How Antitrust Law Can Make FRAND Commitments More Effective

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Abstract

In this article, we explain that the antitrust laws have an important role to play in ensuring that the rules established by standard-setting organizations are effective in preventing the owners of standard-essential patents from engaging in patent holdup after the standard is established and becomes commercially successful. These organizations and their members can violate Section 1 of the Sherman Act if the rules adopted are ineffective in preventing the owners of standard-essential patents from exploiting the ex post monopoly power they gain due to the standard.

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I. Introduction

The development and setting of compatibility standards is a critical part of the information and communications technology sector of the economy. From the Wi-Fi and 4G cell-phone standards to the ubiquitous JPEG and MPEG file formats, many of the benefits generated by the recent and dramatic advances in information technology would have been difficult or impossible to achieve without compatibility standards.

For the past twenty years, antitrust enforcement relating to standard-setting has focused largely on issues related to the interpretation and implementation of the commitments that patent holders make as part of the standard-setting process to license their Standard-Essential Patents [SEPs] on Fair, Reasonable and Non-Discriminatory [FRAND] terms. The DOJ and the FTC devoted an entire chapter to this topic, “Competition Concerns When Patents Are Incorporated Into Collaboratively Set Standards,” in their 2007 report, Antitrust Enforcement and Intellectual

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Property Rights: Promoting Innovation and Competition.\textsuperscript{1} The debate over FRAND commitments has continued undiminished in the ten years since that report was issued.

The largest and most immediate commercial and antitrust concern regarding SEPs is that the owners of SEPs will command very substantial market power once the standard in question becomes widely adopted. Put simply: without some checks, SEP owners could opportunistically engage in patent holdup, taking advantage of the fact that the firms and users adopting the standard become individually and collectively locked in to the standard over time. Of course, it is precisely this danger of \textit{ex post} opportunism that motivates market participants and SSOs to require participants in the standard-setting process to make FRAND commitments.

By its nature, standard setting involves collaboration among competitors and thus raises core antitrust issues. In this article, we argue that the antitrust laws have an important role to play in ensuring that SSO rules are effective in preventing \textit{ex post} opportunism. In particular, SSOs and their members can violate Section 1 of the Sherman Act, 15 U.S.C. § 1, if the SSO fails to adopt and enforce rules that are effective in preventing SEP owners from exploiting their \textit{ex post} monopoly power. This Section 1 liability facing SSO participants and SSOs works side-by-side with liability under Section 2 of the Sherman Act related to unilateral conduct by SEP owners.

II. Standard Setting and the Competitive Process

The fundamental economics in the information technology sector, driven by network effects, implies that there is enormous value associated with establishing compatibility standards. However, because of the large number of patents with vague boundaries that are present in this sector, combined with the lag between patent application and patent issuance, it is simply not practical for firms that will be making compliant products – which we call “implementers” – to enter into patent licenses with all SEP owners prior to the establishment of a standard and to their implementation of it.\textsuperscript{2} Since such \textit{ex ante} licensing is not feasible, license negotiations between SEP holders and standard implementers take place after those implementers are locked into the standard in the sense that the cost to switch to an alternative technology or standard at that point -- \textit{ex post} -- is much greater than it was when the patented technology was first included in the standard -- \textit{ex ante}.\textsuperscript{3} \textit{Ex post}, the patent holder is not competing to have its technology included in the standard but rather owns an asset that is essential to the standard. If the standard is commercially successful, implementers are willing to pay a much larger royalty for use of the patented technology than they would have paid \textit{ex ante}, when the SEP holder faced competition


\textsuperscript{3} This type of lock-in, and the closely related idea of patent hold-up, are an example of the general concept of lock-in and opportunism developed by Oliver Williamson, for which he was awarded the Nobel Prize. For a recent review, see Steven Tadelis and Oliver Williamson, “Transaction Cost Economics,” Chapter 4, \textit{The Handbook of Organizational Economics}, Robert Gibbons and John Roberts, eds., Princeton University Press, 2013
from other technologies. In these circumstances, the SEP holder can be said to have obtained monopoly power in the market in which the patented technology is licensed for use in implementations of the standard.4

Because such *ex post* monopoly power is common, SSOs typically require participants that own SEPs to make certain FRAND commitments. The idea is to limit *ex post* opportunism by SEP holders. In particular, by requiring a commitment to license on “fair and reasonable” terms, the FRAND requirement is intended to prevent or at least reduce the extent of monopoly pricing by SEP holders. And, by requiring a commitment to license on “nondiscriminatory” terms, the FRAND requirement can prevent SEP holders from extracting monopoly premiums by selective licensing or, more important, migrating their monopoly power, from the FRAND-regulated market to the unregulated standard-implementing product market, by licensing to only one or a few implementers or to one or a few implementers on discriminatorily favorable terms.

