fed. Trade Comm'n, Remarks at the Center for the Protection of Intellectual Property Inaugural Academic Conference: The Commercial Function of Patents in Today's Innovation Economy 20 (Sept. 12, 2013) (citing Bruce H. Kobayashi & Joshua

“empirical evidence of patent hold-up is . . . unremarkable.”¹³⁸ Similarly, SSOs have repeatedly told the FTC that they have not encountered patent holdup problems.¹³⁹ The Telecommunications Industry Association (TIA) has publicly stated that it “has never received any complaints regarding such ‘patent hold-up’ and does not agree that ‘patent holdup’ is plaguing the information and telecommunications technology . . . standard development processes.”¹⁴⁰ In a study co-funded by Microsoft,¹⁴¹ which endorses the holdup theory,¹⁴² Lemley and Shapiro do not identify a single occurrence of patent holdup involving SEPs.¹⁴³

Empirical data also do not support the proposition that cases of alleged patent holdup have harmed the success of standards. To the contrary, the data show a dramatic growth in industries, such as the mobile-device industry, in which firms produce devices in compliance with standards that have been subject to disputes related to SEPs. The ITU reported that in 2009 the number of worldwide mobile subscriptions amounted to approximately 4.6 billion.¹⁴⁴ The interim update of the Ericsson Mobility Report, issued in February 2014, estimated that, by the end of 2013, mobile subscriptions had reached approximately 6.7 billion¹⁴⁵—an increase of more than 45 percent since 2009.¹⁴⁶ There was similar growth in sales of mobile devices. Gartner, an

D. Wright, *Intellectual Property and Standard Setting*, in ABA SECTION OF ANTITRUST LAW, HANDBOOK ON ANTITRUST ASPECTS OF STANDARD SETTING 95 (2d ed. 2011)) [hereinafter Wright, *The Commercial Function of Patents*], available at http://www.ftc.gov/sites/default/files/documents/public_statements/ssos-frand-and-antitrust-lessons-economics-incomplete-contracts/130912cpip.pdf.

¹³⁸ *Id.*

¹³⁹ See Roger G. Brooks, *Patent “Hold-Up,” Standards-Setting Organizations and the FTC’s Campaign Against Innovators*, 39 AIPLA Q.J. 435, 446–49 (2011).

¹⁴⁰ USITC Inv. No. 337-TA-868 Initial Determination, *supra* note 108 (citing a letter received from the Telecomms. Indus. Ass’n on standard-setting issues, CX 3144, at 4).

¹⁴¹ Lemley & Shapiro, *Patent Holdup and Royalty Stacking*, *supra* note 4. The Lemley-Shapiro study was funded by Apple, Cisco, Intel, Micron Technology, Microsoft, and SAP. *Id.* at 1991 n.*.

¹⁴² See, e.g., Letter from Brian R. Nester on Behalf of Microsoft Corp. to the Honorable Lisa R. Barton, Acting Secretary to the Commission, U.S. Int’l Trade Comm’n re Comments to Commission’s May 10, 2012 Request for Statements on the Public Interest in Certain Wireless Communications Devices, Portable Music and Data Processing Devices, Computers, and Components Thereof, USITC Inv. No. 337-TA-745 (June 6, 2012) (“Owners of patents necessarily practiced by any party who wishes to implement the standard may demand outsized royalties or seek to enjoin implementation altogether.”).

¹⁴³ Lemley and Shapiro cite only one real-world example of patent holdup. *NTP, Inc. v. Research in Motion, Ltd.*, No. 3:01CV767, 2003 WL 23100881, at *1 (E.D. Va. Aug. 5, 2003). However, that case did not involve the infringement of an SEP. See Lemley & Shapiro, *Patent Holdup and Royalty Stacking*, *supra* note 4, at 2009.

¹⁴⁴ Press Release, Int’l Telecomm. Union, ITU Sees 5 Billion Mobile Subscriptions Globally in 2010 (Feb. 15, 2010), http://www.itu.int/newsroom/press_releases/2010/06.html.

¹⁴⁵ ERICSSON, ERICSSON MOBILITY REPORT ON THE PULSE OF THE NETWORKED SOCIETY 2 (Feb. 2014).

¹⁴⁶ INT’L TELECOMM. UNION, THE WORLD IN 2013: ICT FACTS AND FIGURES 1 (2013).

international information technology research and advisory company, reported that mobile phone sales increased from 308.9 million units in the third quarter of 2009¹⁴⁷ to 455.6 million units in the third quarter of 2013¹⁴⁸—a 47.5-percent increase. Empirical data thus show that the mobile-phone industry experienced extraordinary growth over the four-year period from 2009 to 2013. Empirical evidence therefore contradicts the assertion that SEP holders—if they *have* systematically attempted to engage in opportunistic licensing practices—have harmed the standardization process.

Given the lack of empirical evidence that patent holdup is occurring, courts have required that parties to a legal dispute support any reference to patent holdup with empirical data. In *Ericsson v. D-Link*, a case concerning the determination of damages for the use of Ericsson’s SEPs, the Federal Circuit held that “[t]he district court need not instruct the jury on hold-up or stacking *unless the accused infringer presents actual evidence of hold-up or stacking.*”¹⁴⁹ The Federal Circuit said that the district court must consider “the evidence on the record” when deciding whether to instruct the jury about the risk of patent holdup and royalty stacking.¹⁵⁰ According to the Federal Circuit, “something more than a general argument that these phenomena are possibilities” is required to warrant a jury instruction.¹⁵¹

Second, even if one accepts for the sake of argument that patent holdup could arise, there is no reason to assume that the SEP holder will use the right to an injunction as a tool to hold up the infringer. The SEP holder might seek an injunction for a perfectly legitimate purpose—for example, against an infringer that is not willing to pay FRAND royalties. Similarly, the SEP holder might threaten an injunction as a tool to force the implementer to come to the negotiating table.¹⁵² As Administrative Law Judge Theodore Essex of the U.S. International Trade Commission (ITC) observed when discussing ETSI’s rules, “[t]here is nothing in [the SSO’s] Rules of Procedure, or other documents . . . that state[s] a party cannot use legal means to pressure the other parties in negotiations.”¹⁵³ An implementer has a stronger incentive to negotiate a license for SEPs when it risks an injunction that could disrupt the implementer’s production. Therefore, the SEP holder may use the injunction for a legitimate purpose, rather than as a tool to extract opportunistic licensing terms.

¹⁴⁷ Press Release, Gartner, Gartner Says Grey-Market Sales and Destocking Drive Worldwide Mobile Phone Sales to 309 Million Units; Smartphone Sales Grew 13 Per Cent in Third Quarter of 2009 (Nov. 12, 2009), <http://www.gartner.com/newsroom/id/1224645>.

¹⁴⁸ Press Release, Gartner, Gartner Says Smartphone Sales Accounted for 55 Percent of Overall Mobile Phone Sales in Third Quarter of 2013 (Nov. 14, 2013), <http://www.gartner.com/newsroom/id/2623415>.

¹⁴⁹ Nos. 2013–1625, 2014 WL 6804864, at * 25 (Fed. Cir. Dec. 4, 2014) (emphasis added).

¹⁵⁰ *Id.*

¹⁵¹ *Id.*

¹⁵² See Wright, The Commercial Function of Patents, *supra* note 137, at 30–31.

¹⁵³ USITC Inv. No. 337-TA-868 Initial Determination, *supra* note 108, at 113.

Third, there is no reason to assume that the royalties negotiated under the threat of an injunction will be outside the FRAND range.¹⁵⁴ The SEP holder's request for an injunction does not guarantee that the judge will issue such a remedy. Courts have been reluctant to enjoin implementers of FRAND-committed patents, such that the SEP holder's ability to obtain a remedy is far from self-evident. In *Apple v. Motorola*, for example, the court found that Motorola did not show that Apple's infringement of Motorola's SEPs caused Motorola irreparable harm; the court consequently denied the injunction.¹⁵⁵ When the likelihood of obtaining an injunction is low, the threat created by the request for an injunction is unlikely to distort the negotiation process in any material way. Further, Judge Essex stated—although referring to an exclusion order (and not an injunction)—that,

[w]hile the possibility or existence of an exclusion order may benefit [the SEP holder] in negotiating a license, and move the license fee in the upper direction on the FRAND scale, there are hundreds of other economic factors that go into the parties finding a royalty or flat amount both can agree on.¹⁵⁶

Therefore, even if an injunction can confer some bargaining power on an SEP holder, there is no reason to assume that the licensing terms negotiated under the threat of an injunction will necessarily be outside the FRAND range.

B. Risks from Limiting the SEP Holder's Right to Seek an Injunction

Limiting the availability of injunctions against infringers of SEPs will encourage infringers to behave opportunistically during the licensing negotiation in an attempt to secure lower royalties.¹⁵⁷ An infringer may refuse to pay a FRAND royalty or may even refuse to engage in good-faith negotiations over FRAND terms if it does not face the risk of its infringing products being subject to an injunction. If the penalty for infringement were limited to the payment of court-determined FRAND royalties, it would be in the infringer's best interest consistently to infringe and litigate *ex post*.

Some commentators have criticized such reasoning, suggesting that treble damages awarded in cases of willful infringement would suffice to deter an infringer from acting opportunistically during the negotiation of the licensing terms. It bears emphasis, however, that a court will not necessarily award treble damages to an SEP holder. First, to obtain treble damages, the SEP holder needs to prove that the infringer has willfully infringed the SEPs.¹⁵⁸

¹⁵⁴ See, e.g., Wright, Remarks at the Inaugural Academic Conference, *supra* note 152, at 29–30.

¹⁵⁵ *Apple Inc. v. Motorola, Inc.*, 757 F.3d 1286, 1332 (Fed. Cir. 2014).

¹⁵⁶ USITC Inv. No. 337-TA-868 Initial Determination, *supra* note 108, at 118 (June 13, 2014).

¹⁵⁷ See Damien Geradin, *Reverse Hold-Ups: The (Often Ignored) Risks Faced by Innovators in Standardized Areas*, in THE PROS AND CONS OF STANDARD SETTING 101 (Konkurrensverket 2010); see also Brooks, *supra* note 139, at 435.

¹⁵⁸ See *Bard Peripheral Vascular, Inc. v. W.L. Gore & Assocs., Inc.*, No. 2014–1114, slip op. at 3 (Fed. Cir. Jan. 13, 2015); *In re Seagate Tech., LLC*, 497 F.3d 1360, 1371 (Fed. Cir. 2007);

Second, the award of treble damages is subject to the court's discretion.¹⁵⁹ A court is free to reject an SEP holder's claim for treble damages, even if the jury finds willful infringement. Third, some commentators have argued that courts should categorically deny SEP holders that have committed to license their SEPs on FRAND terms the ability to obtain treble damages. Lemley has argued, for example, that after having made a FRAND commitment, an SEP holder has "only a contractual claim for a royalty, not a cause of action for patent infringement that might result in an injunction, treble damages, and attorneys' fees."¹⁶⁰ (Lemley's theory is doubtful for the reason discussed above—that an implicit waiver by contract of a statutory right must be unequivocal and is therefore disfavored.) If a court does address a FRAND dispute as a breach of contract case, as Judge Robart did in *Microsoft v. Motorola*, there will be no possible award of treble damages. Some courts have gone further, questioning not only the SEP holder's ability to obtain treble damages, but also its right to enforce the SEPs. For example, the District Court for the Northern District of Illinois has questioned whether an SEP holder that has failed to comply with a FRAND commitment should be able to enforce its SEP against a specific infringer.¹⁶¹ In sum, although the award of treble damages could be a good mechanism to deter the infringer's opportunistic behavior, an SEP holder's ability to obtain such a remedy is uncertain. An SEP holder's theoretical ability to claim treble damages for willful infringement may not provide a sufficient incentive for implementers to negotiate licensing terms in good faith.

The Department of Justice and the U.S. Patent and Trademark Office (USPTO) have recognized that the risk of an infringer's opportunistic behavior increases when the infringer "believes its worst-case outcome after litigation is to pay the same amount it would have paid earlier for a license."¹⁶² The implementer's incentive to refuse to license decreases when there are perceived costs of delay. When an infringer does not face the risk of its infringing products being enjoined or excluded from the market, the costs of infringing are litigation costs plus the expected monetary damages that the infringer would pay after the court's finding of infringement. Those expected damages are based on the probability that (1) the patent holder detects the infringement and

S. Chase Means, *The Trouble with Treble Damages: Ditching Patent Law's Willful Infringement Doctrine and Enhanced Damages*, 2013 U. ILL. L. REV. 1999, 2010–11.

¹⁵⁹ *Id.* at 1999.

¹⁶⁰ See Lemley, *Intellectual Property Rights and Standard-Setting Organizations*, *supra* note 35, at 1925.

¹⁶¹ Order to Fujitsu Limited to Show Cause Why the '737 Patent Should Not Be Held Unenforceable as to Tellabs, *Fujitsu Ltd. v. Tellabs Operations, Inc.*, No. 1:09-cv-04530 (N.D. Ill. July 23, 2014).

¹⁶² U.S. DEP'T OF JUSTICE & U.S. PATENT & TRADEMARK OFFICE, POLICY STATEMENT ON REMEDIES FOR STANDARDS-ESSENTIAL PATENTS SUBJECT TO VOLUNTARY F/RAND COMMITMENTS 7 n.15 (2013) [hereinafter DOJ-USPTO POLICY STATEMENT ON SEPs].

(2) the court finds the patents in suit valid, enforceable, and infringed. If an implementer believes that either probability is low enough, then the implementer would be better served by infringing and potentially paying damages *ex post*, than by agreeing upon a royalty *ex ante*.

Several commentators have emphasized that limiting the availability of injunctions might result in an SEP holder's undercompensation. Commissioner Wright has said that "weakening the availability of injunctive relief for infringement—including infringement of F/RAND-committed SEPs—may increase the probability of 'reverse holdup' (also defined as holdout) and weaken any incentives implementers have to engage in good faith negotiations with the patent holder."¹⁶³ Former Chief Judge Randall Rader similarly observed in *Apple v. Motorola* that "'hold out' . . . is equally as likely and disruptive as a 'hold up.'"¹⁶⁴ Judge Essex of the ITC has also recognized the risk of patent holdout in the matter of *Certain Wireless Devices with 3G and/or 4G Capabilities and Components Thereof*.¹⁶⁵ He wrote that, by using the SEP before obtaining the license, an implementer "puts pressure on the IPR owner to settle, as the owner is not compensated during a period of exploitation of the IP by the unlicensed parties."¹⁶⁶ He observed that an implementer can "shift the risk involved in patent negotiation to the [SEP] holder"¹⁶⁷ by forcing the patent owner to take legal action. An SEP holder "can lose the IPR [it] believe[s] [it] ha[s], but if the patent holder wins[, it] gets no more than a FRAND solution, that is, what [it] should have gotten under the agreement in the first place."¹⁶⁸ In contrast, there is no risk for an implementer, if the only consequence of using an SEP without a license "is to pay a FRAND based royalty or fee."¹⁶⁹ Judge Essex said that, by shifting the risk to the SEP holder, an implementer can force an SEP holder to accept a royalty rate that is "in the lower range of FRAND, or perhaps even lower than a reasonable FRAND rate."¹⁷⁰

Reducing or eliminating the availability of injunctions for FRAND-committed SEPs would mean, on the margin, that fewer innovators would participate in SSOs. A patent holder that is constrained in its royalty negotiations and cannot seek to enjoin an infringer derives materially less benefit from participating in an SSO. For example, Nokia said in a 2013 *amicus* brief in the appeal of *Apple v. Motorola* that elimination of injunctive relief for SEP holders "could threaten the standardization process as a whole, as patent

¹⁶³ Wright, The Commercial Function of Patents, *supra* note 137, at 29.

¹⁶⁴ *Apple Inc. v. Motorola, Inc.*, 757 F.3d 1286, 1333 (Fed. Cir. 2014) (Rader, C.J., dissenting in part).

¹⁶⁵ USITC Inv. No. 337-TA-868 Initial Determination, *supra* note 108, at 114.

¹⁶⁶ *Id.* at 113–14.

¹⁶⁷ *Id.*

¹⁶⁸ *Id.*

¹⁶⁹ *Id.*

¹⁷⁰ *Id.* at 114.

holders would be forced to consider the likely difficulties in obtaining fair compensation for the use of their patents before making FRAND commitments concerning them.”¹⁷¹ A Nokia executive similarly said in 2013, “Nokia has stepped back from the standardization process, electing either not to join certain [SSOs] or not to contribute certain technologies to these organizations.”¹⁷²

V. WHAT MAKES AN IMPLEMENTER “UNWILLING”?

There is a growing consensus among public enforcement agencies, industry participants, and scholars that, even after entering into a FRAND contract, an SEP holder may be able to request and obtain an injunction against an implementer that is unwilling to accept FRAND terms.¹⁷³ However, as of January 2015, no court had clearly defined an “unwilling” implementer. It therefore remains uncertain under what circumstances an SEP holder may obtain an injunction against an SEP infringer. I offer here an economic interpretation of “unwillingness” that courts can follow when deciding whether to grant an injunction against an implementer of SEPs.

A. Current Definitions of “Unwilling”

As of January 2015, courts had not commonly defined when an implementer is “unwilling” to accept FRAND terms. The FTC provided a problematic definition of “unwillingness” in two consent agreements—one from 2012 and another from 2013.¹⁷⁴ First, in *Robert Bosch*, the FTC characterized an implementer as “unwilling” when it (1) “states in writing that it will not license the SEP” or when the implementer refuses to enter into a license on terms that either the parties or the courts have confirmed comply with a FRAND commitment.¹⁷⁵ The FTC adopted the slightly different approach in *Motorola Mobility* that an unwilling licensee is one that (1) refuses to license consistent

¹⁷¹ Brief for Nokia Corp. and Nokia Inc. as Amici Curiae Supporting a Reversal and Supporting Neither Party at 10 (Apr. 4, 2013), *Apple Inc. v. Motorola, Inc.*, 757 F.3d 1286 (Fed. Cir. 2014) (Nos. 12–1548, 12–1549).

¹⁷² Katy Oglethorpe, *Nokia Counsel: Major Companies “Wilfully Infringe” FRAND*, GLOBAL COMPETITION REV. (June 17, 2013), <http://globalcompetitionreview.com/news/article/33655/nokia-counsel-major-companies-wilfully-infringe-frand/> (reporting remarks of Jenni Lukander, global head of competition law at Nokia).

¹⁷³ See, e.g., Statement of the Fed. Trade Comm’n at 4 n.14, *Motorola Mobility Inc.*, File No. 121–0120 (F.T.C. Jan. 3, 2013); Brief for Qualcomm Inc. as Amicus Curiae Supporting a Reversal at 7–11, *Apple Inc. v. Motorola, Inc.*, 757 F.3d 1286 (Fed. Cir. 2014) (Nos. 12–1548, 12–1549); Ratliff & Rubinfeld, *supra* note 22, at 5–7; Vesterdorf, *supra* note 109, at 4.

¹⁷⁴ Decision and Order, *Robert Bosch GmbH*, No. C-4377 (F.T.C. Nov. 26, 2012) [FTC Decision and Order in *Bosch*]; Decision and Order, *Motorola Mobility, L.L.C.*, No. C-4410 (F.T.C. Jan. 3, 2013) [hereinafter FTC Decision and Order in *Motorola Mobility*].

¹⁷⁵ FTC Decision and Order in *Bosch*, *supra* note 174, § IV.E.2.

with FRAND terms either in writing or in sworn testimony, (2) refuses to enter a license agreement on terms set by a court or a binding arbitration, or (3) fails to assure the SEP holder in writing that it will accept FRAND terms.¹⁷⁶ The FTC further said in *Motorola Mobility* that “challenging the validity, value, [i]nfringement or [e]ssentiality of an alleged infringing FRAND [p]atent does not constitute a statement that a [p]otential [l]icensee will not license.”¹⁷⁷ The FTC evidently places the burden on an SEP holder to prove that a potential licensee is “unwilling” in accordance with the categories that the agency defines.

The FTC’s definition sets a high bar for an SEP holder to prove that an implementer is unwilling to accept FRAND terms. The FTC’s approach is flawed because it ensures that no potential licensee represented by counsel will be so careless as to certify in writing or in sworn testimony that it is unwilling to negotiate with an SEP holder on any terms. If extended to situations other than enforcement of section 5 of the FTC Act,¹⁷⁸ the FTC’s definition of an unwilling licensee would give the implementer substantial bargaining power. An implementer could continue to refuse to negotiate with an SEP holder and continue infringing the SEP as long as it does not blunder into stating in writing or sworn testimony that it will not enter into a license and pay for the patented technology it is using. The likelihood that an implementer ever would be deemed an unwilling licensee under the FTC’s approach, such that an SEP holder could seek an injunction, is illusory. Given the natural consequences of the FTC’s approach, no one could seriously contend that the agency expects that a different outcome is possible.

The European Commission has defined “unwillingness” in its decision addressing Google’s acquisition of Motorola Mobility: “it *may* be legitimate for the holder of SEPs to seek an injunction against a potential licensee which is not willing to negotiate in good faith on FRAND terms.”¹⁷⁹ The Commission thus recognizes that, to foreclose an injunction, it is not sufficient that an implementer enter into a negotiation with the SEP holder; rather, the implementer must actually be willing to reach an agreement on FRAND terms. It is regrettable that the Commission did not provide more guidance. Google proposed to define a willing licensee as one who “has made . . . a binding and unconditional commitment to license . . . on FRAND terms”¹⁸⁰ and who “provides securities with regard to the royalty payments,” yet the Commission would not define willingness in its decision.¹⁸¹

As I explain in Part VI.C.3, a German court has submitted questions concerning the limits on an SEP holder’s right to seek an injunction from the Court

¹⁷⁶ FTC Decision and Order in *Motorola Mobility*, *supra* note 174, § II.E.

¹⁷⁷ *Id.* § II.E.2.

¹⁷⁸ 15 U.S.C. § 45.