### III. The Need for Effective FRAND Commitments

Restrictions on *ex post* opportunism are needed to prevent a wealth transfer from implementers and their customers to SEP holders as a result of monopoly pricing. But much more is at stake than avoiding that transfer.

Basic economic principles teach that *ex post* monopoly pricing by SEP holders harms consumers by raising the cost of products that comply with the standard. *Ex post* monopoly pricing by SEP holders also creates welfare-reducing deadweight loss in two respects. First, it increases the cost of, and thus reduces the output of, standard-implementing products and follow-on innovation based on the technologies claimed by the SEPs. Second, the prospect of *ex post* monopoly pricing by SEP holders exaggerates incentives *ex ante* for firms to obtain patents that might become SEPs and, perhaps more important, for firms to jockey for inclusion of their patented technologies in industry standards. The latter incentive in turn could cause delays and induce expensive rent-seeking conduct in the standard setting process and distort standards development from optimal technical solutions to solutions that further the interests of rent seekers.

These concerns are not universally shared. Indeed, a heated debate regarding the desirability of efforts to prevent *ex post* opportunism by SEP holders has ensued for the past twenty years. Those who do not share these concerns argue that the greater risk is inhibiting monetization of the inventions claimed by SEPs and thus discouraging innovation on their part.

We believe that those who share our concerns have by far the stronger argument.

- The risk of *ex post* opportunism is very real. Implementation typically precedes resolution of patent issues for good reason. Waiting for the latter would retard the commercialization and innovation process. Implementers are therefore usually locked in to the allegedly infringing technologies well before the issue of patent royalties is addressed. The real issue is how best to prevent opportunism, not whether it is a danger.

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4 See Ericsson v D-Link, 773 F.3d 1201 (Fed. Cir. 2014); *Rambus v FTC*, 522 F. 3d 456 (D.C. Cir. 2008).
• Absent rigorous enforcement of FRAND commitments or a suitable alternative, SEP holders could take advantage of lock-in to exploit their substantial *ex post* market power by charging royalties far above the *ex ante* value of the patented technology, by tying non-SEPs to SEPs, and through other means discussed below. Economic theory predicts that they will, and both anecdotal evidence and litigated cases suggest that they have.

• Those who oppose rigorous enforcement of FRAND commitments rely on studies that purport to show that concerns about *ex post* opportunism leading to excessive royalties are unfounded. However, those studies do not show what they purport to show, namely that aggregate royalty costs have not retarded innovation or commercialization, primarily because they do not offer a sensible but-for world in the absence of opportunism by which to assess observed behavior. For example, noting that cell phone technology has advanced rapidly in recent years simply does not prove a lack of opportunism by the owners of SEPs related to some of the thousands of technologies included in cell phones. Nor do the studies even purport to show that individual holders of asserted patents are not excessively compensated or to rebut the hypothesis that the prospect of such excessive compensation has created perverse incentives for over-patenting and other welfare-reducing strategies.

• Concerns that effective efforts to prevent *ex post* opportunism will result in under-compensation of SEP holders rest on mistaken assumptions.

  o First, patent holders are not required to make FRAND commitments. When they do make such commitments they are voluntarily choosing to gain volume (by inclusion of their technologies in the standard) in exchange for unit price (by agreeing to only FRAND royalties). If the standard is successful, that bargain is generally very profitable; if the standard is not successful, the bargain leaves the SEP holder no worse off than if it had not made the commitment.

  o Second, sound, rigorously defined and enforced FRAND commitments would enable SEP holders to recover the *ex ante* value of their technology – that is, the value of the patented technology before lock-in. *Ex ante* value reflects what the SEP holder would have been paid by implementers of the standard in an *ex ante* world.

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5 We do not have in mind any specific alternatives to well-defined FRAND obligations. However, the antitrust principles on which we rely do not require adoption and enforcement of any particular kind of SSO policy, so long as the policies adopted are effective to prevent the kinds of *ex post* opportunism discussed here. If a creative SSO can develop some policy other than a FRAND commitment that is effective to prevent such opportunism, that policy would likely be a suitable alternative. Because we know of no such alternatives, we will throughout the remainder of this article refer to FRAND commitments as the solution to the problem of *ex post* opportunism by SEP holders.