¹⁷⁹ Google/Motorola Mobility, Case No. COMP/M.6381, *supra* note 39, ¶ 126 (emphasis added).

¹⁸⁰ *Id.* ¶ 141(a).

¹⁸¹ *Id.* ¶ 142.

of Justice of the European Union (CJEU), emphasizing that there is a discrepancy in the approach that national courts and the European Commission have adopted so far. The CJEU has yet to rule on that question. In November 2014, Advocate General Melchior Wathelet opined on how the CJEU should address the questions. He said that “a mere willingness on the part of infringer to negotiate in a highly vague and non-binding fashion” cannot limit the SEP holder’s right to request an injunction, and he consequently discouraged the CJEU from embracing the Commission’s approach.¹⁸²

The current statements of enforcement policy of antitrust agencies in Europe and the United States are vague, if not hostile to SEP holders. Under the current system, the antitrust agencies are more solicitous about an unwilling implementer who infringes an SEP than a willing licensor who seeks an injunction. The alternative is to hold an implementer to a good-faith standard in negotiation. Doing so would increase the incentives of both the implementer and the SEP holder to reach a prompt licensing agreement on FRAND terms.

B. When Is an Implementer “Unwilling” to Accept a FRAND Offer?

Remedies available in cases of patent infringement serve as a framework for the negotiation of FRAND licensing terms.¹⁸³ Parties bargain over licensing terms “in the shadow of the law.”¹⁸⁴ The availability of an injunction will influence how an SEP holder and an implementer negotiate. A court’s framework for deciding whether to grant an injunction in a FRAND licensing dispute should deter opportunistic practices and stimulate the parties to negotiate in good faith.

The decision to enjoin an implementer that has infringed an SEP should depend on whether the implementer has refused the SEP holder’s FRAND offer. By making a FRAND offer and thereby giving the implementer the opportunity to access the SEP holder’s standard-essential technology on FRAND terms, the SEP holder has discharged its FRAND obligation. An infringer that refuses to accept a FRAND offer is “unwilling” to accept FRAND terms.¹⁸⁵ Because the SEP holder has discharged its duties under the FRAND commitment, the SEP holder should be able to request and obtain an

¹⁸² Opinion of Advocate General Wathelet ¶ 50, Case C-170/13 Huawei Tech. Co. v. ZTE Corp. (Nov. 20, 2014) (European Union) [hereinafter Opinion of Advocate General in *Huawei v. ZTE*].

¹⁸³ See, e.g., Ratliff & Rubinfeld, *supra* note 22, at 1; see also Robert Cooter, Stephen Marks & Robert Mnookin, *Bargaining in the Shadow of the Law: A Testable Model of Strategic Behavior*, 11 J. LEGAL STUD. 225, 225 (1982).

¹⁸⁴ Cooter, Marks & Mnookin, *supra* note 183, at 228–29.

¹⁸⁵ See, e.g., DOJ-USPTO POLICY STATEMENT ON SEPS, *supra* note 162, at 7 (discussing, in the context of exclusion orders, that, when “a putative licensee refuses to pay what has been determined to be a F/RAND royalty[.] . . . [s]uch a refusal could take the form of a constructive refusal to negotiate”).

injunction, provided that the SEP holder satisfies the *eBay* criteria against such an infringer.

In determining whether an implementer has rejected a FRAND offer, the court needs to examine three questions. First, the court needs to evaluate whether the SEP holder has made an offer before seeking an injunction. Second, the court needs to evaluate whether that offer was FRAND. Third, the court needs to determine whether the implementer rejected the FRAND offer, actually or constructively. If the court answers those three questions affirmatively, the duties arising from a FRAND commitment do not restrain the SEP holder's ability to obtain an injunction, and the decision whether to grant an injunction should turn to the *eBay* criteria.

1. Did the SEP Holder Make a Licensing Offer?

In deciding whether to grant an injunction, a court first needs to decide whether the SEP holder has made a licensing offer to the implementer. The FRAND commitment obligates the SEP holder to make an offer to license (or otherwise provide access to) its SEPs, and the failure to discharge that duty constitutes a breach of the SEP holder's FRAND contract. An SEP holder that fails to make an offer (or otherwise provide access to its SEPs) should not be able to request an injunction against the implementer.¹⁸⁶

The definition of what constitutes a licensing offer is a question of contract law, and may differ by jurisdiction. However, the mere fact that an SEP holder has contacted an implementer will generally not suffice to establish a licensing offer. Under U.S. contract law, courts have required that an SEP holder make an explicit licensing offer to an implementer so that its acceptance enables the parties to enter into a licensing agreement. The District Court for the Northern District of California adopted this approach in *Realtek v. LSI*, in which the SEP holder sent a letter to the implementer and, less than a week later, filed an action with the ITC to block importation of the implementer's allegedly infringing products.¹⁸⁷ The SEP holder's letter did not include a licensing offer, but merely demanded that the implementer immediately cease and desist its alleged infringement. The court found that the SEP holder's communication with the implementer did not constitute a licensing offer.¹⁸⁸ The court said that the SEP holder did not attempt to make a licensing offer before seeking an exclusion order from the ITC; consequently, there was no evidence that the implementer was unwilling to accept a FRAND license.¹⁸⁹ The FTC adopted a similar approach in its investigation into Motorola Mobility's conduct, in which the agency said that an SEP holder should not

¹⁸⁶ See, e.g., *Realtek Semiconductor Corp. v. LSI Corp.*, 946 F. Supp. 2d 998, 1003 (N.D. Cal. 2013).

¹⁸⁷ *Id.* at 1002.

¹⁸⁸ *Id.*

¹⁸⁹ *Id.* at 1007–08.

seek to enjoin an implementer unless the SEP holder has “made [q]ualified [o]ffers to the [p]otential [l]icensee.”¹⁹⁰ Advocate General Wathelet recommended that the CJEU adopt the same principle in the European Union by requiring the SEP holder to “present to the alleged infringer a written offer for a license on FRAND terms[, including] . . . the precise amount of the royalty.”¹⁹¹ In sum, only an SEP holder that has made a licensing offer to an implementer (or otherwise provided access to its SEPs) has fulfilled its obligations arising from the FRAND commitment and is eligible to receive an injunction against that implementer.

2. *Was the SEP Holder’s Offer FRAND?*

Next, the court needs to determine whether an SEP holder’s offer is within the FRAND range. In some cases, that determination is straightforward. Suppose, for example, that the parties previously asked a court or an arbitral tribunal to determine the FRAND royalty, yet the implementer subsequently refuses to pay the established royalty. The court need only verify whether the SEP holder’s offer complies with what the parties or the third-party adjudicator determined to be a FRAND royalty. When the implementer refuses to accept what has been determined to be a FRAND license, the SEP holder should be entitled to enjoin the infringer from using the SEPs. However, this scenario will be rare. In most cases, determining whether an SEP holder’s offer is FRAND is harder.¹⁹² Indeed, the adjudicator should not conclude that the offer lies outside the FRAND range simply because the implementer considers it unreasonable. Chief Judge Davis said in *Ericsson v. D-Link* that an SEP holder “does not violate its RAND obligations by seeking a royalty greater than its potential licensee believes is reasonable.”¹⁹³ His statement indicates an expectation that judges in FRAND cases will be called upon to do the quintessential thing that judges routinely do—exercise judgment. As an objective matter, an offer that an implementer considers unreasonable still might lie within the FRAND range and therefore suffice as a matter of law to discharge the SEP holder’s FRAND obligation. Only the adjudicator will set this matter to rest.

Determining whether an initial offer is within the FRAND range generally requires detailed economic analysis.¹⁹⁴ The SEP holder may present evidence

¹⁹⁰ FTC Decision and Order in *Motorola Mobility*, *supra* note 174, § II.C.

¹⁹¹ Opinion of Advocate General in *Huawei v. ZTE*, *supra* note 182, ¶ 85.

¹⁹² Judge Learned Hand famously admitted that the “whole notion of a reasonable royalty” merely helps to approximate “that which is really incalculable.” *Cincinnati Car Co. v. N.Y. Rapid Transit Corp.*, 66 F.2d 592, 595 (2d Cir. 1933); *see also Georgia-Pacific Corp. v. U.S. Plywood-Champion Papers Inc.*, 446 F.2d 295, 300 n.5 (2d Cir. 1971).

¹⁹³ *Ericsson Inc. v. D-Link Sys., Inc.*, No. 6:10-CV-473, 2013 WL 4046225, at *25 (E.D. Tex. Aug. 6, 2013), *aff’d in part, rev’d in part, and vacated in part*, 773 F.3d 1201 (Fed. Cir. 2014).

¹⁹⁴ *See Sidak, The Meaning of FRAND, Part I: Royalties*, *supra* note 3, at 988–1025 (analyzing possible economic methodologies for determining a FRAND royalty).

showing that the license offer is comparable to the licensing terms upon which third parties have agreed. When evidence from comparable licenses imply that an SEP holder's offer is within the FRAND range, the court should consider that fact evidence that the SEP holder has discharged its FRAND commitment. It should be then the implementer's burden to prove that the SEP holder's offer is outside the FRAND range.

Courts also should not deem an offer to breach a FRAND obligation simply because the SEP holder has offered to license its SEPs as a portfolio, rather than individually. The U.S. Department of Justice and the FTC have emphasized that "fragmentation of [patent] rights can increase the costs of bringing products to market due to the transaction costs of negotiating multiple licenses and greater cumulative royalty payments."¹⁹⁵ Allowing an SEP holder to offer FRAND terms for an entire patent portfolio can reduce transaction costs—to the benefit of the SEP holder, the implementer, and ultimately consumers. Therefore, the requirement to license SEPs on FRAND terms does not preclude an SEP holder from licensing its SEPs as a portfolio. Moreover, one could argue that the nondiscrimination element of the FRAND commitment *requires* an SEP holder to license its SEPs as a portfolio, if the SEP holder has previously licensed its SEPs as a portfolio to other implementers and the specific circumstances of the case do not justify departing from that established licensing practice.

When the court determines that an SEP holder has made a FRAND offer (or otherwise has provided access to its SEPs¹⁹⁶), the court confirms that the SEP holder has discharged its FRAND obligation. Conversely, an SEP holder that has made an offer outside the FRAND range breaches its contractual obligation and should not be able to request an injunction.¹⁹⁷

Some courts have ruled that an SEP holder's *initial* offer need not be within the FRAND range. In *Microsoft v. Motorola*, Microsoft alleged that Motorola breached its FRAND commitment by making an unreasonably high initial offer.¹⁹⁸ Rejecting Microsoft's argument, Judge Robart said that, "under Motorola's agreements with the IEEE and the ITU, Motorola need *not* make initial offers on RAND terms."¹⁹⁹ Judge Robart found that an initial offer that is not RAND (or FRAND) does not itself violate the SEP holder's RAND commitment.²⁰⁰ However, he said that an initial offer could serve as supporting

¹⁹⁵ U.S. DEP'T OF JUSTICE & FED. TRADE COMM'N, ANTITRUST ENFORCEMENT AND INTELLECTUAL PROPERTY RIGHTS: PROMOTING INNOVATION AND COMPETITION 57 (2007), available at <http://www.justice.gov/atr/public/hearings/ip/222655.pdf>.

¹⁹⁶ As I explained in Part II.B.1, *supra*, an SEP holder may discharge its FRAND obligation by electing to license its SEPs only to downstream manufacturers, provided that the SEP holder grants access to its SEPs to implementers in the upper level of the value chain by some means other than entering into licenses with those upper-level implementers.

¹⁹⁷ See, e.g., Ratliff & Rubinfeld, *supra* note 22, at 11.

¹⁹⁸ *Microsoft Corp. v. Motorola Inc.*, 864 F. Supp. 2d 1023, 1038 (W.D. Wash. 2012).

¹⁹⁹ *Id.* at 1038 (emphasis added).

²⁰⁰ *Id.*

evidence of a violation of a RAND commitment if other circumstances indicate that the SEP holder has not negotiated RAND licensing terms in good faith.²⁰¹

Judge Robart's approach seems wrong because it ignores that, in a FRAND contract, time is of the essence.²⁰² Expeditious formation of a FRAND licensing agreement enables the implementer to commence the prompt production of standard-compliant devices. Consumers can sooner reap the benefits of standardization. And the SEP holder can sooner receive compensation for its invention, which strengthens the SEP holder's incentive to continue investing in developing technology for the SSO's *next* standard. Allowing the SEP holder knowingly to make an initial offer outside of the FRAND range would needlessly prolong the negotiation process and deprive consumers of their timely consumption of standard-compliant devices. As Jerry Hausman has observed, the delayed introduction of a new product is analogous to its having a "virtual price" so high as to drive demand for the product to zero.²⁰³ The resulting welfare loss consists of the entire area beneath the demand curve for the device during the period of delay. This waste of resources is an irretrievable deadweight loss.²⁰⁴ From an economic perspective, averting that loss of consumer surplus is the overriding public interest at stake.

It is also inconsistent for courts to emphasize, on the one hand, the harm to consumers that an injunction would cause but to neglect, on the other hand, the harm to consumers from the failure of the parties to reach a FRAND agreement expeditiously. The FTC, for example, argued in December 2012 that the issuance of an injunction against the infringer of an SEP harms the public interest, because "the alleged infringer likely will be forced out of the market" and "the public would face the immediate impact of an injunction by losing access to the affected products."²⁰⁵ However, the FTC fails to recognize that

²⁰¹ *Id.* at 1038–39.

²⁰² *See, e.g.,* King v. Stevenson, 445 F.2d 565, 569 (7th Cir. 1971) (evaluating the parties' intent to determine whether time is of the essence in a contract).

²⁰³ *See* Jerry A. Hausman, *Valuing the Effect of Regulation on New Services in Telecommunications*, 28 BROOKINGS PAPERS ON ECON. ACTIVITY 1, 2 (1997). Hausman explains:

The basic idea underlying the economic approach to valuing new goods or services is the recognition that until these goods actually come on the market, consumers are unable to purchase them at any price, no matter how much they would like to buy them. Thus, in some sense, the price of the new good or service might as well be infinite. A more refined economic approach estimates the "virtual," or "reservation," price that sets demand for the new good or service to zero. At this virtual price, demand is zero, so a "virtual equilibrium" exists between demand and supply (which is zero).

Id. at 2. For an application of Hausman's insight to intellectual property, see Jerry A. Hausman & J. Gregory Sidak, *Google and the Proper Antitrust Scrutiny of Orphan Books*, 5 J. COMPETITION L. & ECON. 411, 414–16 (2009).

²⁰⁴ *See* Sidak, Inaugural Address for the Ronald Coase Professorship of Law and Economics, Tilburg University: Is Harm Ever Irreparable?, *supra* note 110, at 21, 24.

²⁰⁵ Press Release, Fed. Trade Comm'n, FTC Files Amicus Brief Explaining How Injunctions Related to Standard-Essential Patents Can Harm Competition, Innovation, and Consumers

the same qualitative effect arises if the parties fail to reach a FRAND agreement in a timely manner. The absence of a licensing agreement impairs an implementer's ability to produce standard-compliant devices and compete in the downstream market (unless the implementer willfully infringes the SEP). Failure to reach a licensing agreement harms consumers, because their access to the implementing devices will be delayed. Therefore, failure to reach a FRAND agreement promptly would have the same effect on the public interest that the FTC says would arise if a court were to enjoin an infringer of SEPs.

One could indeed argue that the harm related to a failure to reach a FRAND licensing agreement is merely theoretical, given that, in practice, a producer often implements SEPs before reaching a licensing agreement. Stated differently, willful infringement of SEPs is pervasive. As a result, an implementer can produce standard-compliant devices, even in the absence of a licensing agreement. A delay in the negotiation of licensing terms thus does not preclude the implementer from competing in the product market, nor does it deprive consumers from access to standard-compliant devices. However, any legal rule that was predicated on the expectation that an implementer will systematically infringe SEPs would punish those implementers that wait to use the SEPs until they have concluded a licensing agreement. Richard Epstein and David Kappos argue that the law should protect against the "willful dispossession of property," including intellectual property, such as patents.²⁰⁶ The law should not create a competitive disadvantage for the implementer that does not use the SEPs until it has executed a licensing agreement and obtained the lawful right to use the SEPs.

3. *Did the Implementer Reject a FRAND Offer?*

If a court determines that an SEP holder has made a FRAND offer, it then needs to decide whether an implementer has rejected that offer. An SEP holder should be able to obtain an injunction against an implementer that has refused a FRAND offer.²⁰⁷ In determining whether the implementer has rejected a FRAND offer, the court needs to examine the implementer's

(Dec. 5, 2012), <http://www.ftc.gov/news-events/press-releases/2012/12/ftc-files-amicus-brief-explaining-how-injunctions-related>.

²⁰⁶ Richard A. Epstein & David J. Kappos, *Legal Remedies for Patent Infringement: From General Principles to FRAND Obligations for Standard Essential Patents*, 9 COMPETITION POL'Y INT'L 69, 70 (2013).

²⁰⁷ The FTC has consistently supported the position that an SEP holder should be able to obtain an injunction against an implementer that refuses FRAND terms. See, e.g., FTC Decision and Order in *Bosch*, *supra* note 174, § IV.E.2 (acknowledging that the SEP holder was entitled to seek injunctive relief where the implementer "states in writing it will not license one or more of the [SEPs]" or "refuses to license one or more of the [SEPs] on terms . . . through a process agreed upon by both parties or through a court"); FTC Decision and Order in *Motorola Mobility*, *supra* note 174, § II.E (discussing the various situations in which an SEP holder will not be prohibited from seeking an injunction against an implementer).

negotiating behavior. As Judge Essex has observed, “there appears to be no provision [in the SSO’s rules] made for companies that simply choose to infringe, and then demand FRAND status when caught.”²⁰⁸ Further, Judge Vesterdorf has said that “[i]t is . . . not enough [for an implementer] to just declare [itself] to be willing [to accept FRAND terms]. This must be shown by concrete follow up actions such as signaling a commitment to conclude a binding license agreement and not frustrating negotiations.”²⁰⁹ U.S. agencies have expressed the view (although referring to exclusion orders rather than injunctions) that the implementer is obliged to enter into a negotiation with an SEP holder by stating that an injunctive remedy may be appropriate if an implementer acts “outside the scope of the . . . F/RAND [commitment]”—for example, by refusing to engage in a negotiation to determine FRAND terms.²¹⁰

An implementer that is willing to accept FRAND licensing terms must respond promptly to an SEP holder’s offer. The FTC adopted this approach in *Motorola Mobility* when it said that an SEP holder should be able to obtain an injunction if an implementer “does not provide the written confirmation requested in a FRAND Terms Letter within thirty (30) days.”²¹¹ Although one could question whether the deadline of 30 days is too long or too short, the idea behind the FTC’s decision is sound—a putative licensee that does not respond to an SEP holder’s offer in a timely manner shows that it has no intention to negotiate the FRAND terms in good faith. The consent order correctly recognizes that an implementer should have sufficient time to review the SEP holder’s offer and, at the same time, that the SEP holder should be able to secure a return on its investment in a timely manner.²¹² There is no valid justification for denying an injunction to an SEP holder that has made a FRAND offer, but to whom the implementer has not promptly responded.

However, courts have not always considered an implementer’s failure to respond to an SEP holder’s licensing offer to be evidence of the implementer’s unwillingness to negotiate in good faith. In *Microsoft v. Motorola*, for example, Motorola made Microsoft a licensing offer for the use of Motorola’s SEPs, but Microsoft did not respond. Instead, Microsoft directly filed a breach-of-contract lawsuit, arguing that Motorola’s offer was outside the FRAND range and therefore violated its FRAND commitment.²¹³ It is striking that Judge

²⁰⁸ USITC Inv. No. 337-TA-868 Initial Determination, *supra* note 108, at 114.

²⁰⁹ Vesterdorf, *supra* note 109, at 6.

²¹⁰ DOJ-USPTO POLICY STATEMENT ON SEPs, *supra* note 162, at 7.

²¹¹ FTC Decision and Order in *Motorola Mobility*, *supra* note 174, § II.E.4.

²¹² *See, e.g.*, Opinion of Advocate General in *Huawei v. ZTE*, *supra* note 182, ¶ 89 (“The timeframe for the exchange of offers and counter offers and the duration of the negotiations . . . must be assessed in the light of the ‘commercial window of opportunity’ available to the SEP holder for securing a return on its patent in the sector in question.”).

²¹³ *Microsoft Corp. v. Motorola, Inc.*, 696 F.3d 872, 877–78 (9th Cir. 2012); *see also* Defendants’ Response to Microsoft’s Motion for Partial Summary Judgment of Breach of Contract and Summary Judgment on Motorola’s Third, Fourth, Fifth, Seventh, Eighth, and Ninth Affirmative Defenses and Second Counter Claim at 1, *Microsoft Corp. v. Motorola, Inc.*,

Robart did not discuss the significance of Microsoft's failure to respond to Motorola's licensing offer.²¹⁴ Ignoring an implementer's failure to respond to an SEP holder's licensing offer biases the negotiation in the implementer's favor. The court would allow a perverse situation in which an implementer does not explicitly refuse a FRAND offer, but nonetheless engages in a course of conduct that results in an actual refusal to negotiate licensing terms. This kind of ambiguity promotes economic inefficiency. It thwarts the expeditious formation of a contract and in that respect contravenes the purpose of the SSO in creating, and the purpose of the SEP holder in accepting, the FRAND obligation in the first place. To avoid being enjoined from using the SEPs in question, an implementer should be required to respond to what the SEP holder represents to be a FRAND offer *before* the implementer initiates litigation against the SEP holder. An implementer's failure to do so should weigh heavily in favor of the issuance of an injunction.

Next, if a court finds that the implementer has responded to the SEP holder's offer, the court needs to determine whether the implementer has implicitly or explicitly rejected a FRAND offer. An infringer can explicitly refuse an SEP holder's FRAND offer if, for example, it states in writing that it does not intend to accept the offer. However, this situation is relatively rare in practice. It is also relatively implausible. What rational infringer that is aware of the legal consequences attached to its refusal would explicitly refuse a FRAND offer?