6 Lee and Melamed (2016) provide a number of examples of such conduct.


bargain. This is how technology markets work in general, including markets for the licensing of patented technologies; and ex ante value is the standard for determining reasonable royalties in patent infringement cases. The ex ante value is the proper measure of the market value of the SEPs and by definition is the amount the patent holder would have received had a license been negotiated before lock-in. As we explain below, effective prevention of ex post opportunism need not, and should not, enable SSOs to act as a buyers’ cartel or otherwise to require SEP holders to accept less than the ex ante value of their patents.

- Some critics of effective measures to prevent ex post opportunism argue that SEP holders, too, are locked-in because of the costs they have already incurred in developing the patented technology and thus vulnerable to “reverse holdup” when dealing with implementers of the standard. But this argument rests on a fundamental misunderstanding of how the development of new technologies takes place in a market economy and how markets for the licensing of technology operate.

  o Typically, a new technology is licensed only after it has been developed. By the time the owner of the new technology negotiates licenses with users, that owner has already incurred various R&D expenses. This is common in the development of products of all types. In effect, technology and product developers make speculative investments. The complained-of plight of the technology developer is simply that, having made a speculative investment, it incurs a risk, like that incurred by all that make speculative investments, that it will not be sufficiently compensated by an arms’ length market bargain.

  o The problem faced by the implementer of an industry-wide standard that has been promised reasonable access to the essential patented technologies is very different. The implementer is vulnerable to extraction of supracompetitive royalties based, not just on the value of the patented technology, but also on the entire value of the implementer’s standard-compliant product. The implementer is therefore vulnerable to a kind of ex post opportunism that is very different from the risk knowingly incurred by a technology developer.

  o In any event, for good reason, antitrust law does not permit a firm introducing a new product or technology to act anti-competitively on the ground that it cannot

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9 See, e.g., LaserDynamics v. Quanta Computer, 694 F.3d 51 (Fed. Cir., 2012); CSIRO v Cisco, 809 F. 3rd 1295, 1304 (Fed Cir., 2015) (“We therefore reaffirm that reasonable royalties for SEPs generally – and not only those subject to a RAND commitment – must not include any value flowing to the patent from the standard’s adoption.”)

10 See, for example, Ohlhausen and Wright, supra.

11 The exception occurs when one or more potential users of the technology agree to fund its development, e.g., by entering into a research joint venture with the developer(s) of that technology.

12 The principles discussed here apply whether or not the firm developing the new technology is vertically integrated into one or more downstream uses of the technology.

13 See Lee & Melamed at 409-439 (explaining the several reasons that ex post compensation, including for SEPs, is excessive).
otherwise obtain sufficient compensation for its sunk R&D expenses.\textsuperscript{14} That kind of self-help would be especially inappropriate here because enabling SEP owners to engage in opportunism would harm all implementers, including those that would readily pay the patent holder the \textit{ex ante} value of its invention, and would retard innovation and the adoption of new technologies by implementers, which often are themselves significant innovators.

- Those who oppose effective measures to prevent \textit{ex post} opportunism argue that so-called “patent hold-out” by implementers – meaning that some implementers are unwilling to bargain in good faith for patent licenses – is a more serious problem.\textsuperscript{15} We know of no factual support for this argument. Moreover, given that implementers are alleged patent infringers, the issue is not whether they would prefer not to pay for a license, but whether there is a need for special rules in patent infringement cases, not available in other settings, to deal with alleged debtors who would rather litigate than settle on the terms offered to them.

\textbf{IV. The Role for Antitrust Law to Ensure that FRAND Commitments Are Effective in Preventing \textit{Ex Post} Opportunism}

Contract law and patent law play a major role in making FRAND commitments effective. Implementers and SEP owners can use contract law to determine the FRAND rate and to make sure that royalties due are collected. Contract law also can operate to enforce the “non-discrimination” prong of a FRAND commitment and thereby prevent SEP owners from discriminating against certain implementers. Patent law operates, following \textit{eBay}, by limiting the use of injunctions for SEP owners that have made FRAND commitments.\textsuperscript{16} Patent law also operates by setting reasonable royalties, in principle at the level to which the SEP owner and the implementer would have agreed in a hypothetical negotiation prior to the establishment of the standard,\textsuperscript{17} based on the smallest saleable patent-practicing component of the infringing device.\textsuperscript{18}

Experience and economic principles, however, teach that contract law and patent law are not sufficient to guard against patent holdup. For a variety of reasons, both court-ordered patent remedies and licenses negotiated in the shadow of litigation tend to overcompensate patent

\textsuperscript{14} See \textit{United States v Apple}, 791 F. 3d 290, XXX (2d Cir. 2015) (rejecting argument that a firm might engage in otherwise illegal conduct if necessary to compete against an incumbent monopoly as “a concept of marketplace vigilantism that is wholly foreign to the antitrust laws”). Indeed, permitting anticompetitive conduct to ensure that a firm receives an adequate return on investment would be the antithesis of antitrust law, which is based on the premise that lawful competition should determine the appropriate rewards to investment. See, e.g., \textit{United States v. Socony-Vacuum Oil Co.}, 310 U.S. 150 (1940); \textit{United States v. Trenton Potteries Co.}, 273 U.S. 392 (1927); \textit{United States v. Trans-Missouri Freight Association}, 166 U.S. 290 (1897).