It is, on the other hand, possible that an infringer implicitly rejects an SEP holder's FRAND offer. Suppose the implementer makes a counteroffer that is outside the FRAND range. The Department of Justice and the USPTO have soundly reasoned that an implementer that "insist[s] on [licensing] terms clearly outside the bounds of what could reasonably be considered to be F/RAND terms in an attempt to evade the . . . obligation to fairly compensate the patent holder" should be considered unwilling.²¹⁵ The implementer might also implicitly reject a FRAND offer by delaying the negotiation process. It does not suffice for an implementer to enter into a negotiation with an SEP holder. Rather, an implementer must negotiate the licensing terms in good faith with a genuine intent to reach an agreement on FRAND terms. The European Commission adopted this approach in its Motorola Mobility investigation, stating that an SEP holder may legitimately use an injunction "against a potential licensee which is not willing to negotiate in good faith on FRAND terms."²¹⁶

No. 2:10-cv-01823-JLR (N.D. Ill. July 15, 2013), ECF No. 758 ("Microsoft . . . [took] the unprecedented step of filing a breach-of-contract lawsuit just 20 days after receiving Motorola's letter, without making any counteroffer.").

²¹⁴ Microsoft Corp. v. Motorola, Inc., No. C10-1823JLR, 2013 WL 2111217 (W.D. Wash. Apr. 25, 2013).

²¹⁵ DOJ-USPTO POLICY STATEMENT ON SEPs, *supra* note 162, at 7.

²¹⁶ Google/Motorola Mobility, Case No. COMP/M.6381, *supra* note 39, ¶ 126.

The implementer might delay the negotiation in an attempt to extract from the SEP holder a lower licensing rate. The implementer might reject the SEP holder's FRAND offer and counteroffer within the FRAND range. However, after an SEP holder has made a FRAND offer, any further negotiation of the licensing terms is solely at the SEP holder's discretion. An SEP holder that has made an offer within the FRAND range is not required to negotiate further the licensing terms with the implementer. An implementer cannot refuse an offer that is within the FRAND range on the grounds that it prefers a lower royalty and still avoid an injunction. An implementer that refuses a FRAND royalty as part of a strategy of continuing negotiation still has rejected a FRAND offer.

What if the implementer agrees to FRAND terms but cannot pay the FRAND royalty? Should such an implementer be considered unwilling?²¹⁷ By making a FRAND commitment, an SEP holder agrees only to license its standard-essential technology under FRAND terms. An SEP holder assumes no obligation under the FRAND commitment to an implementer that cannot pay the FRAND royalty. (And the SEP holder certainly bears no duty under any other body of law to subsidize impecunious implementers.) To maintain an SEP holder's incentive to contribute its future technologies to standards, a court must ensure that only an implementer willing and able to pay a FRAND royalty may use the SEPs. An SEP holder therefore should be able to enjoin an implementer unwilling or unable to pay a FRAND royalty.

VI. WHEN WOULD THE SEP HOLDER FACE ANTITRUST LIABILITY?

Antitrust authorities across the globe have initiated investigations into SEP holders that seek injunctions against infringers of SEPs, suggesting that such a request is anticompetitive.²¹⁸ However, an SEP holder's request for an injunction can be anticompetitive only in rare circumstances. Properly construed, antitrust law does not suspend or extinguish an SEP holder's right to request an injunction against infringers, and a request for an injunction should not automatically trigger antitrust scrutiny under U.S. antitrust law or EU competition law.

²¹⁷ DOJ-USPTO POLICY STATEMENT ON SEPs, *supra* note 162, at 7 ("An exclusion order may still be an appropriate remedy . . . [f]or example, if a putative licensee refuses to pay what has been determined to be a F/RAND royalty.")

²¹⁸ See, e.g., Press Release, European Commission, Antitrust: Commission Finds that Motorola Mobility Infringed EU Competition Rules by Misusing Standard Essential Patents (Apr. 29, 2014), http://europa.eu/rapid/press-release_IP-14-489_en.html (reporting that the European Commission found that Motorola's use of an injunction against an infringer of its SEPs constituted an abuse of a dominant position); Takanori Abe, *Japan: IP High Court Rules in Apple v. Samsung FRAND Case*, MANAGING INTELLECTUAL PROPERTY (Sept. 1, 2014), <http://www.managingip.com/Article/3375734/Latest-News-Magazine/Japan-IP-High-Court-rules-in-Apple-v-Samsung-FRAND-case.html> (reporting the decision of the Grand Panel of the IP High Court holding that seeking an injunction based on a FRAND-committed patent is an abuse of a right unless exceptional circumstances are met).

A. Section 2 of the Sherman Act

Section 2 of the Sherman Act prohibits acts that “monopolize, or attempt to monopolize, or combine or conspire with any other person or persons, to monopolize any part of the trade or commerce.”²¹⁹ For a monopolization claim to succeed, the plaintiff must prove that the defendant maintained or obtained market power through anticompetitive acts.²²⁰ For an attempted monopolization claim to succeed, the plaintiff must prove the defendant’s “dangerous probability of success” in monopolizing a market.²²¹

In 1995, the Antitrust Division and the FTC jointly issued the Antitrust Guidelines for the Licensing of Intellectual Property.²²² The agencies recognize that “[i]ntellectual property law bestows on the owners of intellectual property certain rights to exclude others,”²²³ and that a patent owner’s “rights to exclude are similar to the rights enjoyed by owners of other forms of private property.”²²⁴ The exercise of intellectual property rights is “neither particularly free from scrutiny under the antitrust laws, nor particularly suspect under them.”²²⁵

An implementer challenging on antitrust grounds an SEP holder’s request for an injunction would first need to prove that the SEP holder has sufficient market power to trigger the application of section 2. The Supreme Court said in *Illinois Tool Works Inc. v. Independent Ink, Inc.* in 2006 that “a patent does not necessarily confer market power upon the patentee.”²²⁶ An SEP holder will have little or no market power if the standard faces strong competition from other standards or non-standardized products.²²⁷ Again, the SEP holder will have little market power if the standard in which its technology has been implemented has not been successful—for example, because market participants do not adhere to the standard. One therefore needs to evaluate evidence of an SEP holder’s market power on a case-by-case basis.

Courts also have yet to scrutinize whether an SEP holder’s act of seeking an injunction violates antitrust law. Deputy Assistant Attorney General Renata Hesse questioned, in a speech in February 2013, whether an SEP holder’s

²¹⁹ 15 U.S.C. § 2.

²²⁰ See *United States v. Grinnell Corp.*, 384 U.S. 563, 570–71 (1966).

²²¹ See *Spectrum Sports, Inc. v. McQuillan*, 506 U.S. 447, 453 (1993).

²²² U.S. DEP’T OF JUSTICE & FED. TRADE COMM’N, ANTITRUST GUIDELINES FOR THE LICENSING OF INTELLECTUAL PROPERTY (1995), available at <http://www.justice.gov/atr/public/guidelines/0558.html> [hereinafter ANTITRUST IP GUIDELINES].

²²³ *Id.* § 2.1.

²²⁴ *Id.*

²²⁵ *Id.*

²²⁶ 547 U.S. 28, 45 (2006).

²²⁷ See Deborah Platt Majoras, Chairman, Fed. Trade Comm’n, Recognizing the Procompetitive Potential of Royalty Discussions in Standard Setting, Remarks at Standardization and the Law: Developing the Golden Mean for Global Trade 3 (Sept. 23, 2005), available at <http://www.ftc.gov/speeches/majoras/050923stanford.pdf> (“[I]f the chosen standard has to compete with rival standards, the owner of the SSO’s chosen technology may end up with little market power.”).

attempt to seek an injunction violates section 2 of the Sherman Act.²²⁸ Judging from Hesse's speech, the Antitrust Division evidently believed that section 2 applies even when the SEP holder did not deceive other SSO members during the standardization process.²²⁹ She stated that "the division has also been focused on the role that Section 2 of the Sherman Act might play in protecting competition in high-technology industries from certain exclusionary practices involving patent licensing."²³⁰ Hesse did not specify when the Antitrust Division would consider an SEP holder's request for an injunction to violate antitrust law.

As of January 2015, the Antitrust Division had scrutinized an SEP holder's use of an injunction (or, more precisely, an exclusion order) only once—in the investigation initiated against Samsung Electronics.²³¹ The premise of the Division's investigation was a concern that the SEP holder would use the exclusion order to hold up implementers:

While there are certain circumstances where an exclusion order as a remedy for infringement of [standard-essential] patents could be appropriate, in many cases there is a risk that the patent holder could use the threat of an exclusion order to obtain licensing terms that are more onerous than would be justified by the value of the technology itself, effectively exploiting the market power obtained through the standards-setting process.²³²

The Antitrust Division decided to close the investigation against Samsung after it became clear that Samsung could not enforce an exclusion order against the infringer of its SEPs.²³³ Although the ITC initially granted Samsung an exclusion order regarding Apple's products infringing Samsung's SEPs,²³⁴ President Obama, acting through the U.S. Trade Representative, vetoed the ITC's decision on the grounds that the exclusion order would disserve the public interest.²³⁵ The Antitrust Division then said that "no further action [was] required"²³⁶ with respect to its investigation.

Although the Antitrust Division's investigation did not result in an antitrust remedy, the Division's statement upon terminating the investigation raised

²²⁸ Renata B. Hesse, Deputy Assistant Attorney Gen., Antitrust Div., U.S. Dep't of Justice, Speech at the Global Competition Review's 2d Annual Antitrust Law Leaders Forum (Feb. 8, 2013), available at <http://www.justice.gov/atr/public/speeches/292573.pdf>.

²²⁹ *Id.* at 19 (recommending that SSOs adopt policies to mitigate patent holdup by "limiting injunction actions for F/RAND-encumbered SEP infringement claims").

²³⁰ *Id.* at 15.

²³¹ Press Release, U.S. Dep't of Justice, Statement of the Department of Justice Antitrust Division on Its Decision to Close Its Investigation of Samsung's Use of Its Standards-Essential Patents (Feb. 7, 2014) [hereinafter *DOJ Closes Its Samsung Investigation*], available at http://www.justice.gov/atr/public/press_releases/2014/303547.pdf.

²³² *Id.* at 1.

²³³ *Id.*

²³⁴ Certain Electronic Devices, Including Wireless Communication Devices, Portable Music and Data Processing Devices, and Tablet Computers, USITC Inv. No. 337-TA-794 (July 5, 2013).

²³⁵ Letter from Michael B.G. Froman, Exec. Office of the President, to the Honorable Irving A. Williamson, Chairman, U.S. Int'l Trade Comm'n (Aug. 3, 2013).

²³⁶ *DOJ Closes Its Samsung Investigation*, *supra* note 231, at 1.

two significant concerns. First, having threatened Samsung with antitrust liability, the Antitrust Division, in its notice terminating the investigation, neglected to shed light on when the Antitrust Division *would* consider an SEP holder's request for an exclusion order to violate the Sherman Act. Second, the notice evidently rests on a simplistic and theoretical conjecture about patent holdup—a narrative for which the Division could never convey the burden of proof in actual litigation before a discerning judiciary.²³⁷

1. Does an SEP Holder's Request for an Exclusion Order Reduce Competition in a Manner That Reduces Consumer Welfare?

The Antitrust Division's notice terminating its investigation of Samsung fails to articulate a cognizable theory of harm under U.S. antitrust law. The Division does not say under which antitrust doctrine it would consider itself able to challenge Samsung's conduct. The scant analysis presented by the Antitrust Division suggests that Samsung's request for an exclusion order could be considered, at most, an act of unfair competition, which is actionable through section 5 of the FTC Act,²³⁸ which the Antitrust Division has no authority to enforce. Alternatively, one might view the Antitrust Division's investigation of Samsung as treating the theory of patent holdup as an incipency offense, akin to a potentially anticompetitive merger under section 7 of the Clayton Act.²³⁹ But that law is irrelevant in Samsung's case, given that no merger was involved.

In that situation, the only appropriate antitrust tool that the Antitrust Division might have had in its arsenal would have been section 2 of the Sherman Act. However, even if one accepts that the Antitrust Division intended to challenge Samsung's request for an exclusion order under section 2, it is improbable that liability could arise. The publicly available documents do not clarify whether the Antitrust Division intended to prosecute Samsung's request for an exclusion order as an act of monopolization or an act of attempted monopolization. The Antitrust Division also failed to clarify in which relevant market Samsung's request for an exclusion order would have allegedly had an anticompetitive effect—the “market” for SEPs, standard-compliant goods, or something else altogether. The Antitrust Division merely stated that the SEP holder could use the threat of an exclusion order to “exploit the market power obtained through the standards-setting process.”²⁴⁰ That is hardly compelling reasoning. Market power with respect to what and whom? Moreover, the exploitation of legitimately obtained market power does

²³⁷ *Ericsson Inc. v. D-Link Sys., Inc.*, No. 6:10-cv-00473, 2013 WL 4046225, at *18 (E.D. Tex. Aug. 6, 2013) (Davis, C.J.) (“The best word to describe Defendants’ royalty stacking argument is theoretical.”), *aff’d in part, rev’d in part, and vacated in part*, 773 F.3d 1201 (Fed. Cir. 2014).

²³⁸ 15 U.S.C. § 45.

²³⁹ *Id.* § 18.

²⁴⁰ *DOJ Closes Its Samsung Investigation*, *supra* note 231, at 1.

not constitute an antitrust offense.²⁴¹ Unless Samsung's request for an exclusion order enabled the company to obtain or maintain market power—or unless there was a reasonable probability that Samsung could achieve such an effect—it is implausible that the Antitrust Division could have successfully challenged Samsung's actions under section 2 of the Sherman Act.

Commissioner Joshua Wright of the FTC has observed that the “position that an SEP holder violates the antitrust laws simply by seeking an injunction . . . clearly departs from the symmetry principle as antitrust law does not generally prohibit the holder of any other property right from seeking an injunction to vindicate that right.”²⁴² The general assumption is that “property rights and their exercise . . . facilitat[e] economic exchange and growth.”²⁴³ Commissioner Wright has further noted that “there is no economic evidence available to support”²⁴⁴ that “seeking injunctive relief . . . is itself anticompetitive.”²⁴⁵ Rather, a mere request for an exclusion order, even if illegitimate, is unlikely to lead to an anticompetitive acquisition of market power for at least three reasons. First, an SEP holder's request for an exclusion order will not necessarily be granted. The ITC might, for example, reject an SEP holder's request if it finds that the patent is not valid or not infringed. Second, even if the request for an exclusion order were granted, the exclusion order would not necessarily be enforced. Samsung's case before the ITC shows that the SEP holder could not enforce the obtained exclusion order. Third, even when an exclusion order is granted and enforced, it does not necessarily allow the SEP holder to maintain or obtain market power. Therefore, it is far from evident that an SEP holder's request for an exclusion order could have an anticompetitive effect and support a finding of antitrust liability under section 2 of the Sherman Act. Judge Douglas Ginsburg and other antitrust experts have observed that imposing an antitrust sanction on an SEP holder that requested an injunction will often be unnecessary as a remedy to prevent consumer harm.²⁴⁶

2. *The Antitrust Division's Incorrect Assumptions*

The Antitrust Division's notice terminating the investigation of Samsung also deserves criticism for relying on false assumptions. First, the Antitrust Division

²⁴¹ See, e.g., *Verizon Commc'ns Inc. v. Law Offices of Curtis V. Trinko, LLP*, 540 U.S. 398, 407 (2004).

²⁴² Joshua D. Wright, Comm'r, Fed. Trade Comm'n, Remarks at the 2014 Milton Handler Lecture: Antitrust in the 21st Century, Does the FTC Have a New IP Agenda? 20–21 (Mar. 11, 2014), http://www.ftc.gov/system/files/documents/public_statements/288861/140311_ipagenda.pdf.

²⁴³ *Id.* at 19.

²⁴⁴ *Id.* at 18.

²⁴⁵ *Id.*

²⁴⁶ Douglas H. Ginsburg, Taylor M. Owings & Joshua D. Wright, *Enjoining Injunctions: The Case Against Antitrust Liability for Standard Essential Patent Holders Who Seek Injunctions*, ANTITRUST SOURCE (Oct. 2014).

assumed that the mere “threat” of an exclusion order (or an injunction) could allow an SEP holder to engage in patent holdup.²⁴⁷ That conjecture is wrong.²⁴⁸ To support a strategy of holdup, the patent holder’s threat of obtaining an exclusion order (or an injunction) must be credible. In reality, however, the issuance of an exclusion order (or an injunction) for a FRAND-committed patent is far from likely. U.S. courts and the ITC are reluctant to issue injunctions and exclusion orders to SEP holders. The Antitrust Division’s notice terminating its investigation of Samsung erroneously suggests that an SEP holder’s request for an exclusion order is so credible that it could sustain a strategy of patent holdup. That view is shrill and devoid of factual evidence.

Second, the Antitrust Division’s notice erroneously assumes that licensing terms negotiated under the threat of an injunction necessarily will not produce FRAND prices. The Antitrust Division disregards an implementer’s ability to seek a court determination of licensing terms if it believes that the offered terms are not FRAND and, in this way, effectively prevent the SEP holder from engaging in patent holdup.

Third, the Antitrust Division assumes that the risk of patent holdup is so strong that it requires departing from the established rules on exclusion orders (and perhaps also the established rules on injunctions). The Antitrust Division incorrectly treats the current legal rule, which gives the patent holder the right to request an exclusion order against products that infringe its patents, as the *exception*. The Antitrust Division incorrectly maintains that, in the context of SEPs, an exclusion order “could” be appropriate only in “certain circumstances.”²⁴⁹ Meanwhile, the Antitrust Division seems to assume that an SEP holder could systematically engage in opportunistic behavior when requesting exclusion orders. In other words, the Antitrust Division assumes that patent holdup is the norm. This assumption is unproven and, in my assessment, false. As I have explained elsewhere, empirical evidence does not support the patent-holdup conjecture.²⁵⁰ Therefore, the Antitrust Division cannot credibly cite the risk of patent holdup as a justification for departing from the ITC’s established rule for granting exclusion orders. Samsung’s experience itself shows that, without any intervention by the Antitrust Division, the current legal system provides sufficient safeguards against patent holdup,²⁵¹ and that it would be difficult for an SEP holder to use an exclusion order opportunistically. In short, no valid antitrust rationale exists for departing from the established law regarding the grant of ITC exclusion orders—or, by extension, injunctions.

²⁴⁷ *DOJ Closes Its Samsung Investigation*, *supra* note 231, at 1.

²⁴⁸ See Sidak, *The Meaning of FRAND, Part I: Royalties*, *supra* note 3, at 1007–08.

²⁴⁹ *DOJ Closes Its Samsung Investigation*, *supra* note 231, at 1.

²⁵⁰ See Sidak, *The Meaning of FRAND, Part I: Royalties*, *supra* note 3, at 1021.

²⁵¹ See Peter Camesasca, Gregor Langus, Damien Neven & Pat Treacy, *Injunctions for Standard-Essential Patents: Justice Is Not Blind*, 9 J. COMPETITION L. & ECON. 285 (2013).

B. Section 5 of the FTC Act

An SEP holder's request for an injunction could also be challenged under section 5 of the FTC Act.²⁵² Congress passed the FTC Act in 1914 to address unfair practices not contemplated within the then-existing antitrust laws.²⁵³ Section 5 gives the FTC the authority to prohibit "unfair methods of competition" and "unfair or deceptive acts or practices."²⁵⁴ Section 5 prohibits conduct that "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."²⁵⁵ The Supreme Court held in *FTC v. Sperry & Hutchinson Company* that section 5 applies to unfair acts "beyond simply those enshrined in the letter or encompassed in the spirit of the antitrust laws."²⁵⁶ The FTC can base a section 5 allegation on two grounds: (1) violations of antitrust laws, such as the Sherman Act, or (2) stand-alone unfair acts that the antitrust laws do not prohibit.

The FTC first asserted a stand-alone violation of section 5 with respect to actions contravening commitments to an SSO in *Negotiated Data Solutions, LLC (N-Data)*.²⁵⁷ The FTC brought a claim under both the "unfair acts and practices" and the "unfair method of competition" clauses of section 5 against N-Data for failing to honor a flat-fee royalty rate that its predecessor-in-interest had committed to offer to an SSO.²⁵⁸ The FTC concluded that N-Data violated section 5 when it charged a higher royalty rate, even though that action did not violate the Sherman Act.²⁵⁹ The FTC alleged that N-Data's behavior "undermines the [standard-setting] process [and] may also undermine competition in an entire industry, raise prices to consumers, and reduce choices."²⁶⁰ The case nonetheless concluded with a consent agreement, without any court determining whether the challenged conduct amounted to a stand-alone violation of section 5.²⁶¹ The FTC has since expressed interest in applying

²⁵² 15 U.S.C. § 45.

²⁵³ See, e.g., William E. Kovacic & Marc Winerman, *Competition Policy and the Application of Section 5 of the Federal Trade Commission Act*, 76 ANTITRUST L.J. 929, 930 (2010).

²⁵⁴ 15 U.S.C. § 45.

²⁵⁵ *Id.* § 45(n).

²⁵⁶ *FTC v. Sperry & Hutchinson Co.*, 405 U.S. 233, 244 (1972).

²⁵⁷ Complaint, *Negotiated Data Solutions, LLC*, No. 0510094 (F.T.C. Sept. 22, 2008), available at <http://www.ftc.gov/sites/default/files/documents/cases/2008/09/080923ndscomplaint.pdf>.

²⁵⁸ *Id.*

²⁵⁹ Statement of the Commission, *Negotiated Data Solutions, LLC*, No. 0510094 (F.T.C. Jan. 23, 2008), available at <http://www.ftc.gov/sites/default/files/documents/cases/2008/01/080122statement.pdf>.

²⁶⁰ *Id.* at 2.

²⁶¹ Agreement Containing Consent Order, *Negotiated Data Solutions, LLC*, No. 051-0094 (F.T.C. Jan. 23, 2008), available at <http://www.ftc.gov/sites/default/files/documents/cases/2008/01/080122agreement.pdf>. The FTC also sought to apply section 5 in *Rambus* and focused instead on its monopolization claims only when the case reached the D.C. Circuit on appeal. See *Rambus Inc. v. Fed. Trade Comm'n*, 522 F.3d 456, 462 (D.C. Cir. 2008) (expressing "serious concerns" about the FTC's evidence of alleged violations of section 5).

section 5 even more broadly, including using the statute to challenge an SEP holder's act of seeking an injunction against an infringer of a FRAND-committed SEP. In 2013, the FTC said that "[SEP] holders that seek injunctive relief . . . should understand that in appropriate cases the Commission can and will challenge this conduct as an unfair method of competition under section 5 of the FTC Act."²⁶²

The FTC has addressed an SEP holder's request for an injunction on two occasions. First, the FTC addressed the issue in reviewing the acquisition of SPX Service Solutions by Robert Bosch GmbH.²⁶³ The FTC alleged that, by requesting an injunction against a willing licensee, SPX (the SEP holder) engaged in unfair acts of competition in violation of section 5. The FTC reasoned that the threat of an injunction "has the potential to cause substantial harm to U.S. competition, consumers and innovation."²⁶⁴ The Decision and Order, through which the FTC approved the merger between the two companies, required Bosch to make a binding commitment to license SPX SEPs on FRAND terms.²⁶⁵ The order also prohibited Bosch from seeking an injunction for any alleged infringement of SPX SEPs.²⁶⁶ As explained earlier, the order allowed Bosch to seek an injunction only if (1) a court determines that the SEP is used for a different purpose than the one required to comply with the standard, (2) the implementer refuses in writing to accept the SEP holder's offer of a license on FRAND terms, or (3) the implementer refuses to license the SEPs on what has been determined to be a FRAND royalty.²⁶⁷

Second, the FTC scrutinized the SEP holder's request for an injunction under section 5 in *Motorola Mobility*. The FTC alleged that Motorola Mobility, following its acquisition by Google, committed "unfair methods of competition and unfair acts or practices" when it sought injunctions against allegedly willing licensees of its SEPs for smartphones and tablet computers.²⁶⁸ The FTC charged Motorola Mobility with violating section 5 for unfair practices that harmed competition in the market for electronic devices and were "likely to cause substantial injury to consumers."²⁶⁹ Motorola Mobility's conduct would allegedly reduce incentives for the development of standard-compliant products, potentially exclude important consumer products, and

²⁶² Statement of the Federal Trade Commission at 2, Robert Bosch GmbH, No. C-4377 (F.T.C. Apr. 24, 2013), available at <http://www.ftc.gov/sites/default/files/documents/cases/2012/11/121126boschcommissionstatement.pdf>.

²⁶³ *Id.* at 1.

²⁶⁴ *Id.* at 1–2 n.4.

²⁶⁵ Decision and Order § IV.D, Robert Bosch GmbH, No. C-4377 (F.T.C. Apr. 23, 2013).

²⁶⁶ *Id.* § IV.E.

²⁶⁷ *Id.*

²⁶⁸ Complaint at 1, Motorola Mobility, L.L.C., No. 121–0120 (F.T.C. Jan. 3, 2013).

²⁶⁹ Analysis of Proposed Consent Order to Aid Public Comment at 6, Motorola Mobility, L.L.C., No. 121–0120 (internal citations omitted) ("[C]onsumers will likely pay higher prices because many consumer electronics manufacturers will pass on some portion of unreasonable or discriminatory royalties they agree to pay to avoid an injunction or exclusion order.").

allow SEP holders to realize higher royalty payments—the cost of which the FTC believed licensees would pass on to consumers.²⁷⁰

It is telling that the FTC emphasized that section 5 may compensate for the fact that courts have found section 2 of the Sherman Act applicable only in cases of bad faith or deceptive behavior during the standardization process.²⁷¹ By pursuing actions under section 5, the FTC said that it “can reach opportunistic conduct that takes place *after* a standard is adopted that tends to harm consumers and undermine the standard-setting process.”²⁷² Despite announcing this new legal risk for SEP holders, the FTC neglected to say what constitutes “opportunistic conduct.” It said only that courts have traditionally viewed opportunistic conduct as “conduct devoid of countervailing benefits.”²⁷³

With this vacuous guidance, the FTC, as in *Bosch*, settled its *Motorola Mobility* investigation with a consent agreement requiring Motorola to cease and desist from seeking injunctions against an alleged infringer. The FTC’s consent agreement prohibits Motorola Mobility (and its owner, Google) from “directly or indirectly making any future claims for Covered Injunctive Relief based on alleged infringement” unless a potential licensee (1) refuses a FRAND offer either in writing or in sworn testimony, (2) refuses court-ordered or binding arbitration-determined FRAND terms, or (3) fails to communicate in writing its acceptance to an SEP holder.²⁷⁴ The consent agreement also says that “challenging the validity, value, [i]nfringement or [e]ssentiality of an alleged infringing [SEP]” should not be considered evidence of the implementer’s refusal of a FRAND offer.²⁷⁵

In dissent, Commissioner Maureen Ohlhausen refused to apply section 5 to a patent holder’s seeking of injunctive relief, a position she also expressed in *Bosch*.²⁷⁶ In both cases, Commissioner Ohlhausen criticized the FTC’s proposed action to prosecute SEP holders for seeking injunctions against

²⁷⁰ *Id.*

²⁷¹ *Id.* at 4. The Commission reasoned that “courts have found that patent holders may injure competition by breaching FRAND commitments they made to induce SSOs to standardize their patented technologies. Each of these cases, brought under Section 2 of the Sherman Act, involved allegations of bad faith or deceptive conduct by the patent holder before the standard was adopted.” *Id.* (citations omitted).

²⁷² *Id.* (emphasis added).

²⁷³ *Id.* at 5 (citing Negotiated Data Solutions L.L.C., File 051-0094, 2008 WL 258308, at *37 (F.T.C. Jan. 22, 2008)).

²⁷⁴ FTC Decision and Order in *Motorola Mobility*, *supra* note 174, § I.E.

²⁷⁵ *Id.*

²⁷⁶ Dissenting Statement of Commissioner Maureen K. Ohlhausen, *Motorola Mobility, L.L.C.*, No. 121-0120 (F.T.C. Jan. 3, 2013), available at http://www.ftc.gov/sites/default/files/documents/public_statements/statement-commissioner-maureen-ohlhausen/130103google-motorolaohlhausenstmt.pdf; see also Statement of Commissioner Maureen K. Ohlhausen, Robert Bosch GmbH, No. C-4377, 2012 WL 5944820 (F.T.C. Nov. 21, 2012), available at <http://www.ftc.gov/sites/default/files/documents/cases/2012/11/121126boschohlhausenstatement.pdf>.

willing licensees. In her view, the *Noerr-Pennington* doctrine (which rests on the petition clause of the First Amendment) “precludes Section 5 liability for conduct grounded in legitimate pursuit of an injunction or any threats incidental to it.”²⁷⁷

To the extent that it is constitutional and otherwise lawful and binding on third parties (none of which is self-evident), the FTC’s settlement orders in *Bosch* and *Motorola Mobility* restrict an SEP holder’s right to seek an injunction in an important way. Although, in theory, the consent agreement permits an SEP holder to seek an injunction, it fails to recognize that an implementer might act opportunistically during negotiations. In particular, the consent agreement neglects the possibility that an implementer might enter into a negotiation of FRAND terms without a genuine intention of reaching a FRAND agreement. The FTC enforcement action against an SEP holder that seeks an injunction for infringement of its SEPs also violates the SEP holder’s First Amendment right to seek redress of grievances through the courts.²⁷⁸ The Supreme Court’s *Noerr-Pennington* doctrine long ago established that a petitioner’s good-faith request for relief is immune from antitrust liability.²⁷⁹

The FTC’s threat also contradicts its own policy statement that a claim under section 5 requires *actual* substantial harm resulting from the unfair act, not merely speculative harm—something evinced in the consumer-protection rhetoric concerning section 5.²⁸⁰ One form of harm that the FTC repeatedly cites is an SEP holder’s ability to engage in holdup by seeking an injunction. However, patent holdup is a conjecture, not a proven fact—let alone a proven fact of a magnitude that establishes that the harm it causes to consumers is substantial. It is reckless for the FTC to encroach on an explicit and unconditional First Amendment right in the name of preventing an alleged harm, whose existence and severity are matters of considerable scholarly dispute.

Finally, the FTC’s approach conflicts with decisions of the ITC and consequently sends contradictory signals to SEP holders. The ITC has held that a FRAND-committed SEP holder is *not* precluded from seeking an ITC exclusion order.²⁸¹

²⁷⁷ Dissenting Statement of Commissioner Maureen K. Ohlhausen, *supra* note 276, at 1; *see also* *United Mine Workers of Am. v. Pennington*, 381 U.S. 657 (1965); *Eastern R.R. Presidents Conference v. Noerr Motor Freight*, 365 U.S. 127 (1961).

²⁷⁸ U.S. CONST. amend. I.

²⁷⁹ *Pennington*, 381 U.S. 657; *Noerr*, 365 U.S. 127; *see also* *Prof'l Real Estate Investors, Inc. v. Columbia Pictures Indus., Inc.*, 508 U.S. 49, 56 (1993); *City of Columbia v. Omni Outdoor Adver., Inc.*, 499 U.S. 365, 379–81 (1991).

²⁸⁰ *See* FTC Policy Statement on Unfairness, Appended to *Int'l Harvester Co.*, 104 F.T.C. 949, 1070 (1984).

²⁸¹ *See, e.g.*, Commission Opinion, *Certain Electronic Devices, Including Wireless Communications Devices, Portable Music and Data Processing Devices, and Tablet Computers*, USITC Inv. No. 337-TA-794 (July 5, 2013); *see also* Doris Johnson Hines & J. Preston Long, *The Continuing (R)evolution of Injunctive Relief in the District Courts and the*

In short, the FTC's settlement agreements constitute "soft law" that demonstrates the FTC's intention to initiate further stand-alone section 5 proceedings to prevent an SEP holder from seeking an injunction for infringement of its SEPs. However, because the FTC settled its claims against Bosch and Google, its consent agreements serve neither as an admission of liability by the parties nor as legal authority that section 5 applies to an SEP holder seeking an injunction. It is also evident that, if and when the FTC's enforcement efforts do generate an appealable order, the agency will face considerable skepticism in the Court of Appeals that an SEP holder's mere request for an injunction constitutes a stand-alone violation of section 5 of the FTC Act.

C. Abuse of Dominance Under Article 102 TFEU

The European Commission has also prosecuted an SEP holder's request for an injunction under Article 102 TFEU, which prohibits an undertaking from abusing its dominant position.²⁸² However, as I explain below, an SEP holder's request for an injunction should not be considered abusive without due evaluation.

1. *The European Commission's Position*

As of January 2015, the European Commission had reasoned in two investigations that an SEP holder's request for an injunction for the infringement of a FRAND-committed patent could constitute an abuse of a dominant position in violation of Article 102 TFEU.²⁸³ The Commission first expressed its position in January 2012, during its investigation of Samsung, the holder of SEPs included in the 3G UMTS standard. Samsung requested an injunction against Apple from courts in various EU Member States.²⁸⁴ The Commission ruled that the

seeking of an injunction based on SEPs may constitute an abuse of a dominant position if a SEP holder has given a commitment to license its SEPs on [FRAND] terms and where the company against which an injunction is sought is willing to enter into a licence agreement on FRAND terms.²⁸⁵

International Trade Commission, IP LITIGATOR (2013), <http://www.finnegan.com/resources/articles/articlesdetail.aspx?news=3aad1da2-08a9-4f14-a147-611b1e39ff75>.

²⁸² See, e.g., Urška Petrovčič, *Patent Hold-up and the Limits of Competition Law: A Trans-Atlantic Perspective*, 50 COMMON MKT. L. REV. 1363, 1373–74 (2013).

²⁸³ European Commission Opens Proceedings Against Samsung, *supra* note 18; Press Release, European Commission, Antitrust: Commission Sends Statement of Objections to Motorola Mobility on Potential Misuse of Mobile Phone Standard-Essential Patents (May 6, 2013), http://europa.eu/rapid/press-release_IP-13-406_en.pdf [hereinafter European Commission Sends Statement of Objections to Motorola Mobility]; see also EUROPEAN COMMISSION, STANDARD-ESSENTIAL PATENTS, COMPETITION POLICY BRIEF 8 (June 2014) [hereinafter EC POLICY BRIEF ON SEPs] (summarizing the European Commission's concerns with SEPs).

²⁸⁴ European Commission Opens Proceedings Against Samsung, *supra* note 18.

²⁸⁵ Press Release, European Commission, Antitrust: Commission Consults on Commitments Offered by Samsung Electronics Regarding Use of Standard Essential Patents 1 (Oct. 17, 2013),

In October 2013, Samsung offered the Commission commitments to address its concerns, including the commitment that Samsung will “abstain from seeking injunctions for mobile SEPs for a period of five years against any company that agrees to a particular licensing framework.”²⁸⁶ Samsung further agreed that, if a disagreement arises over FRAND terms, the matter would be submitted to an arbitrator or a court to determine the FRAND terms.²⁸⁷ In April 2014, the Commission accepted Samsung’s commitments, made them binding, and ended its investigation.²⁸⁸ However, the commitment decision itself did not say whether or not Samsung’s request for an injunction was an abuse of a dominant position.

In April 2012, the Commission initiated a similar investigation into Motorola Mobility’s request for an injunction against Apple. Motorola Mobility sought to enjoin Apple’s product that allegedly infringed certain Motorola Mobility SEPs implemented in the GPRS standard.²⁸⁹ The Commission said that, although seeking an injunction is a legitimate remedy for patent infringement, it could be an abuse of dominance “where SEPs are concerned and the potential licensee is willing to enter into a license on [FRAND] terms.”²⁹⁰ The Commission said that an SEP holder should not use the threat of an injunction to distort licensing negotiations and impose licensing conditions that the licensee would otherwise not accept.²⁹¹

In April 2014, the Commission adopted an infringement decision that found Motorola Mobility’s behavior to be anticompetitive.²⁹² The Commission found that Apple made several license offers to Motorola Mobility during the injunction proceedings that Motorola Mobility had initiated before several German courts.²⁹³ One of Apple’s offers provided that Motorola Mobility could “set the royalties according to its equitable discretion and according to the ‘FRAND standard in the industry.’”²⁹⁴ The offer

http://europa.eu/rapid/press-release_IP-13-971_en.pdf [hereinafter European Commission Consults on Samsung’s Commitments].

²⁸⁶ *Id.*; see also Samsung Elecs. Enforcement of UMTS Standard Essential Patents, Commitments Offered to the European Commission, Case COMP/C-3/39.939, at 1–3, 7 (Sept. 23, 2013) [hereinafter Samsung Commitments], available at http://ec.europa.eu/competition/antitrust/cases/dec_docs/39939/39939_1301_5.pdf.

²⁸⁷ *Id.* § A.1.b.

²⁸⁸ Press Release, European Commission, Antitrust: Commission Accepts Legally Binding Commitments by Samsung Electronics on Standard Essential Patent Injunction (Apr. 29, 2014), http://europa.eu/rapid/press-release_IP-14-490_en.htm.

²⁸⁹ European Commission Sends Statement of Objections to Motorola Mobility, *supra* note 283.

²⁹⁰ *Id.* at 1.

²⁹¹ *Id.* at 2.

²⁹² Press Release, European Commission, Antitrust: Commission Finds that Motorola Mobility Infringed EU Competition Rules by Misusing Standard Essential Patents (Apr. 29, 2014), http://europa.eu/rapid/press-release_IP-14-489_en.htm.

²⁹³ European Commission, Commission Decision, Case 39985 ¶¶ 123–45 (Apr. 29, 2014) [hereinafter *Motorola Mobility Infringement Decision*].

²⁹⁴ *Id.* ¶ 303.

permitted “a full judicial review of the amount of FRAND royalties, where both [parties] could submit their own evaluation.”²⁹⁵ Apple’s offer covered all products that allegedly infringed Motorola Mobility’s SEPs, under the condition that these SEPs were actually infringed and not covered by other license agreements (such as a licensing agreement that Apple had signed with Qualcomm, which manufactures chipsets for mobile devices).²⁹⁶ In the Commission’s view, by making that offer, Apple showed that it “was not unwilling to enter into a license agreement on FRAND terms and conditions.”²⁹⁷ Motorola Mobility did not accept Apple’s licensing terms and continued the infringement proceedings against Apple. The Commission said that Motorola Mobility’s decision to continue to seek an injunction, although it did not actually exclude Apple’s products from the market, “was capable of having . . . anti-competitive effects.”²⁹⁸ In the Commission’s view, such effects included (1) a temporary ban on the online sales of Apple’s products in Germany, (2) the inclusion of “licensing terms disadvantageous to Apple”²⁹⁹ in the license agreement—in particular, “Motorola’s entitlement to terminate the license if Apple challenges the validity of the SEPs covered by the settlement agreement,”³⁰⁰ and (3) a negative effect on standard-setting.³⁰¹ The Commission concluded that, by seeking and enforcing an injunction against Apple,³⁰² Motorola Mobility abused its dominant position in violation of Article 102. The infringement decision adopted pursuant to the Motorola Mobility investigation was the first decision in which an SEP holder’s request for an injunction has been ruled to be anticompetitive.

2. Does Article 102 TFEU Support Banning Injunctions for FRAND-Committed Patents?

Commentators have criticized the European Commission’s response to SEP holders that have requested injunctions against infringers. Like Commissioner Ohlhausen in her analysis of the *Noerr-Pennington* doctrine under American law, Judge Vesterdorf emphasizes that the “right to access to a court is a fundamental right enshrined in Article 6(1) of the European Convention of Human Rights and in Article 47 of the Charter of Fundamental Rights of the European Union,” and he says that “it is only for the national court in question to decide whether the case brought shall be admitted or dismissed.”³⁰³

²⁹⁵ *Id.*

²⁹⁶ *Id.* ¶ 305. Apple argued that Motorola Mobility’s patent rights with respect to the iPhone 4S were exhausted because the iPhone 4S was already licensed under an agreement between Motorola Mobility and Qualcomm. *Id.* ¶ 136.

²⁹⁷ *Id.* ¶ 307.

²⁹⁸ *Id.* ¶ 311.

²⁹⁹ *Id.*

³⁰⁰ *Id.* ¶ 322.

³⁰¹ *Id.* ¶ 311.

³⁰² *Id.*

³⁰³ Vesterdorf, *supra* note 109, at 1.

Vesterdorf reasons that “it follows from this fundamental civil right that a person who has brought a case before a national court should not be prosecuted or punished for doing so” by a competition authority.³⁰⁴

Even if one accepts that an SEP holder could face antitrust liability for seeking an injunction, the doctrines developed to date do not support the presumption that a request for an injunction against an infringer of SEPs is anticompetitive. To prove that the SEP holder’s request for an injunction constitutes an abuse of a dominant position, the Commission would need to prove the two elements of an Article 102 violation—in this case, that (1) the SEP holder holds a dominant position in the relevant market and (2) the SEP holder has abused that position.³⁰⁵ An SEP holder’s request for an injunction would not necessarily satisfy both elements.

First, an SEP holder would not necessarily hold a dominant position. Advocate General Wathelet emphasizes in his opinion in *Huawei v. ZTE* that “the fact that an undertaking owns an SEP does not necessarily mean that it holds a dominant position with the meaning of Article 102 TFEU.”³⁰⁶ He says that it is for the court to determine the existence of a dominant position on a case-by-case basis.³⁰⁷ In the Guidelines on the Applicability of Article 101 TFEU to Horizontal Cooperation Agreements, the Commission similarly observed that, “even if the establishment of a standard can create or increase the market power of IPR holders . . . , *there is no presumption that holding or exercising IPR essential to a standard equates to the possession . . . of market power.*”³⁰⁸

However, Wathelet then inexplicably urges the CJEU to adopt a “rebuttable presumption [of] . . . a dominant position” for an SEP holder.³⁰⁹ That suggestion contradicts Wathelet’s statement that “it is only natural that” a holder of an *inessential* patent will have more bargaining power than an SEP holder, because an SEP holder has given a commitment to license on FRAND

³⁰⁴ *Id.*

³⁰⁵ Article 102 TFEU does not define the concept of abuse. It merely provides a nonexclusive list of examples of possible abuses:

- (a) directly or indirectly imposing unfair purchase or selling prices or other unfair trading conditions; (b) limiting production, markets or technical development to the prejudice of consumers; (c) applying dissimilar conditions to equivalent transactions with other trading parties, thereby placing them at a competitive disadvantage; (d) making the conclusion of contracts subject to acceptance by the other parties of supplementary obligations which, by their nature or according to commercial usage, have no connection with the subject of such contracts.

TFEU, *supra* note 27, art. 102.

³⁰⁶ *See, e.g.*, Opinion of Advocate General in *Huawei v. ZTE*, *supra* note 182, ¶ 57.

³⁰⁷ *Id.*

³⁰⁸ Commission Guidelines on the Applicability of Article 101 of the Treaty on the Functioning of the European Union to Horizontal Co-operation Agreements, 2011 O.J. (C 11) 1, ¶ 269 (emphasis added).

³⁰⁹ *Id.* ¶ 58.

terms.³¹⁰ In fact, when an SEP holder is bound by a FRAND commitment, the implementer can ask the court to determine FRAND licensing terms if the implementer asserts that the SEP holder's offer is not FRAND. An implementer's ability to seek the court's determination effectively precludes the SEP holder from freely setting licensing terms and thus also precludes the SEP holder from exercising market power. Consequently, an SEP holder may have less market power than a holder of an inessential (implementation) patent. Therefore, there is no valid justification to introduce a rebuttable presumption that an SEP holder possesses market power.

Second, even if the Commission finds that an SEP holder holds a dominant position, the Commission should not automatically characterize the SEP holder's request for an injunction as abusive. Parties regularly request that courts resolve their disputes in a final and binding manner. In *ITT Promedia v. Commission*, the CJEU ruled that access to courts is a "fundamental right and a general principle" guaranteeing the rule of law,³¹¹ and that it is "only in wholly exceptional circumstances that [a] . . . legal proceeding," such as a request for an injunction, "is capable of constituting an abuse of an [sic] dominant position."³¹² Wathélet suggests that the CJEU adopt a similar approach in the context of SEPs, although he does not explicitly cite *ITT Promedia*. Wathélet emphasizes that an SEP holder's mere request for an injunction "cannot in itself constitute an abuse of a dominant position."³¹³ He reiterates that the right to obtain an injunction "represents the essential means of asserting intellectual property" and that "any restriction of [that] right . . . necessarily constitutes a significant limitation" and can "be permitted only in exceptional and clearly defined circumstances."³¹⁴ Wathélet states that any limitation on an SEP holder's right to an injunction must comport with the principle of proportionality and should be possible only when "the limitation [is] necessary" and "meets objectives of general interest" that the European Union has recognized.³¹⁵ Put differently, even a dominant SEP holder has the right to request an injunction against an infringer, and only truly exceptional circumstances can justify limiting that right.

In *ITT Promedia v. Commission*, the European Commission said that initiating legal action can be anticompetitive only if two conditions are met. First, the legal action must be "manifestly unfounded," such that it "cannot reasonably be considered to be an attempt to enforce the rights" of the company in question and serves only to "harass" the other party.³¹⁶ Second, the legal action must be part of a plan designed to "eliminate competition."³¹⁷ However, an

³¹⁰ *Id.* ¶ 48.

³¹¹ Case T-111/96, *ITT Promedia NV v. Comm'n*, 1998 E.C.R. II-2937, at 60.

³¹² *Id.*

³¹³ Opinion of Advocate General in *Huawei v. ZTE*, *supra* note 182, ¶ 61.

³¹⁴ *Id.* ¶¶ 61–62.

³¹⁵ *Id.* ¶ 66.

³¹⁶ Case T-111/96, *ITT Promedia NV v. Comm'n*, 1998 E.C.R. II-2937, 55–56.

³¹⁷ *Id.*

SEP holder's request for an injunction does not plausibly satisfy either element of the *Promedia* test.

First, there is no reason to presume that the SEP holder's request for an injunction is "manifestly unfounded." An SEP holder's request for an injunction is justified if an implementer has not responded to the SEP holder's FRAND offer, has rejected that offer, or refuses to negotiate licensing terms. Wathelet says that an SEP holder should be able to request an injunction against an implementer that, although ostensibly negotiating licensing terms, does so in a manner that is "purely tactical and/or dilatory and/or not serious."³¹⁸ The European Commission itself confirmed this principle in 2012 in *Google/Motorola Mobility* when it said that an SEP holder's request for an injunction might be legitimate when applied "against a potential licensee which is not willing to negotiate in good faith on FRAND terms."³¹⁹

Second, there is no reason to presume that the SEP holder's request for an injunction is part of a plan designed to "eliminate competition." An SEP holder supplies technology inputs to downstream firms. It benefits from selling to a competitive market and has no incentive to reduce the number of buyers to which it sells. Even if the SEP holder is vertically integrated into the manufacture of the downstream product practicing the standard, the SEP holder has agreed to be bound by the nondiscrimination component of the FRAND commitment with respect to supplying its downstream competitors. (And, in any event, vertical foreclosure by the SEP holder is not the theory of competitive harm that implementers typically assert when they complain about FRAND royalties.) In short, an SEP holder's request for an injunction need not—and most plausibly *would not*—have any exclusionary effect in the downstream market. Although an injunction can, in theory, allow the SEP holder to exclude the licensee's product from the market, at least for a limited period of time, courts typically *refuse* to enjoin infringement of FRAND-committed patents.³²⁰ As of January 2015, European courts had issued few injunctions for the infringement of SEPs, and even fewer had been legally enforced. If a requested injunction is not issued or enforced, then an SEP holder's conduct cannot plausibly have an exclusionary effect on the market. The FRAND injunction is the Yeti of antitrust law.

The European Commission also can initiate legal action on the theory that an SEP holder's request for an injunction has an exploitative effect. The Commission has said that the mere threat of seeking an injunction may allow the SEP holder to extract licensing conditions that the implementer otherwise would not accept³²¹—such as high royalties, an agreement not to challenge the SEP's validity, or an agreement to cross license its implementation patents to the SEP holder. In *Motorola Mobility*, for example, the Commission was

³¹⁸ Opinion of Advocate General in *Huawei v. ZTE*, *supra* note 182, ¶ 88.

³¹⁹ *Google/Motorola Mobility*, Case No. COMP/M.6381, *supra* note 39, ¶ 126.

³²⁰ See Camesasca, Langus, Neven & Treacy, *supra* note 251, at 293–98.

³²¹ European Commission Sends Statement of Objections to Motorola Mobility, *supra* note 283, at 2.

particularly concerned with Motorola Mobility's insistence on including a termination clause in a license agreement, whereby Motorola Mobility could terminate the license if Apple challenged the validity of the SEPs included in the license agreement.³²² The Commission said that Apple had the choice to "either have its products excluded from the market or accept the disadvantageous licensing terms requested by Motorola."³²³ The Commission disregarded that a termination clause is typical in portfolio licenses. The royalties determined in a license agreement account for the possibility that not all patents in the licensed portfolio would turn out to be valid and infringed if challenged.³²⁴ Put differently, the parties to a portfolio license agreement typically discount the royalty payment by considering that some of the patents may actually be invalid or not infringed. If the parties knew that all patents included in the licensed portfolio are valid and infringed, the agreed royalty would be higher. Therefore, the Commission was correct in stating that, if Motorola Mobility's SEPs were found to be invalid or not infringed, Apple could have negotiated a lower royalty. But the Commission ignored the second of the two symmetric counterfactuals: If Motorola Mobility's patents were found to be valid and infringed, then its compensation should be adjusted *upward*. Furthermore, a finding that Motorola Mobility's SEPs are valid and infringed would increase the royalty not only for Apple, but also for other licensees. The Commission also disregarded that consumers and producers benefit from settlement agreements that end legal disputes between companies and allow them to redirect their focus on producing goods and services, rather than on litigation. In short, it is unjustifiable to presume that the inclusion of a termination clause in a FRAND license agreement harms consumer welfare and is anticompetitive.

More generally, it is unjustifiable to presume that an SEP holder's request for an injunction for infringement of an SEP is an abuse of dominance under Article 102 TFEU. To the contrary, an SEP holder that has made a FRAND offer should be able to request and enforce an injunction, without fear that its resort to a court to protect its patents might be condemned as an abuse of a dominant position.³²⁵

3. *The Proper Conditions on the Availability of the Competition Law Defense to an Injunction for Infringement of SEPs*

Manufacturers of standard-compliant goods have, at times, brought a "competition law defense" when facing a patent-infringement suit by an SEP holder. Those manufacturers have argued that an SEP holder's request for an

³²² *Motorola Mobility Infringement Decision*, *supra* note 293, ¶ 322.

³²³ *Id.* ¶ 320.

³²⁴ *See, e.g.*, Mark A. Lemley & Carl Shapiro, *Probabilistic Patents*, 19 J. ECON. PERSP. 75, 82 (2005).

³²⁵ Vesterdorf, *supra* note 109, at 6.

injunction constituted anticompetitive conduct and, therefore, should not be granted by courts. The competition law defense has arisen mainly in Germany, where courts almost automatically grant an injunction after a finding of patent infringement. Therefore, it is useful to review the approach of the German courts and to evaluate the extent to which the competition law defense restricts an SEP holder's right to seek an injunction.

In the *Orange Book Standard* case, the German Federal Supreme Court in 2009 ruled for the first time that an alleged infringer could raise a competition law defense against a patent holder's request for an injunction.³²⁶ The case established an important exception to the patent holder's general right to obtain an injunction. The German Federal Supreme Court said that an alleged infringer may invoke the defense if two conditions are met. First, the alleged infringer must have made an unconditional licensing offer that the patent holder may not reject without violating competition law. Second, the alleged infringer must act as if the patent holder had accepted that offer. In other words, the infringer must adhere to its contractual obligations (that is, the duty to pay for using the patent). The infringer need not directly pay the patent holder—the infringer may instead deposit the royalties into an escrow account and waive its right to withdrawal. Only when the alleged infringer has met those two conditions will a German court accept the competition law defense and reject the patent holder's request to enjoin the alleged infringer.³²⁷

In 2012, in *IPCom v. Deutsche Telekom & Vodafone*, the Regional Court in Düsseldorf evaluated how the competition law defense applies in cases involving the infringement of FRAND-committed patents.³²⁸ The court evaluated whether a FRAND commitment changes the requirements with which the infringer must comply when invoking the competition law defense. In particular, the court examined whether an *SEP holder* must make the licensing offer first. The court rejected this proposition and instead ruled that a FRAND commitment is simply a declaration of an obligation to conclude a contract that already exists under German competition law. Consequently, the court found that a FRAND commitment does not lessen an alleged infringer's duty to make a licensing offer. The court found that the *Orange Book* criteria apply when an alleged infringer pleads a competition law defense against the holder of a FRAND-committed patent.³²⁹

³²⁶ Bundesgerichtshof [BGH] [Federal Court of Justice] May 6, 2009, 180 ENTSCHIEDUNGEN DES BUNDESGERICHTSHOFES IN ZIVILSACHEN [BGHZ] 312, 2009 (Ger.), available at <http://www.ipeg.eu/blog/wp-content/uploads/EN-Translation-BGH-Orange-Book-Standard-eng.pdf>.

³²⁷ *Id.* § 2(b).

³²⁸ Landgericht Düsseldorf [LG Düsseldorf] [Civil Regional Court of First Instance] Apr. 24, 2012, *IPCom v. Deutsche Telekom & Vodafone*, Case Number 4b O 274/10 (Ger.), available at <http://openjur.de/u/454915.html> (in German).

³²⁹ Michael Fröhlich & Gertjan Kuipers, *FRAND and Injunctive Relief*, 25 AIPPI E-NEWS (July 2012), https://www.aippi.org/enews/2012/edition25/Michael_Frohlich.html.

In *Huawei v. ZTE* in 2013, a German court again addressed an SEP holder's ability to enjoin an alleged infringer.³³⁰ The Düsseldorf court acknowledged that there are conflicting views of when an implementer may invoke the competition law defense against the SEP holder's request for an injunction.³³¹ The main conflicting standards are *Orange Book*, applied by German courts, and the European Commission's informal approach under Article 102 TFEU, which places a lesser evidentiary burden on the implementer. The Düsseldorf court stayed the proceeding and referred the following questions to the CJEU:³³²

- (1) Does the proprietor of a standard-essential patent who informs a standardization body that he is willing to grant any third party a license on fair, reasonable and non-discriminatory terms abuse his dominant market position if he brings an action for an injunction against a patent infringer although the infringer has declared that he is willing to negotiate concerning such a license?

or

is an abuse of the dominant market position to be presumed only where the infringer has submitted to the proprietor of a standard-essential patent an acceptable, unconditional offer to conclude a licensing agreement which the patentee cannot refuse without unfairly impeding the infringer or breaching the prohibition of discrimination, and the infringer fulfils his contractual obligations for acts of use already performed in anticipation of the license to be granted?

- (2) If abuse of a dominant market position is already to be presumed as a consequence of the infringer's willingness to negotiate:

Does Article 102 TFEU lay down particular qualitative and/or time requirements in relation to the willingness to negotiate? In particular, can willingness to negotiate be presumed where the patent infringer has merely stated (orally) in a general way that he is prepared to enter into negotiations, or must the infringer already have entered into negotiations by, for example, submitting specific conditions upon which he is prepared to conclude a licensing agreement?

³³⁰ Vorabentscheidungsersuchen des Landgerichts Düsseldorf (Deutschland) eingereicht am 5 Apr. 2013, Huawei Techs. Co. Ltd gegen ZTE Corp., ZTE Deutschland GmbH, Rechtssache C-170/13, translated in Request for a Preliminary Ruling from the Landgericht Düsseldorf (Germany) lodged on Apr. 5, 2013, Huawei Techs. Co. v. ZTE Corp., Case C-170/13, available at <http://curia.europa.eu/juris/document/document.jsf?text=&docid=139489&pageIndex=0&doclang=EN&mode=lst&dir=&occ=first&part=1&cid=42242>.

³³¹ See Landgericht Düsseldorf Beschluss [LG Düsseldorf] [Civil Regional Court of First Instance] Mar. 21, 2013, Az.: 4b O 104/12, ¶ 52 (Ger.), available at http://www.justiz.nrw.de/nrwe/lgs/duesseldorf/lg_duesseldorf/j2013/4b_O_104_12_Beschluss_20130321.html. The original text in German reads: "Ob und unter welchen Voraussetzungen Rechte aus einem solchen [standardessentiellen] Patent hergeleitet werden können, insbesondere ob der Unterlassungsanspruch durchsetzbar ist, wird von maßgeblichen Stellen (Bundesgerichtshof, Europäische Kommission) nicht einheitlich beurteilt. Endgültige Klarheit kann nur eine Entscheidung des Gerichtshofs bringen." *Id.* [The questions of whether and under which conditions SEP rights could be asserted, and especially if an injunction would be enforceable, have not been treated consistently in previous decisions ([*Orange Book*] and the European Commission[’s Press Release]). Only a decision of the European Court of Justice can give a definitive clarification.]

³³² See Vorabentscheidungsersuchen des Landgerichts Düsseldorf (Deutschland) eingereicht am 5. Apr. 2013, Huawei Technologies Co. Ltd gegen ZTE Corp., ZTE Deutschland GmbH, Rechtssache C-170/13, *supra* note 330.

- (3) If the submission of an acceptable, unconditional offer to conclude a licensing agreement is a prerequisite for abuse of a dominant market position:

Does Article 102 TFEU lay down particular qualitative and/or time requirements in relation to that offer? Must the offer contain all the provisions which are normally included in licensing agreements in the field of technology in question? In particular, may the offer be made subject to the condition that the standard-essential patent is actually used and/or is shown to be valid?

- (4) If the fulfillment of the infringer's obligations arising from the license that is to be granted is a prerequisite for the abuse of a dominant market position:

Does Article 102 TFEU lay down particular requirements with regard to those acts of fulfillment? Is the infringer particularly required to render an account for past acts of use and/or to pay royalties? May an obligation to pay royalties be discharged, if necessary, by depositing a security?

- (5) Do the conditions under which the abuse of a dominant position by the proprietor of a standard-essential patent is to be presumed apply also to an action on the ground of other claims (for rendering of accounts, recall of products, damages) arising from a patent infringement?³³³

³³³ The original German text reads:

(1) Missbraucht der Inhaber eines standardessentiellen Patentbesitzes, der gegenüber einer Standardisierungsorganisation seine Bereitschaft erklärt hat, jedem Dritten eine Lizenz zu fairen, angemessenen und nicht-diskriminierenden Bedingungen zu erteilen, seine marktbeherrschende Stellung, wenn er gegenüber einem Patentverletzer einen Unterlassungsanspruch gerichtlich geltend macht, obwohl der Patentverletzer seine Bereitschaft zu Verhandlungen über eine solche Lizenz erklärt hat,

oder
ist ein Missbrauch der marktbeherrschenden Stellung erst dann anzunehmen, wenn der Patentverletzer dem Inhaber des standardessentiellen Patentbesitzes ein annahmefähiges unbedingtes Angebot auf Abschluss eines Lizenzvertrages unterbreitet hat, das der Patentinhaber nicht ablehnen darf, ohne den Patentverletzer unbillig zu behindern oder gegen das Diskriminierungsverbot zu verstoßen, und der Patentverletzer im Vorgriff auf die zu erteilende Lizenz für bereits begangene Benutzungshandlungen die ihn treffenden Vertragspflichten erfüllt?

(2) Sofern der Missbrauch einer marktbeherrschenden Stellung bereits infolge der Verhandlungsbereitschaft des Patentverletzers anzunehmen ist:

Stellt Art. 102 AEUV besondere qualitative und/oder zeitliche Anforderungen an die Verhandlungsbereitschaft? Kann eine solche insbesondere bereits dann angenommen werden, wenn der Patentverletzer lediglich in allgemeiner Art und Weise (mündlich) erklärt hat, bereit zu sein, in Verhandlungen einzutreten, oder muss der Patentverletzer bereits in Verhandlungen eingetreten sein, indem er beispielsweise konkrete Bedingungen nennt, zu denen er bereit ist, einen Lizenzvertrag abzuschließen?

(3) Sofern die Abgabe eines annahmefähigen unbedingten Angebots auf Abschluss eines Lizenzvertrages Voraussetzung für den Missbrauch einer marktbeherrschenden Stellung ist:

Stellt Art. 102 AEUV besondere qualitative und/oder zeitliche Anforderungen an dieses Angebot? Muss das Angebot sämtliche Regelungen enthalten, die üblicherweise in Lizenzverträgen auf dem in Rede stehenden Technikgebiet enthalten sind? Darf das Angebot insbesondere unter die Bedingung gestellt werden, dass das standardessentielle Patent tatsächlich benutzt wird und/oder sich als rechtsbeständig erweist?

(4) Sofern die Erfüllung von Pflichten aus der zu erteilenden Lizenz seitens des Patentverletzers Voraussetzung für den Missbrauch einer marktbeherrschenden Stellung ist:

Stellt Art. 102 AEUV besondere Anforderungen bezüglich dieser Erfüllungshandlungen? Ist der Patentverletzer namentlich gehalten, über vergangene Benutzungshandlungen

The wording of these five questions shows that the Düsseldorf court implicitly asked the CJEU to endorse the *Orange Book* approach in cases concerning SEPs.

As of January 2015, the CJEU had yet to answer the questions of the Düsseldorf court. Consequently, it remained unclear under which exact conditions an implementer may raise a competition law defense. In November 2014, Advocate General Wathelet opined on the case and suggested that *Orange Book* should not apply in *Huawei v. ZTE*.³³⁴ He emphasized that *Huawei v. ZTE* concerns a patent essential to the LTE standard, whereas in *Orange Book* the patent was included in a *de facto* standard (a standard not developed by an SSO), such that the patent holder consequently made no FRAND commitment.³³⁵ Wathelet said that, because of this factual difference, *Orange Book* should not apply.³³⁶ However, as explained above, neither did he endorse the European Commission's approach. Wathelet concluded that either approach would produce "over-protection or under-protection of the SEP-holder,"³³⁷ and he recommended that the CJEU adopt a "middle path" between the two solutions.³³⁸

Presumably, the CJEU will say in 2015 whether *Orange Book* comports with Article 102 TFEU when applied to SEPs. A rule closer to *Orange Book* than the European Commission's approach would be judicious. *Orange Book* has important implications for the economic incentives of the SEP holder and the implementer expeditiously to execute a FRAND licensing agreement. By extending *Orange Book* to FRAND cases, German courts have created an efficient negotiation framework within which the implementer cannot avoid an injunction simply by claiming that the offered license is not FRAND and thereby postpone paying a FRAND royalty.

VII. CONCLUSION

An SEP holder is entitled to request and enforce an injunction against an unlicensed implementer if the SEP holder has discharged its FRAND obligation by having offered to license its SEPs to the implementer on FRAND terms (or

Rechnung zu legen, und/oder Lizenzgebühren zu zahlen? Kann eine Pflicht zur Zahlung der Lizenzgebühren gegebenenfalls auch mittels Leistung einer Sicherheit erfüllt werden?

(5) Gelten die Bedingungen, unter denen ein Machtmissbrauch durch den Inhaber eines standardessentiellen Patents anzunehmen ist, auch für die klageweise Geltendmachung der sonstigen aus einer Patentverletzung herzuleitenden Ansprüche (auf Rechnungslegung, Rückruf, Schadenersatz)?

Id.

³³⁴ Opinion of Advocate General in *Huawei v. ZTE*, *supra* note 182, ¶ 48.

³³⁵ *Id.* ¶ 50.

³³⁶ *Id.* ¶ 48.

³³⁷ *Id.* ¶ 50.

³³⁸ *Id.* ¶ 52.

by having otherwise granted access to its SEPs). An infringer that rejects a FRAND offer is not immune from an injunction. This understanding of the law balances the implementer's need for access to standard-essential technology with the SEP holder's need to be fairly compensated for the use of its patented inventions contributed to the standard.

Determining whether the implementer is unwilling to reach a FRAND agreement begins by asking: Has the SEP holder made the implementer a licensing offer, and is it within the FRAND range? The failure to make any licensing offer, or the making of an offer that lies outside the FRAND range, indicates that the SEP holder is not willing to license its SEPs on FRAND terms. In that case, the SEP holder has not discharged its obligations under its FRAND commitment, and the court should deny the SEP holder's request for an injunction. When the court determines that the SEP holder has made a FRAND offer, the court should then ask: Has the implementer explicitly or implicitly rejected the offer? An implementer cannot refuse a FRAND offer and hope to avoid an injunction simply because it wants a better deal. (The implementer is free to keep making counteroffers, but not in the absence of a possible injunction.) After the SEP holder has made a FRAND offer, it has discharged its duties arising from the FRAND commitment, and any further negotiation of the licensing terms is at the sole discretion of the SEP holder. An SEP holder should be able to request and obtain an injunction against an implementer that refuses, or is unable, to pay a FRAND royalty, subject only to the condition (if American law applies) that the SEP holder satisfies the *eBay* factors. In sum, neither an SSO's rules, nor public law, nor first principles of economics give an implementer a safe haven if it infringes an SEP. An implementer cannot use the SEPs without a license, fail to negotiate the licensing terms in good faith, and yet expect to be immune from an injunction or an exclusion order.³³⁹

There is no intellectually rigorous basis for creating the legal presumption that an SEP holder's request for an injunction either breaches its FRAND commitment or violates antitrust law. A court's decision to enjoin an infringer of SEPs should depend on the facts of the case rather than presumptions erected upon conjectures about patent holdup, royalty stacking, harm to competition, or other predictions of woe that are empirically unsubstantiated if not also facially implausible. A categorical ban on injunctions for SEPs would indeed avoid the theoretical risk of patent holdup. However, if there were no threat of an injunction, an implementer's best strategy would be to infringe the SEPs and litigate FRAND terms, delaying the execution of a licensing agreement and burdening the courts in the meantime. An implementer would lose

³³⁹ See, e.g., USITC Inv. No. 337-TA-868 Initial Determination, *supra* note 108, at 125–26 (an implementer cannot “manufacture potentially infringing goods without license or consequence[,] . . . seek to invalidate the IPR in question, and yet [be] free from the risk of a remedy”).

nothing by litigating the FRAND licensing terms given that, if the implementer lost, a court would simply order the implementer to pay a FRAND royalty that the implementer would have found acceptable in the voluntary negotiation. Therefore, a categorical ban on injunctions for SEPs would delay the execution of FRAND licenses and diminish the incentives for an SEP holder to contribute future technologies to the standard.

The Antitrust Division's Devaluation of Standard-Essential Patents

J. GREGORY SIDAK*

The Institute of Electrical and Electronics Engineers (IEEE) is a standard-setting organization (SSO) whose standards incorporate technologies owned by many different holders of standard-essential patents (SEPs). The IEEE's patent policy specifies the conditions under which an SEP holder voluntarily commits to license its SEPs on fair, reasonable, and nondiscriminatory (FRAND) terms. In February 2015, the IEEE became the first SSO to regulate the calculation of FRAND royalties. The IEEE made that transformative change with the encouragement and blessing of the Antitrust Division of the U.S. Department of Justice. The amendments purport to mitigate the risk of patent holdup and royalty stacking—theoretically and empirically disputed conjectures, which postulate that SEP holders routinely extract supracompetitive royalties from the implementers of a standard. In fact, the amendments broaden the binding provisions of the IEEE's FRAND commitment, diminish the SEP holder's ability to enforce its patent rights, and unambiguously lower the royalties that the SEP holder may charge a licensee. In its business review letter, the Antitrust Division commended the bylaw amendments for addressing the risk of patent holdup and royalty stacking without any analysis of whether those harms actually occur in the implementation of the IEEE's standards (let alone occur so often as to raise a legitimate policy concern). At the same time, the Antitrust Division ignored the obvious, countervailing concern that the bylaw amendments facilitate collusion among implementers to suppress the royalties they pay for SEPs. The Antitrust Division exists not to orchestrate or cheerlead the coordinated action of buyers in a market to suppress prices. It exists to ensure that firms obey the antitrust laws. That duty required the Division to assess, with skepticism and scrupulous impartiality, the competitive implications of the coordinated action of a subset of members of the IEEE that would benefit from

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the SSO's adoption of bylaw amendments having the purpose and effect of suppressing the FRAND royalties that this subset of members would pay to license standard-essential patents. The Division failed to discharge that duty.

INTRODUCTION

The Institute of Electrical and Electronics Engineers (IEEE) is a standard-setting organization (SSO). Its 802.11 Wi-Fi standard, universally used in cellphones and other mobile devices, incorporates technologies owned by many different holders of standard-essential patents (SEPs). The IEEE's patent policy specifies the conditions under which an SEP holder voluntarily commits to license its SEPs on fair, reasonable, and nondiscriminatory (FRAND) terms. Before 2015, the IEEE (like other SSOs) took no position on how to calculate a FRAND royalty. In February 2015, the IEEE reversed its policy and became the first SSO to regulate the calculation of FRAND royalties.

The IEEE made that transformative change with the encouragement and subsequent blessing of the Antitrust Division of the U.S. Department of Justice, which several years earlier had begun urging SSOs to amend their bylaws to suppress the FRAND royalties that implementers pay to use SEPs. In a speech in October 2012 to another leading SSO for technologies used in mobile devices, the International Telecommunication Union (ITU), Deputy Assistant Attorney General Renata Hesse said that an SEP holder might "engag[e] in . . . patent hold-up, . . . obtaining an unjustifiably higher price for its invention than would have been possible before the standard was set."¹ She urged SSOs to adopt policies that she said would (1) identify SEPs that a patent holder has declined to commit to license on FRAND terms, (2) clarify the binding nature of the SSO's licensing commitments, (3) prohibit an SEP holder from demanding its licensee to cross-license implementation patents, (4) limit an SEP holder's right to seek an injunction against a potential licensee, (5) set guidelines for determining FRAND licensing terms, and (6) increase the certainty that pa-

1. Renata Hesse, Deputy Assistant Attorney Gen., U.S. Dep't of Justice, Six "Small" Proposals for SSOs Before Lunch: Remarks as Prepared for the ITU-T Patent Roundtable 5 (Oct. 10, 2012), *available at* <http://www.justice.gov/atr/public/speeches/287855.pdf>.

tents declared to be standard-essential are essential in fact.²

The Patent Committee of the IEEE's Standards Board embraced this advice. It appointed an *ad hoc* committee that drafted proposed amendments to the IEEE's bylaws that mirrored Ms. Hesse's recommendations.³ The stated purpose of the amendments was to reduce the risk of patent holdup and royalty stacking by "provid[ing] greater clarity on issues that have divided SEP owners and standards implementers in recent years."⁴ In substance, however, the amendments that the committee actually drafted, and thus the amendments that the IEEE ultimately ratified, transcended mere "clarification" of policy.⁵ The actual amendments broaden the binding provisions of the IEEE's FRAND commitment, diminish the SEP holder's ability to enforce its patent rights, and suppress the royalties that the SEP holder may charge a licensee.⁶ The amendments mandate, among other things, that a FRAND royalty exclude any value attributable to the standard, and they restrict an SEP holder's right to seek an injunction against an unlicensed implementer. Consequently, "clarity" and "clarification" are euphemisms for truncating the upper range of the distribution of bilaterally negotiated FRAND royalties for SEPs. Another term for this kind of clarification, accomplished through the coordinated action of buyers in a market, is price fixing.

Before ratifying these bylaw amendments, the IEEE sought, in Sep-

2. *Id.* at 9–10.

3. Letter from Michael A. Lindsay, Esq., Dorsey & Whitney, L.L.P., to Hon. William J. Baer, Assistant Attorney Gen., U.S. Dep't of Justice 13 (Sept. 30, 2014) [hereinafter IEEE Business Review Letter Request], available at <http://www.justice.gov/atr/public/busreview/request-letters/311483.pdf> (comments of Dina Kallay, Dir. for IP and Competition, Ericsson).

4. *Id.* at 15; *see id.* at 16–17 ("When a SEP owner can seek a Prohibitive Order [either an injunction from a court or an exclusion order from the U.S. International Trade Commission] without any limitation, the negotiation can become a negotiation over the cost to the implementer of being excluded from implementing the standard, rather than the value that the particular SEP contributes to the implementation.").

5. *See, e.g.*, IEEE-SA Standards Bd. Patent Comm., IEEE-SA Patent Policy: Draft Comments, Comment ID No. 37 (Mar. 4, 2014) [hereinafter IEEE-SA Patent Policy: Draft Comments, Second Round], available at http://grouper.ieee.org/groups/pp-dialog/drafts_comments/PatCom_sort_by_commentID_040314.pdf.

6. *See, e.g., id.*; Don Clark, *Patent Holders Fear Weaker Tech Role*, WALL ST. J. (Feb. 9, 2015, 1:26 PM), <http://www.wsj.com/articles/patent-holders-fear-weaker-tech-role-1423442219>; Ryan Davis, *Patent Owners Take Hit with Standard-Setting Body's Rules*, LAW360 (Feb. 9, 2015, 8:49 PM), http://www.law360.com/competition/articles/619687?utm_source=shared-articles&utm_medium=email&utm_campaign=shared-articles.

tember 2014, a business review letter from the Antitrust Division confirming that the amendments would “compl[y] with all applicable antitrust and competition laws.”⁷ The IEEE further sought assurance that the Division “would not bring action against IEEE under any antitrust theory.”⁸ Although the Division “is not authorized to give advisory opinions to private parties,”⁹ it is “willing in certain circumstances to review proposed business conduct and state its enforcement intentions.”¹⁰ A party requesting a business review letter has “an affirmative obligation to make full and true disclosure with respect to the business conduct for which review is requested.”¹¹ The IEEE’s Standards Board recommended that the IEEE’s Board of Governors approve the amendments contingent on obtaining a “favorable Business Review Letter.”¹² In its request to the Antitrust Division, the IEEE said that it was seeking a business review letter because some of the IEEE’s stakeholders had expressed antitrust concerns over the proposed amendments and other stakeholders had asked the IEEE to seek such a letter.¹³

In a letter to Ms. Hesse on January 28, 2015, I expressed concern that the IEEE’s proposed bylaw amendments posed a serious risk of violating section 1 of the Sherman Act¹⁴ by facilitating tacit or explicit collusion among implementers to suppress the royalties they pay for SEPs.¹⁵ I explained that the amendments would weaken patent rights, reduce incentives to invest in standard-essential technology, and thereby harm innovation and long-term consumer welfare.¹⁶ On Monday morning, February 2,

7. IEEE Business Review Letter Request, *supra* note 3, at 17.

8. *Id.* at 19.

9. 28 C.F.R. § 50.6.

10. *Id.*

11. *Id.* § 50.6(5).

12. IEEE Business Review Letter Request, *supra* note 3, at 14–15.

13. *Id.* at 17–18. Strictly speaking, “the issuance of such a letter is not to be represented to mean that the Division believes that there are no anticompetitive consequences warranting agency consideration.” 28 C.F.R. § 50.6(7)(a).

14. 15 U.S.C. § 1 (2012).

15. Letter from J. Gregory Sidak, Chairman, Criterion Economics, L.L.C., to Hon. Renata Hesse, Deputy Assistant Attorney Gen., U.S. Dep’t of Justice (Jan. 28, 2015) [hereinafter Sidak’s Letter to Hesse], *available at* <http://www.criterioneconomics.com/proposed-ieee-bylaw-amendments-affecting-stand-licensing-of-seps.html>.

16. *Id.* Two months earlier, the founder of Qualcomm had expressed similar concerns to the IEEE’s president. *See* Letter from Irwin M. Jacobs, Chairman & CEO, Qualcomm, to Dr. Roberto Boisson de Marca, President & CEO, IEEE (Nov. 19, 2014), *available at* <http://www.advancingengineering.org/irwin-jacobs>.

2015, a patent law blog posted a letter dated January 30, 2015 that executives from Apple, Cisco, Intel, Microsoft, and other companies reportedly sent to the IEEE's leadership, endorsing the proposed amendments.¹⁷ Although six professors—including Mark Lemley and two former chief economists of the Antitrust Division—also signed the letter,¹⁸ these scholars said nothing about how the proposed amendments, by effecting collective action among buyers, would facilitate their potential suppression of the prices they pay for technology inputs.

Later on February 2, 2015, the Antitrust Division released its business review letter, signed by Ms. Hesse, declining to challenge the IEEE's proposed amendments to its bylaws.¹⁹ Ms. Hesse said that the amendments had “the potential to benefit competition and consumers” and were likely to “facilitat[e] licensing negotiations, mitigat[e] [patent] hold up and royalty stacking, and promot[e] competition among technologies for inclusion in standards.”²⁰ Further, the Antitrust Division did not find the amendments likely to result in anticompetitive harm because, in Ms. Hesse's assessment, “licensing rates . . . are [still] determined through bilateral negotiations, the [amendments] are not out of step with the direction of current U.S. law interpreting [F]RAND commitments[,] . . . and patent holders

17. Letter from Ira Blumberg, Vice President of Intellectual Prop., Lenovo Grp. Ltd., et al. to Howard E. Michel, President & CEO, IEEE, and Bruce Kraemer, President, IEEE-SA & Dir., IEEE (Jan. 30, 2015), *available at* <http://comparativepatentremedies.blogspot.com/2015/02/letter-in-support-of-proposed-ieee-sa.html>. The companies signing the letter were Apple, Cisco Systems, Dell, Hewlett-Packard Española, Intel, Juniper Networks, Kingston Technology, Lenovo, Microsoft, Samsung, Sceptre, and Verizon. Professor Thomas Cotter posted the letter on his blog, Comparative Patent Remedies, at 10:50 AM, presumably central time, because he is at the University of Minnesota.

18. *Id.* (economists Richard Gilbert and Fiona Scott Morton, and lawyers Michael Carrier, Jorge Contreras, Mark Lemley, and Daryl Lim).

19. Business Review Letter from Hon. Renata B. Hesse, Acting Assistant Attorney Gen., U.S. Dep't of Justice, to Michael A. Lindsay, Esq., Dorsey & Whitney, L.L.P. (Feb. 2, 2015) [hereinafter 2015 IEEE Business Review Letter], *available at* http://www.justice.gov/sites/default/files/opa/press-releases/attachments/2015/02/02/ieee_business_review_letter.pdf. Bloomberg posted its story on the Antitrust Division's decision at 12:46 PM EST. *See* Susan Decker & Ian King, *Wi-Fi Inventors' Cut of iPhone 6 Sales to Shrink in Vote*, BLOOMBERG (Feb. 2, 2015, 12:46 PM), *available at* <http://www.bloomberg.com/news/articles/2015-02-02/wi-fi-inventors-cut-of-iphone-6-sales-to-shrink-in-patent-vote>. Ms. Hesse signed the business review letter in her capacity as Acting Assistant Attorney General because Assistant Attorney General William J. Baer had recused himself from the matter.

20. 2015 IEEE Business Review Letter, *supra* note 19, at 16.

can avoid” the amendments by refusing to submit a Letter of Assurance (LOA) or “can depart to other SSOs.”²¹ The Antitrust Division said that, even if the amendments did generate anticompetitive repercussions, the “potential procompetitive benefits” of the bylaw amendments would “likely outweigh those harms.”²² Six days after receiving Ms. Hesse’s positive business review letter, the IEEE’s Board of Directors ratified the bylaw amendments.²³

In the following pages, I refer to the “patent-holdup conjecture” and the “royalty-stacking conjecture” in the strict Popperian sense of an *a priori* hypothesis that must survive rigorous attempts at falsification (both theoretical and empirical) before it can be accepted as plausibly true (that is, before it can be regarded as having what Sir Karl Popper called verisimilitude or “truthlikeness”).²⁴ Strictly speaking, Popper believed that we never really confirm a conjecture; we only fail to refute it. But in the course of repeatedly failing to refute a conjecture, we become more confident that it is true. Popper called the information in which we have such confidence “objective knowledge.” The Supreme Court had this epistemological framework of conjecture and refutation in mind when, in *Daubert*, it cited Popper to describe the essence of admissible scientific evidence under the Federal Rules of Evidence.²⁵ I am not aware of any binding legal principle that requires an Executive Branch official who has sworn to faithfully execute a highly technical body of law to act solely on the basis of objective knowledge. Yet, as a prudential matter, it is hardly asking too much that the official inform her exercise of prosecutorial discretion with

21. *Id.* at 8.

22. *Id.* at 16. Lest anyone get the wrong impression, Ms. Hesse said in her letter that “the U.S. government does not dictate patent policy choices to private SSOs,” *id.* at 10, and that “it is not the [Antitrust Division’s] role to assess whether the IEEE’s policy choices are right for IEEE as a[n] [SSO],” *id.* at 1.

23. Press Release, IEEE, IEEE Statement Regarding Updating of Its Standards-Related Patent Policy (Feb. 8, 2015), http://www.ieee.org/about/news/2015/8_february_2015.html?WT.mc_id=std_8feb.

24. See KARL R. POPPER, CONJECTURES AND REFUTATIONS: THE GROWTH OF SCIENTIFIC KNOWLEDGE (1963); KARL R. POPPER, OBJECTIVE KNOWLEDGE: AN EVOLUTIONARY APPROACH (1972).

25. See *Daubert v. Merrill Dow Pharm., Inc.*, 509 U.S. 579, 593 (1993) (quoting KARL R. POPPER, CONJECTURES AND REFUTATIONS: THE GROWTH OF SCIENTIFIC KNOWLEDGE 37 (5th ed. 1989) (“The criterion of the scientific status of a theory is its falsifiability, or refutability, or testability.”) (emphasis omitted)); see also J. Gregory Sidak, *Court-Appointed Neutral Economic Experts*, 9 J. COMPETITION L. & ECON. 359, 384–86 (2013) (analyzing the epistemological foundation of *Daubert* and its progeny).

no less intellectual rigor than what, on any day of the week, a federal court demands of an expert witness in the same technical area of law. The Antitrust Division's decision to prosecute or not to prosecute collaborative price setting by buyers or sellers in a market is one example of where an understanding of the difference between fact and conjecture matters if a statute's purpose is to be advanced.

The patent-holdup and royalty-stacking conjectures have created a gulf too wide to bridge. On one side are SEP holders and the scholars who regard these conjectures as theoretically flawed and empirically unsubstantiated (if not by now refuted). On the other side are the Antitrust Division, the companies that make products practicing SEPs, and the scholars who believe that patent holdup and royalty stacking are real phenomena that occur often enough to justify changing the governance of SSOs to deter such phenomena. Technologically dynamic markets generate vast amounts of economic surplus. Much of that value becomes consumer surplus, which is why antitrust policy concerning dynamic competition is vastly more important than antitrust policy concerning static competition.²⁶ The tug-of-war over how to divide the remaining surplus pitches sophisticated sellers of technology (companies like Ericsson, Nokia, and Qualcomm) against equally sophisticated buyers of technology (companies like Apple, Cisco, and Intel). Anyone who witnessed similar battles combining law, economics, and technology—such as the mandatory unbundling of telecommunications networks, the Microsoft antitrust case, the network neutrality debate—understands that the opposing sides in the current debate over patent holdup and royalty stacking will never agree. Ms. Hesse told a public conference in Washington in March 2015: “Patent holders come in and say, ‘Holdup? What you are talking about it is not a problem—has never been a problem.’ That’s not true, and they should stop saying that.”²⁷

So the Antitrust Division has decreed that the patent-holdup conjecture is true, and the authorities will not be bothered with further evidence of the conjecture's falsification. This contempt for the process of acquiring ob-

26. See generally J. Gregory Sidak & David J. Teece, *Dynamic Competition in Antitrust Law*, 5 J. COMPETITION L. & ECON. 581 (2009).

27. Michael Macagnone, *SEP License Fees Are Getting Out Of Hand, Officials Say*, LAW360 (Mar. 16, 2015, 8:26 PM), <http://www.law360.com/articles/631607/sep-license-fees-are-getting-out-of-hand-officials-say> (quoting Deputy Assistant Attorney Gen. Renata Hesse).

jective knowledge deserves Churchill's retort: "[The] truth is incontrovertible. Panic may resent it, malice may attack it, ignorance may deride it, but there it is."²⁸ Ms. Hesse's message of intellectual expediency confirmed what her business review letter to the IEEE had earlier telegraphed: The Antitrust Division requires no proof that there exists a problem for which the IEEE bylaw amendments are the promised solution. Merely to posit a market failure suffices.

But Ms. Hesse did not merely assume the existence of benefits on one side of the scale. She also assumed the absence of costs on the other side. Though Ms. Hesse's letter ran sixteen single-spaced pages, the extent of her analysis of the danger of tacit or explicit collusion among buyers of standard-essential technology consisted of, at most, one sentence: "The Department has analyzed whether the Update's provisions . . . will harm competition by anticompetitively reducing royalties and thereby diminishing incentives to innovate."²⁹ Despite having discussed the patent-holdup and royalty-stacking conjectures at length, Ms. Hesse declined to identify the methods or principles that the Antitrust Division applied to the facts of the IEEE's bylaw amendments to reach the conclusion that the coordinated suppression of FRAND royalties was "unlikely."³⁰ To have concluded with such exiguity that the IEEE bylaw amendments presented no potential violation of antitrust law was facile to the point of silliness. If the IEEE's proposed bylaw amendments had the potential to generate only benefits to economic welfare, then why would the IEEE have thought it necessary to get the Antitrust Division to represent that it "would not bring action against IEEE under any antitrust theory"?³¹ Why would the IEEE's Standards Board have urged the IEEE's Board of Governors to make its approval of the bylaw amendments conditional on receipt of an accommodating business review letter? These questions were too obvious for the Antitrust Division to ignore. Remarkably for someone entrusted with enforcing the antitrust laws, Ms. Hesse never provides a sustained explanation of what costs might offset the claimed benefits from suppressing the royalties for SEPs.

In Part I of this article, I analyze the IEEE's bylaw amendments in detail. I explain the multiple ways in which they now impair an SEP holder's

28. 82 PARL. DEB., H.C. (5th ser.) (1916) 1578 (U.K.).

29. 2015 IEEE Business Review Letter, *supra* note 19, at 8.

30. *Id.*

31. IEEE Business Review Letter Request, *supra* note 3, at 19.

ability to enforce its patent rights. In Part II, I explain how the Antitrust Division, in its business review letter, exaggerated the benefits of the IEEE's bylaw amendments as a remedy for patent holdup and royalty stacking without first establishing, both theoretically and empirically, that patent holdup and royalty stacking occur in the implementation of the IEEE's standards—and that they occur with such frequency as to create a market failure justifying the coordinated actions of buyers within a market. In Part III, I examine the Antitrust Division's stunning failure to assess the collusive implications of the IEEE's bylaw amendments. The Antitrust Division averted its eyes from those obvious implications and in so doing abdicated its duty to faithfully execute the antitrust laws.

I. THE IEEE'S BYLAW AMENDMENTS

The amendments to section 6 of the IEEE Standard Board Bylaws (known as the IEEE's Patent Policy) do more than merely clarify the IEEE's policy. These amendments will fundamentally alter the negotiations between licensors and licensees regarding the interpretation and determination of a reasonable royalty for an implementer's use of a standard-essential technology. The amended bylaws prohibit the SEP holder from seeking an injunction, regulate the determination of reasonable rates for SEPs, and contradict industry norms regarding the licensing of standard-essential technology.

The amended bylaws define the new term "Prohibitive Order" as "an interim or permanent injunction, exclusion order, or similar adjudicative directive that limits or prevents making, having made, using, selling, offering to sell, or importing a Compliant Implementation."³² The significance of the definition of a Prohibitive Order becomes clear when one examines how the IEEE then defines another new term, "Reasonable Rate," as

appropriate compensation to the patent holder for the practice of an Essential Patent Claim excluding the value, if any, re-

32. IEEE-SA, Draft 39 IEEE Standards Board Bylaws § 6.1, at 1 (2014) [hereinafter IEEE Standards Board Bylaws], *available at* http://grouper.ieee.org/groups/pp-dialog/drafts_comments/SBBylaws_100614_redline_current.pdf; *see also* IEEE-SA, Draft IEEE-SA Patent Policy FAQs: Understanding Patent Issues During IEEE Standards Development, Draft 14 ¶ 47, at 13–14 (Dec. 3, 2014) [hereinafter Draft IEEE-SA Patent Policy FAQs], *available at* http://grouper.ieee.org/groups/pp-dialog/drafts_comments/Patent_Policy_FAQ_031214_redline.pdf.

sulting from the inclusion of that Essential Patent Claim's technology in the IEEE Standard. In addition, determination 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 licenses are otherwise sufficiently comparable to the circumstances of the contemplated license.³³

Before the IEEE adopts a patent holder's technology into a standard, the IEEE requires that the patent holder furnish an accepted Letter of Assurance (LOA). Under the IEEE's amended bylaws, the patent holder must also waive its right to seek an injunction against an infringer. The patent holder's licensing assurance contains either a general waiver of enforcement or

[a] statement that the Submitter will make available a license for Essential Patent Claims to an unrestricted number of Applicants on a worldwide basis without compensation or under Reasonable Rates, with other reasonable terms and conditions that are demonstrably free of any unfair discrimination to make, have made, use, sell, offer to sell, or import any Compliant Implementation that practices the Essential Patent Claims for use in conforming with the IEEE Standard. An Accepted LOA that contains such a statement signifies that *reasonable terms and conditions, including without compensation*

33. Draft 39 IEEE Standards Board Bylaws, *supra* note 32, § 6.1, at 2 (emphasis added).

*or under Reasonable Rates, are sufficient compensation for a license to use those Essential Patent Claims and precludes seeking, or seeking to enforce, a Prohibitive Order except as provided in this policy.*³⁴

In informal accompanying documents, the IEEE purports to describe the SEP holder's forced waiver of its right to an injunction as a voluntary act: "An Accepted Letter of Assurance defines the circumstances in which the Submitter has *voluntarily agreed not to seek or seek to enforce a Prohibitive Order*, even if otherwise permitted in a specific jurisdiction."³⁵ The IEEE deems a patent holder's request for an injunction an "explicit threat," and it considers even the mention of the availability of an injunction during negotiations an "implicit threat":

A patent holder's request that a court issue a Prohibitive Order against an implementer, who does not have a license, would be an example of an *explicit threat*. A patent holder's reminder to an implementer that a Prohibitive Order might be available if the implementer does not agree to the requested rate would be an example of an *implicit threat*.³⁶

The IEEE's amended bylaws permit an SEP holder to seek an injunction only after it has successfully litigated claims against the unlicensed implementer to conclusion in a court of appeals, which could take years.³⁷

34. *Id.* § 6.2, at 3 (emphasis added).

35. Draft IEEE-SA Patent Policy FAQs, *supra* note 32, ¶ 56, at 15 (emphasis added).

36. *Id.* ¶ 47, at 13–14 (emphasis added).

37. The IEEE amended its statement of policy to provide:

The Submitter of an Accepted LOA who has committed to make available a license for one or more Essential Patent Claims agrees that it shall *neither seek nor seek to enforce a Prohibitive Order* based on such Essential Patent Claim(s) in a jurisdiction *unless the implementer fails to participate in, or to comply with the outcome of, an adjudication, including an affirming first-level appellate review*, if sought by any party within applicable deadlines, in that jurisdiction by one or more courts that have the authority to: determine Reasonable Rates and other reasonable terms and conditions; adjudicate patent validity, enforceability, essentiality, and infringement; award monetary damages; and resolve any defenses and counterclaims.

Draft 39 IEEE Standards Board Bylaws, *supra* note 32, § 6.2, at 4 (emphasis added).

The IEEE directly connects the patent holder's forced waiver of the right to an injunction to the determination of "appropriate compensation" for SEPs—a phrase notable for embodying a different touchstone than a fair, reasonable, and nondiscriminatory royalty—because, in the calculation of such rates, "the policy recommends consideration of license agreements obtained *without explicit or implicit threat of a Prohibitive Order*."³⁸ In other words, analysis of comparable licenses for purposes of determining a FRAND royalty "should" consider only licenses for which the SEP holder had relinquished the right to seek and enforce an injunction against an unlicensed implementer.³⁹ Since no such licenses are likely to have existed before the IEEE's bylaw amendments in February 2015, the practical import of this provision is that, for several years after February 2015, no SEP holder can attempt to set a FRAND royalty on the basis of terms contained in comparable licenses.

The IEEE's amended bylaws also depart from real-world licensing practices by recommending that a reasonable rate for an SEP be derived from the value of the "smallest saleable Compliant Implementation that practices an Essential Patent Claim."⁴⁰ This concept seems to embody the Federal Circuit's concept of the smallest salable patent-practicing component (SSPPC).⁴¹ A "Compliant Implementation" comprises a "component, sub-assembly, or end-product" that incorporates technology essential to the IEEE standards.⁴² For example, a Wi-Fi chip and a smartphone are both compliant implementations of the IEEE 802.11 standard. The IEEE advocates calculating a reasonable rate as a percentage of the price of the component, such as a Wi-Fi chip. However, most privately negotiated licenses specify a reasonable rate as a percentage of the price of a downstream product, such as a smartphone.⁴³ The IEEE's departure from this established licensing practice may cause a disparity between market-

38. Draft IEEE-SA Patent Policy FAQs, *supra* note 32, ¶ 48, at 14 (emphasis added).

39. Draft 39 IEEE Standards Board Bylaws, *supra* note 32, § 6.1, at 2 (emphasis added).

40. *Id.*; Draft IEEE-SA Patent Policy FAQs, *supra* note 32, ¶¶ 44–45, at 12–13.

41. See, e.g., J. Gregory Sidak, *The Proper Royalty Base for Patent Damages*, 10 J. COMPETITION L. & ECON. 989 (2014).

42. Draft 39 IEEE Standards Board Bylaws, *supra* note 32, § 6.1, at 1.

43. See, e.g., Sidak, *supra* note 41, at 996 ("Voluntary licenses negotiated for patented technologies implemented in multi-component products typically use the entire market value of the downstream product as a royalty base.") (citing RESEARCH IN MOTION, RESPONSE CONCERNING CALL FOR EVIDENCE BY THE INDEPENDENT REVIEW OF INTELLECTUAL PROPERTY AND GROWTH 6 (2011)).

disciplined royalties and royalties calculated according to the IEEE's recommendations.

II. THE ANTITRUST DIVISION'S CREDULOUS ASSESSMENT OF PATENT HOLDUP AND ROYALTY STACKING

In her business review letter to the IEEE, Ms. Hesse praised the IEEE's bylaw amendments for protecting implementers and consumers from the risk of patent holdup and royalty stacking.⁴⁴ The letter, which selectively surveys outdated literature and case law that subscribe to the patent-holdup and royalty-stacking conjectures, ignores any of the more recent literature and case law that refute (or even so much as question) those conjectures. Ms. Hesse accepts, without the level of skeptical inquiry one would expect of the acting head of the Antitrust Division, the premise that patent holdup and royalty stacking harm the implementation of the IEEE's standards. Her letter overlooks the existing prophylactic mechanisms and the evidence that refute this premise. In short, Ms. Hesse facilitates the fixing of an unbroken system. She posits the existence of an unsubstantiated market failure, for which the proportionate response, she agrees, is conduct that ordinarily would arouse the Antitrust Division's suspicion about horizontal collusion.

Ms. Hesse assumes, incorrectly, that the theoretical and empirical underpinnings of the patent-holdup and royalty-stacking conjectures are robust, and her letter's analysis relies on an outdated account of those conjectures. Referencing an article from 2007 by lawyer Mark Lemley of Stanford and economist Carl Shapiro of Berkeley that introduced the patent-holdup and royalty-stacking conjectures, Ms. Hesse states that "[t]he economic bargaining model underlying claims of hold up has been studied extensively and applied to the standard-setting context."⁴⁵ Ms. Hesse neglects to say that the Lemley-Shapiro article was funded by companies that were the major proponents of the IEEE's 2015 bylaw amendments—Apple, Cisco, Intel, and Microsoft⁴⁶—and she ignores the many articles, which first started to appear in 2007, that have refuted the Lemley-Shapiro

44. 2015 IEEE Business Review Letter, *supra* note 19, at 16.

45. *Id.* at 6 n.28 (citing Mark A. Lemley & Carl Shapiro, *Patent Holdup and Royalty Stacking*, 85 TEX. L. REV. 1991 (2007)).

46. Lemley & Shapiro, *supra* note 45, at 1991 n.*. The other corporate funders were Micron Technology and SAP. *Id.*

model on both theoretical and empirical grounds.⁴⁷ For the same reason, the 2007 report of the Department of Justice and the Federal Trade Commission that Ms. Hesse cites is also unreliable evidence in 2015 of the plausibility of the patent-holdup conjecture.⁴⁸ By early 2015, more than two dozen economists and lawyers had disproved or disputed the numerous assumptions and predictions of the patent-holdup and royalty-stacking conjectures.⁴⁹ Ms. Hesse's letter ignores all of that scholarship.⁵⁰ Her let-

47. For the earliest rebuttals, see John M. Golden, "Patent Trolls" and Patent Remedies, 85 TEX. L. REV. 2111 (2007) (criticizing the method and data that Lemley and Shapiro use to show that patent holders are systematically overcompensated); 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 (2008) (explaining methodological flaws in the Lemley-Shapiro model and assessing the factors that bias their results); see also Damien Geradin, Anne Layne-Farrar & A. Jorge Padilla, *Royalty Stacking in High Tech Industries: Separating Myth from Reality* 3–4 (CEMFI, Working Paper No. 0701, 2007).

48. 2015 IEEE Business Review Letter, *supra* note 19, at 6 n.28 (citing U.S. DEP'T OF JUSTICE & FED. TRADE COMM'N, ANTITRUST ENFORCEMENT AND INTELLECTUAL PROPERTY RIGHTS: PROMOTING INNOVATION AND COMPETITION 36–37 (2007)).

49. See, e.g., Roger G. Brooks, *SSO Rules, Standardization, and SEP Licensing: Economic Questions from the Trenches*, 9 J. COMPETITION L. & ECON. 859 (2013); Einer R. Elhauge, *Do Patent Holdup and Royalty Stacking Lead to Systematically Excessive Royalties?*, 4 J. COMPETITION L. & ECON. 535 (2008); Richard A. Epstein, F. Scott Kieff, & Daniel F. Spulber, *The FTC, IP, and SSOs: Government Hold-Up Replacing Private Coordination*, 8 J. COMPETITION L. & ECON. 1 (2012); Luke Froeb, Bernhard Ganglmair & Gregory J. Werden, *Patent Hold-Up and Antitrust: How a Well-Intentioned Rule Could Retard Innovation*, 60 J. INDUS. ECON. 249 (2012); Alexander Galetovic, Stephen Haber & Ross Levine, *An Empirical Examination of Patent Hold-Up* 11 J. COMPETITION L. & ECON. (forthcoming 2015), available at <http://hooverip2.org/working-paper/wp15010>; Damien Geradin & Miguel Rato, *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); Damien Geradin, Anne Layne-Farrar & Jorge Padilla, *Competing Away Market Power? An Economic Assessment of Ex Ante Auctions in Standard Setting*, 4 EUR. COMPETITION J. 443 (2008); Damien Geradin, Anne Layne-Farrar & Jorge Padilla, *The Complements Problem Within Standard Setting: Assessing the Evidence on Royalty Stacking*, 14 B.U. J. SCI. & TECH. L. 144 (2008); Kirti Gupta, *The Patent Policy Debate in the High-Tech World*, 9 J. COMPETITION L. & ECON. 827 (2013); Sir Robin Jacob, *Competition Authorities Support Grasshoppers: Competition Law as a Threat to Innovation*, 9 COMPETITION POL'Y INT'L 15 (2013); Bruce H. Kobayashi & Joshua D. Wright, *Federalism, Substantive Preemption, and Limits on Antitrust: An Application to Patent Holdup*, 5 J. COMPETITION L. & ECON. 469 (2009); Gregor Langus, Vilen Lipatov & Damien Neven, *Standard-Essential Patents: Who Is Really Holding Up (and When)?*, 9 J. COMPETITION L. & ECON. 253 (2013); Mario Mariniello, *Fair, Reasonable and Non-Discriminatory (FRAND) Terms: A Challenge for Competition Authorities*, 7 J. COMPETITION L. & ECON. 523 (2011); James Ratliff & Daniel L. Rubinfeld, *The Use and Threat of Injunctions in the RAND Context*, 9 J. COMPETITION L.

ter even ignores concessions made by the leading proponents of the patent-holdup and royalty-stacking conjectures concerning the unavailability of injunctions to SEP holders and the infrequency with which licensor opportunism actually occurs. In 2014, Carl Shapiro and Fiona Scott-Morton, who previously served as chief economists at the Antitrust Division, said that “the risk of injunctions appears to be quite low” and that “[m]any holders of SEPs *do license at FRAND rates*, perhaps due to concerns about reputation or retaliatory conduct by others.”⁵¹ Some scholars are skeptical of whether patent holdup and royalty stacking have *ever* occurred in the implementation of a standard. In 2013, Commissioner Joshua Wright of the Federal Trade Commission (FTC) emphasized that, “[d]espite the amount of attention patent hold-up has drawn from policy-makers and academics, there have been relatively few instances of litigated patent hold-up among the thousands of standards adopted.”⁵² In 2014, Alexander Galetovic, Stephen Haber, and Ross Levin found that, “over

& ECON. 1 (2013); J. Gregory Sidak, *Mandating Final-Offer Arbitration of FRAND Royalties for Standard-Essential Patents*, 18 STAN. TECH. L. REV. 1 (2015); J. Gregory Sidak, *The Meaning of FRAND, Part I: Royalties*, 9 J. COMPETITION L. & ECON. 931 (2013); J. Gregory Sidak, *The Meaning of FRAND, Part II: Injunctions*, 11 J. COMPETITION L. & ECON. 201, 231–34 (2015); Richard S. Taffet & Hill B. Wellford, *Questioning the FTC’s Incremental Value Test and Claims of Widespread Hold-Up in Technology Standards*, 57 ANTITRUST BULL. 161 (2012); David J. Teece & Edward F. Sherry, *Standard Setting and Antitrust*, 87 MINN. L. REV. 1913 (2003); Joshua D. Wright & Aubrey N. Stuempfle, *Patent Holdup, Antitrust, and Innovation: Harness or Noose?*, 61 ALA. L. REV. 559 (2010); Kirti Gupta & Mark Snyder, *Smart Phone Litigation and Standard Essential Patents* (Hoover Inst. Working Grp. on Intellectual Prop., Innovation & Prosperity, Stanford Univ., Working Paper No. 14006, 2014).

50. As further evidence of the existence of patent holdup, Ms. Hesse, 2015 IEEE Business Review Letter, *supra* note 19, at 7 n.28, cites Joseph Kattan & Chris Wood, *Standard-Essential Patents and the Problem of Hold-Up*, in WILLIAM E. KOVACIC: AN ANTITRUST TRIBUTE—LIBER AMICORUM 409 (Nicolas Charbit & Elisa Ramundo eds., 2014). This book chapter from 2014 addresses only a small fraction of the scholarly articles since 2007 that dispute the patent-holdup and royalty-stacking conjectures. It appears to be the only source that Ms. Hesse cites in her letter that acknowledges any of the legal or economic scholarship since 2007 that disputes the patent-holdup and royalty-stacking conjectures. However, in the 2015 IEEE business review letter itself, Ms. Hesse does not acknowledge the existence of any of that subsequent scholarship.

51. Fiona M. Scott Morton & Carl Shapiro, *Strategic Patent Acquisitions*, 79 ANTITRUST L.J. 463, 473, 475 (2014) (emphasis added).

52. Joshua D. Wright, Comm’r, Fed. Trade Comm’n, Remarks at the Center for the Protection of Intellectual Property Inaugural Academic Conference: The Commercial Function of Patents in Today’s Innovation Economy 20 (Sept. 12, 2013), *available at* http://www.ftc.gov/sites/default/files/documents/public_statements/ssos-frand-and-antitrust-lessons-economicsincomplete-contracts/130912cpip.pdf.

long periods[,] SEP industries tend to show better performance than most other industries,” and that innovation appears to grow fastest in SEP industries.⁵³ In 2015, Galetovic, Haber, and Levin also empirically refuted the classic hypothesis of the patent-holdup conjecture—that “hold-up will harm downstream consumers in the form of slower price declines and slower improvements in product quality and variety”—by showing that the quality-adjusted prices for products in SEP industries decline faster than quality-adjusted prices for products in non-SEP industries.⁵⁴ All of these empirical and theoretical challenges to the patent-holdup and royalty-stacking conjectures are conspicuously absent from Ms. Hesse’s letter. Instead, she warns parties not to say that patent holdup and royalty stacking are nonexistent problems.⁵⁵

Ms. Hesse might consider talking to more federal judges. Apart from incorrectly representing the current state of scholarly research on patent holdup and royalty stacking, Ms. Hesse incorrectly represents the current state of patent law. Her reliance on the Federal Circuit’s December 2014 decision in *Ericsson, Inc. v. D-Link Systems, Inc.*⁵⁶ is misplaced. To substantiate a claim that royalty stacking “may hamper implementation of a standard,” Ms. Hesse cites the Federal Circuit’s discussion in *Ericsson v. D-Link* of royalty stacking’s theoretical harms.⁵⁷ However, Ms. Hesse neglects to mention the Federal Circuit’s actual holding concerning jury instructions on patent holdup and royalty stacking. The Federal Circuit upheld Chief Judge Leonard Davis’ reasoning not to instruct the jury about the theoretical risk of patent holdup and royalty stacking because, he concluded, the accused infringers had presented no empirical evidence that patent holdup or royalty stacking had ever occurred.⁵⁸ Chief Judge Davis found that, “given the opportunity to present evidence of an *actual* stack[,]

53. Alexander Galetovic, Stephen Haber & Ross Levine, *Patent Holdup: Do Patent Holders Holdup Innovation?* 19 (Hoover Inst. Working Grp. on Intellectual Prop., Innovation & Prosperity, Stanford Univ., Working Paper No. 14011, 2014).

54. Galetovic, Haber & Levine, *supra* note 49, manuscript at 2.

55. See *supra* note 27 and accompanying text.

56. 773 F.3d 1201 (Fed. Cir. 2014).

57. 2015 IEEE Business Review Letter, *supra* note 19, at 13 n.47 (citing *Ericsson*, 773 F.3d at 1209).

58. *Ericsson*, 773 F.3d at 1233–34; *Ericsson Inc. v. D-Link Sys., Inc.*, 6:10-cv-00473, 2013 WL 4046225, at *18 (E.D. Tex. Aug. 6, 2013).

... [the] Defendants came up empty.”⁵⁹ Observing that “[a]ll of [the] Defendants’ concerns about royalty stacking were just that—concerns,”⁶⁰ Chief Judge Davis declined to instruct the jury that there existed any risk of royalty stacking.⁶¹ The Federal Circuit affirmed Chief Judge Davis’ decision and emphasized that, “[i]n deciding whether to instruct the jury on patent hold-up and royalty stacking[,] . . . the district court must consider the evidence on the record before it.”⁶² The accused infringer must show “something more than a general argument that these phenomena are possibilities.”⁶³ The Federal Circuit said that “[t]he district court need not instruct the jury on hold-up or stacking unless the accused infringer presents actual evidence of hold-up or stacking” in the case at issue.⁶⁴

Setting aside Ms. Hesse’s incomplete assessment of the theoretical and empirical foundations upon which the patent-holdup and royalty-stacking conjectures stand, she fails to examine the extent to which patent holdup and royalty stacking actually jeopardize the implementation of the IEEE’s standards and thus demand revision of the IEEE’s patent policy. The IEEE itself has emphasized the need to produce empirical evidence of this harm. In November 2014, the Board of Directors of IEEE-USA (a U.S. affiliate of the IEEE) approved a statement requesting “evidence (if any) that IEEE or IEEE-SA is harmed, or is threatened to be harmed, on account of its current patent policy.”⁶⁵ The Board of Directors also requested “factual evidence” of “specific problems being addressed by the [amended by-laws].”⁶⁶ However, in its business review request, the IEEE does not identify a single incident of harm to its standardization process. Similarly, Ms. Hesse’s assessment of this harm is devoid of any credible examples.

59. *Ericsson*, 2013 WL 4046225, at *18 (emphasis in original). Chief Judge Davis’ patent decisions, and the appeals from those decisions, are especially informative, as he has personally presided over 1,700 intellectual property matters in the most active district court for patent litigation in the United States. See *Biography—Judge Leonard Davis, Eastern District of Texas*, U.S. DIST. COURT FOR THE E. DIST. OF TEX. (Jan. 15, 2015), http://www.txed.uscourts.gov/cgi-bin/view_document.cgi?document=2388.

60. *Ericsson*, 2013 WL 4046225 at *26.

61. *Id.* at *18.

62. *Ericsson*, 773 F.3d at 1234.

63. *Id.*

64. *Id.*

65. IEEE-USA, Motion Approved by the IEEE-USA Board of Directors (Nov. 21, 2014), available at <http://www.ieeeusa.org/volunteers/committees/IPC/IEEEUSAPatentPolicyMotionNov14.pdf>.

66. *Id.*

Ms. Hesse further inflates the benefits of the IEEE's amended bylaws by dismissing less restrictive alternatives—namely, current legal mechanisms and developments that have significantly reduced the probability that an SEP holder can successfully engage in an opportunistic licensing practice. Ms. Hesse claims that the recent decisions in *Microsoft Corp. v. Motorola, Inc.*⁶⁷ and *Innovatio IP Ventures*⁶⁸ “demonstrate the *potential* for hold up when owners of RAND-encumbered standard-essential patents make royalty demands significantly above the adjudicated RAND rate.”⁶⁹ However, Ms. Hesse imputes a more extravagant meaning to these two decisions than the IEEE does in its request for a business review letter: “[I]n two cases relating to IEEE’s 802.11 standard, the patent holder and the implementer were several orders of magnitude apart in their respective valuations of the reasonable rate The breadth of these differing valuations suggests that IEEE-SA *has not provided sufficient clarity in its patent policy.*”⁷⁰ A large initial bid-ask spread in a negotiation due to a lack of clarity of the pricing rule does not prove the existence of, or even the potential for, patent holdup.

The greater problem with Ms. Hesse’s argument is that *Microsoft v. Motorola* and *Innovatio* both demonstrate not the potential for patent holdup, but rather the implausibility of patent holdup. Although the judge in each case ultimately set a royalty rate well below the licensor’s initial asking price, it does not follow from anything in those opinions or in Ms. Hesse’s letter that the adjudicated rates were necessarily high enough to be FRAND. The methodologies used to determine the final rates in those two decisions contained significant economic flaws.⁷¹ Moreover, even if one assumes for the sake of argument that the SEP holder’s initial asking price in each case was too high to be FRAND, the court’s rejection of that rate attests to the effectiveness of existing legal mechanisms for preventing patent holdup. Dennis Carlton and Allan Shampine observe that patent

67. No. C10-1823JLR, 2013 WL 2111217 (W.D. Wash. Apr. 25, 2013).

68. No. 11 C 9308, 2013 WL 5593609 (N.D. Ill. Oct. 3, 2013).

69. 2015 IEEE Business Review Letter, *supra* note 19, at 7 n.28 (emphasis added) (citing *Innovatio*, 2013 WL 5593609, at *43; *Microsoft v. Motorola*, 2013 WL 2111217, at *100).

70. IEEE Business Review Letter Request, *supra* note 3, at 10–11 (emphasis added) (citing *Innovatio*, 2013 WL 5593609, at *12; *Microsoft v. Motorola*, 2013 WL 2111217, at *10, *87, *99).

71. See, e.g., Sidak, *The Meaning of FRAND, Part I: Royalties*, *supra* note 49, at 979–86, 1009–14.

holdup is particularly unlikely when the implementer has the legal right to challenge the SEP holder's offered licensing terms in court if it believes that the licensing terms are not FRAND.⁷² The implementer's ability to go to court affects the royalty negotiation and safeguards the implementer against unreasonable terms.⁷³

Ms. Hesse herself concedes the implausibility of patent holdup when she analyzes the IEEE's provision to restrict an SEP holder's right to seek an injunction. Ms. Hesse begins by depicting the threat of an injunction as a "powerful weapon" that enables an SEP holder "to engage in patent hold up,"⁷⁴ but she then defends the IEEE's new provision on the grounds that such a ban "will not be significantly more restrictive than current U.S. case law."⁷⁵ Confirming the latter proposition, Kirti Gupta and Mark Snyder of Qualcomm have found that, from 2003 to 2013, courts denied every request for an injunction in SEP infringement litigation.⁷⁶ Judge Douglas Ginsburg (a former Assistant Attorney General of the Antitrust Division) and coauthors Taylor Owings and FTC Commissioner Joshua Wright similarly report that, "despite all the handwringing over the prospect of SEP holders using injunctions and exclusion orders[,] . . . we have not found even one injunction or exclusion order that actually kept a product off the shelf because it infringed an SEP."⁷⁷ Thus, it is misleading and contrary to fact for Ms. Hesse in 2015 to characterize the SEP holder's threat of an injunction as a "powerful weapon." Once powerful perhaps, but certainly powerful no longer. If injunctions are rarely, if ever, available to SEP holders, then there is no serious risk that a SEP holder could use an injunction—much less the mere threat of an injunction—to hold up an implementer of the standard.

In sum, Ms. Hesse's depiction of the benefits of the IEEE's bylaw amendments is a string of false or implausible propositions leading to a fallacious conclusion. First, she assumes the theoretical and empirical validity of the patent-holdup and royalty-stacking conjectures. Second, she

72. Dennis W. Carlton & Allan Shampine, *Identifying Benchmarks for Applying Non-Discrimination in FRAND*, 8 COMPETITION POL'Y INT'L 1, 5 (2014).

73. *Id.*

74. 2015 IEEE Business Review Letter, *supra* note 19, at 9.

75. *Id.* at 10.

76. Gupta & Snyder, *supra* note 49, at 23.

77. Douglas H. Ginsburg, Taylor M. Owings & Joshua D. Wright, *Enjoining Injunctions: The Case Against Antitrust Liability for Standard Essential Patent Holders Who Seek Injunctions*, 14 ANTITRUST SOURCE, no. 1, Oct. 2014, at 4.

exaggerates the risk of patent holdup and royalty stacking. Third, she asserts that the IEEE's new policy mitigates that risk. Fourth, she mischaracterizes the current ability of a SEP holder to use, or threaten to use, an injunction to deny an implementer's access to the SEP holder's technology.

III. THE ANTITRUST DIVISION'S STUDIED INDIFFERENCE TO THE COORDINATED SUPPRESSION OF FRAND ROYALTIES FOR SEPS

Not only does Ms. Hesse exaggerate the benefits of the IEEE's amended bylaws, she also incorrectly dismisses their potential anticompetitive costs. If certain antitrust concerns compelled the IEEE to request a business review letter, and if a perceived need for clarification of the Antitrust Division's present enforcement intentions regarding those concerns motivated Ms. Hesse to answer, then why does her letter analyze none of those concerns? Ms. Hesse's failure to address the collusive implications of the IEEE's bylaw amendments is baffling, given the serious nature of such concerns and the Antitrust Division's record of prosecuting buyer cartels.

The Antitrust Division has worried that the functioning of an SSO is conducive to collusion.⁷⁸ The proponents of the patent-holdup and royalty-stacking conjectures have themselves observed that “[c]ooperative standard setting often involves horizontal competitors agreeing on certain specifications of the products they plan to market, implicating core antitrust issues regarding the boundary between cooperation and collusion.”⁷⁹ In addition to the general risk of collusion among all participants of an SSO, standard setting may facilitate collusion within smaller groups of participants, notably implementers of an industry standard. SEPs are essential inputs in the production of their products, and implementers, particularly those having weak or nonexistent SEP portfolios, share an incentive to suppress royalties for SEPs. Implementers could suppress SEP royalties directly, by collectively agreeing to lower the royalties that they will pay a specific SEP holder. Or implementers could suppress SEP royalties indirectly, by collectively lobbying SSOs to adopt rules that would make the enforcement of SEPs particularly onerous or that would prescribe particu-

78. U.S. DEP'T OF JUSTICE & FED. TRADE COMM'N, *supra* note 48, at 34–35.

79. Joseph Farrell, John Hayes, Carl Shapiro & Theresa Sullivan, *Standard Setting, Patents, and Holdup*, 74 ANTITRUST L.J. 603, 603 (2007).

lar rate-setting methodologies guaranteed to produce lower royalties than would eventuate from bilateral negotiations undertaken in the absence of such coordinated modifications of SSO rules. Coordinated action to devalue SEPs can only harm long-run consumer welfare. A price for an SEP that buyers have suppressed through their coordinated action would diminish the SEP holder's incentives to continue contributing valuable technology to the SSO in question. By April 2015, Nokia, Ericsson, and Qualcomm each had reportedly stated publicly their unwillingness to license their technologies essential to the IEEE's 802.11 standard under the new rules of the IEEE patent policy, and InterDigital had directly informed the IEEE-SA by letter of its unwillingness to do so.⁸⁰ When the current price that implementers pay for a standard-essential technology is low, an innovator will pursue only easily attainable technologies, because low-cost technologies will be the only investments for which the firm can expect to earn a positive return. In the long run, the coordinated suppression of SEP royalties will retard innovation, curtail investment in those technologies that firms remain willing to contribute to a standard, and diminish long-run consumer welfare.

My letter to Ms. Hesse on January 28, 2015 explained that the IEEE's amended bylaws could facilitate buyer collusion.⁸¹ It is remarkable that Ms. Hesse's business review letter failed to explain her analysis of that danger. Companies that are major contributors of technology to the IEEE's standards expressed similar concerns. Ericsson told the IEEE that the proposed amendments "constitute[] the collective establishment of mandatory, uniform licensing terms . . . akin to a buyer's-side cartel."⁸² Other major holders of patents essential to IEEE standards, including Qualcomm and Nokia, echoed Ericsson's concern.⁸³ On January 14, 2015,

80. See, e.g., Susan Decker & Ian King, *Qualcomm Says It Won't Follow New Wi-Fi Rules on Patents*, Bloomberg (Feb. 11, 2015, 11:23 AM), <http://www.bloomberg.com/news/articles/2015-02-11/qualcomm-says-new-wi-fi-standard-rules-unfair-may-not-take-part>; Richard Lloyd, *Ericsson and Nokia the Latest To Confirm That They Will Not License Under the New IEEE Patent Policy*, IAM (Apr. 10, 2015), <http://www.iam-media.com/blog/detail.aspx?g=d07d0bde-ebd6-495a-aa72-4eecb9dac67d>; Letter from Lawrence F. Shay, Exec. Vice President of Intellectual Prop., InterDigital, Inc., to David Law, Patent Comm. Chair, IEEE-SA Standards Bd. (Mar. 24, 2015), available at <http://wpupload.s.interdigital.com.s3.amazonaws.com/uploads/2015/03/Letter-to-IEEE-SA-PatCom.pdf>.

81. See Sidak's Letter to Hesse, *supra* note 15.

82. IEEE-SA Patent Policy: Draft Comments, Second Round, *supra* note 5, at Comment ID No. 39 (comments of Dina Kallay, Dir. for IP and Competition, Ericsson).

83. *Id.* at Comment ID Nos. 13, 38, 61.

Senator Christopher Coons of Delaware wrote a letter to Attorney General Eric Holder and Assistant Attorney General William Baer to say that the IEEE's amendments could "undermine the rights and competitiveness of U.S. inventors."⁸⁴ Even the IEEE's outside counsel—which in requesting a business review letter bore a duty of "full and true disclosure" to the Antitrust Division⁸⁵—mentioned the concerns of certain IEEE members that that the bylaw amendments could amount to "buyer-side price-fixing."⁸⁶ On these concerns about buyer collusion Ms. Hesse was mute.

Horizontal collusion has always been antitrust's gravest concern,⁸⁷ no less when buyers rather than sellers collude.⁸⁸ The Antitrust Division for that reason has repeatedly prosecuted buyer cartels under a theory of *per se* illegality.⁸⁹ It should treat buyer collusion within SSOs no differently. Yet, without explanation, Ms. Hesse applies a laxer standard to the risk of collusion over the prices that buyers will pay for SEPs than the Antitrust Division has applied to the risk of collusion over the prices that the very same buyers will pay for other kinds of essential inputs.

In 2010, the Antitrust Division prosecuted a buyer cartel of technology companies in Silicon Valley that had colluded to suppress the price of an essential input: highly skilled employees. In *United States v. Adobe Systems, Inc.*, the Division sued Adobe, Apple, Google, Intel, Intuit, and Pixar for engaging in "facially anticompetitive" collusion by enacting "no cold

84. Letter from Sen. Christopher A. Coons, U.S. Senate, to Hon. Eric Holder, Attorney Gen., U.S. Dep't of Justice, and Hon. William J. Baer, Assistant Attorney Gen., U.S. Dep't of Justice (Jan. 14, 2015), *available at* <http://ipwatchdog.com/materials/1-14-2015-Coons-IEEE.pdf>.

85. *See supra* note 11 and accompanying text.

86. IEEE Business Review Letter Request, *supra* note 3, at 18 (internal quotation marks omitted).

87. *See, e.g.*, RICHARD A. POSNER, ANTITRUST LAW 35 (2d ed. 2001) ("[B]y 1898 the Supreme Court had established the principle, *immensely important to the development of a sound antitrust policy*, that cartels and other price-fixing agreements were illegal regardless of the 'reasonableness' of the price fixed.") (citing *United States v. Joint Traffic Ass'n*, 171 U.S. 505 (1898); *United States v. Trans-Missouri Freight Ass'n*, 166 U.S. 290 (1897)).

88. *See, e.g.*, *Mandeville Island Farms v. Am. Crystal Sugar Co.*, 337 U.S. 219 (1948); *Todd v. Exxon Corp.*, 275 F.3d 191 (2d Cir. 2001); *Omnicare, Inc. v. UnitedHealth Grp., Inc.*, 524 F. Supp. 2d 1031 (N.D. Ill. 2007).

89. *See, e.g.*, Competitive Impact Statement at 1, *United States v. Omnipoint Corp.*, No. 1:98-cv-02750 (D.D.C. Nov. 10, 1998), ECF No. 1. The Antitrust Division and thirteen state attorneys general challenged a merger in October 2008 on the grounds that it would promote monopsony. *See Amended Complaint, United States v. JBS S.A.*, No. 1:08-cv-05992 (Nov. 7, 2008), ECF No. 48.

call agreements” in which they agreed not to hire away skilled employees from one another.⁹⁰ The Antitrust Division said that the “concerted behavior” of these companies “both reduced their ability to compete for employees and disrupted the normal price-setting mechanisms that apply in the labor setting.”⁹¹ The Division stressed that the “antitrust analysis of downstream, customer-related restraints is equally applicable to upstream monopsony restraints” because anticompetitive collusion “in both input and output markets create[s] allocative inefficiencies.”⁹² The U.S. District Court for the District of Columbia found the Silicon Valley buyer cartel to be *per se* illegal and permanently enjoined the defendants from engaging in their coordinated behavior.⁹³ In a subsequent class-action lawsuit alleging the same violation of section 1 of the Sherman Act by four of the prior defendants (Apple, Google, Adobe, and Intel), Judge Lucy Koh of the Northern District of California approved a \$415 million settlement in March 2015.⁹⁴

Given the Antitrust Division’s prosecution of the Silicon Valley buyer cartel in *Adobe*, why did the Division so credulously accept the asserted need for collective action in the IEEE’s proposed bylaw amendments and so thoroughly disregard, as undeserving of sustained discussion, the potential for those amendments to facilitate buyer collusion? In both cases, horizontal competitors coordinated their actions as buyers for the common purpose of suppressing the price they would need to pay for an essential input. The IEEE bylaw amendments even make the desired suppression of prices for SEPs explicit. Yet, the two cases elicited contradictory responses from the Antitrust Division. In the case of the Silicon Valley buyer cartel, the Division condemned the coordinated devaluation of an essential input (highly skilled labor) as *per se* illegal. In its review of the IEEE’s amended bylaws, the Division applauded the coordinated devaluation of

90. Complaint ¶ 2, at 2, *United States v. Adobe Sys., Inc.*, No. 1:10-cv-01629 (D.C.C. Sept. 24, 2010), ECF No. 1.

91. Competitive Impact Statement at 10, *United States v. Adobe Sys., Inc.*, No. 1:10-cv-01629 (D.C.C. Sept. 24, 2010), ECF No. 2.

92. *Id.* at 7–8.

93. Final Judgment § 4, *United States v. Adobe Sys., Inc.*, No. 1:10-cv-01629 (D.C.C. Mar. 18, 2011), ECF No. 17.

94. Order Granting Plaintiffs’ Motion for Preliminary Approval of Class Action Settlement with Defendants Adobe Sys., Inc., Apple, Inc., Google Inc., and Intel Corp., Approving Form and Manner of Notice, and Scheduling Final Approval Hearing, *In re High-Tech Emp. Antitrust Litig.*, No. 1:11-cv-02509 (N.D. Cal. Mar. 3, 2015), ECF No. 1054.

another essential input (intellectual property) as an unambiguous benefit to society. In the past, the Antitrust Division used a principle of symmetry to guide its antitrust scrutiny of conduct involving intellectual property and conduct involving other forms of property.⁹⁵ Even Ms. Hesse professed as recently as 2013 that “the Antitrust Division applies the same general anti-trust principles to . . . matters involving intellectual property that it applies to any other type of property.”⁹⁶ She can no longer make that claim. An obvious *asymmetry* now characterizes the Antitrust Division’s evaluation of the collusive conduct alleged in *Adobe* and Ms. Hesse’s evaluation of the conduct of certain IEEE members in amending its bylaws.

There is an important economic distinction between an SEP input and a labor input. A suppression of the price of skilled labor will reduce the quantity of labor supplied, both in the short run and the long run. All other things being equal, as the quantity of labor supplied decreases, total output will decrease as well. Consequently, buyer collusion in the input market will generate an immediate deadweight loss in the output market.⁹⁷ In contrast, the suppression of the price of SEPs will reduce the output of SEPs *only* in the long run. Because the marginal cost to the licensor of each additional license is close to zero, it is unlikely that suppressing the FRAND royalty will decrease the number of licenses that the SEP holder grants in the short run.⁹⁸ Once a standard-essential technology has been developed, it is in the SEP holder’s interest to license its technology to a large number of licensees because some licensing revenue is better than none. Nonethe-

95. Commissioner Joshua Wright and Judge Douglas Ginsburg analyze this “principle of symmetry” and the U.S. antitrust authorities’ recent departure from it in cases involving SEPs. Joshua D. Wright & Douglas H. Ginsburg, *Whither Symmetry? Antitrust Analysis of Intellectual Property Rights at the FTC and DOJ*, 9 COMPETITION POL’Y INT’L 13, 15 (2013) (“A good deal of recent antitrust scholarship calls for more interventionist antitrust policy regarding IPRs—sometimes even expressly challenging the symmetry principle and calling instead for IP-specific antitrust treatment.”).

96. Renata Hesse, Deputy Assistant Attorney Gen., U.S. Dep’t of Justice, IP, Antitrust and Looking Back on the Last Four Years, Remarks Presented at the Global Competition Review 2nd Annual Antitrust Law Leaders Forum (Feb. 8, 2013), available at <http://www.justice.gov/atr/public/speeches/292573.pdf>.

97. See James M. Dowd, *Oligopsony Power: Antitrust Injury and Collusive Buyer Practices in Input Markets*, 76 B.U. L. REV. 1075, 1084 (1996).

98. See, e.g., Richard A. Posner, *Intellectual Property: The Law and Economics Approach*, 19 J. ECON. PERSP., Spring 2005, at 57, 58 (“Intellectual Property is often very costly to create, but the costs of creation, being invariant to output, are fixed costs once incurred. In contrast, the costs that vary with output, which is to say the costs incurred in actually providing the intellectual property to consumers, often are very low.”).

less, even if a buyer cartel can successfully suppress the prices of SEPs in the short run without causing the SEP holder to reduce output, that coordinated price suppression will still reduce the SEP holder's output in the long run.⁹⁹ Whatever static benefits might flow to consumers from lower SEP prices for downstream manufacturers would be offset by forgone consumer surplus in future periods because of reduced innovation and diminished dynamic efficiency.¹⁰⁰ The Antitrust Division's conclusion that the potential anticompetitive costs of the IEEE's bylaw amendments will not exceed their asserted benefits is illusory as soon as one views consumer welfare over a longer horizon, as is proper to do when addressing a technologically dynamic market.

Public choice considerations suggest that it is unrealistic to expect the Antitrust Division ever to take dynamic efficiency seriously. The electoral cycle drives the political process that installs the Division's top officials into positions of ephemeral authority. That cycle is short, which suggests that those officials have a high discount rate when assessing the long-run harm to consumer welfare from discouraging private investment in innovative activity. Someone else will be running the Antitrust Division by the time the adverse consequences of forsaking dynamic efficiency manifest themselves. Conversely, the Antitrust Division's current leadership will not receive accolades for long-run gains in consumer surplus that accrue, because of sustained investment in innovation, only after the current political cycle has ended and those leaders have left. This relationship between the political cycle and the discount rate of antitrust enforcers might explain why the federal judges, who notably have lifetime tenure, tend to credit arguments about dynamic efficiency in the debate over SEPs more than Ms. Hesse's business review letter to the IEEE suggests that the Antitrust Division does.

99. See J. Gregory Sidak, *Patent Holdup and Oligopsonistic Collusion in Standard-Setting Organizations*, 5 J. COMPETITION L. & ECON. 123, 158–59 (2009); see also Posner, *supra* note 98, at 58 (“Marginal-cost pricing would maximize access to existing intellectual property and deter or expel inefficient entrants, but it would reduce, indeed often eliminate, the incentive to create the property in the first place.”).

100. See generally Sidak & Teece, *supra* note 26.

CONCLUSION

The Antitrust Division exists not to orchestrate or cheerlead the coordinated action of buyers in a market to suppress prices. It exists to ensure that firms obey the antitrust laws. That duty required the Division to assess, with skepticism and scrupulous impartiality, the competitive implications of the coordinated action of a subset of members of the IEEE that would benefit from the SSO's adoption of bylaw amendments having the purpose and effect of suppressing the FRAND royalties that this subset of members would pay to license standard-essential patents. The Division failed to discharge that duty. Its 2015 business review letter found that the IEEE's bylaw amendments would benefit economic welfare by mitigating patent holdup and royalty stacking. That conclusion was unsupported. The Division ignored the academic literature refuting the patent-holdup and royalty-stacking conjectures, and it did not cite any empirical evidence that patent holdup and royalty stacking have impaired implementation of the IEEE's standards. In a word, the benefits that the Division credited to the IEEE's amendments were fictitious. With respect to the competitive harm from the IEEE's bylaw amendments, the Antitrust Division ignored the obvious.