\textsuperscript{17} \textit{Ericsson Inc. v. D-Link Systems Inc. et. al.}, 773 F.3d 1201 (Fed. Cir. 2014).

\textsuperscript{18} \textit{LaserDynamics v. Quanta Computer}, 694 F.3d 51 (Fed. Cir. 2012).
holders, even when they purport to be based on the *ex ante* value of the patents. While the *eBay* case has limited the availability of injunctions in infringement cases involving SEPs, it has not eliminated that possibility or the bargaining leverage that the prospect of an injunction can confer upon SEP holders in royalty negotiations with infringers. We are specifically concerned about proposals to grant an injunction to a SEP holder if an implementer is found to have refused an offer that was subsequently deemed to have been FRAND-compliant. That approach would not eliminate the pressure on implementers to accept offers they regard as non-compliant, for fear that the court will reach a different conclusion at a later time and expose them to patent holdup. That approach also would enable SEP owners to pressure implementers to accept offers even when the implementers believe that the asserted SEPs are not valid or not infringed. Such pressure predictably induces settlements on terms more onerous to implementers than the *ex ante* value of the SEPs. The proper approach after a FRAND rate has been determined is to make a SEP license available to the implementer on FRAND terms, imposing an injunction only if the implementer then refuses to pay the FRAND rate.

Put simply: more is needed than contract and patent law. To effectively prevent *ex post* opportunism involving SEPs, antitrust law should be used in conjunction with contract law and patent law to constrain anticompetitive conduct by both SEP holders and SSOs.

**A. Anticompetitive Conduct by SEP Holders**

Courts have already recognized that, in some situations, antitrust cases can be brought against SEP holders under Section 2 of the Sherman Act, 15 U.S.C. § 2. Thus, for example, a SEP holder that makes a FRAND commitment without intending to comply, and thereby induces the SSO to include its technology in the standard, obtains its technology monopoly unlawfully and thus violates Section 2. In that situation, the SEP holder could be liable for damages to holders of patents on technologies wrongfully excluded from the standard and to implementers harmed by the SEP holder’s subsequent exercise of the unlawfully obtained monopoly power. However, Section 2 cases of that type are unlikely to have a significant impact on the efficacy of measures to prevent *ex post* opportunism because they require the plaintiff to prove both that the

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20 Of course, *eBay* applies only within the United States and thus does not prevent SEP owners from obtaining bargaining leverage based on the threat of an injunction in other jurisdictions.

21 This approach gives the implementer an incentive to accept a reasonable offer rather than litigate, because the reasonable *ex ante* value of the patents would appropriately be discounted to reflect the likelihood that the patents would be found to be invalid or not infringed. This is the normal situation when parties negotiate patent licenses in the shadow of litigation in the absence of lock-in and in circumstances where the court is expected to award ongoing royalties rather than issue an injunction if the patent is found valid and infringed.

22 Broadcom Corp. v Qualcomm Inc., 501 F.3d 297 (3d Cir 2007); see also Conwood Co. v. United States Tobacco Co., 290 F.3d 768 6th Cir (4th Cir. 2002) (misrepresentation and other tortious conduct can meet the anticompetitive conduct element of unlawful monopolization).

FRAND commitment was fraudulent when made and that it caused the inclusion of the patented technology in the standard and, thus, the SEP holder’s monopoly.

A SEP holder might violate Section 2 if it refuses to license to an implementer in violation of a FRAND commitment and if that refusal enables the SEP holder to gain or preserve market power in a market in which the implementer does or would otherwise compete.24 At first glance, an antitrust claim of that type might seem to face long odds. In the first place, the Federal Circuit held in the CSU case that a unilateral refusal to license a lawfully obtained patent does not violate the antitrust laws.25 While that case has been soundly criticized for giving patent holder an exemption from the antitrust laws that is not required by the patent statute and is not available to owners of tangible property,26 and the Supreme Court has repeatedly in recent years overturned Federal Circuit law that the Court found to be too protective of patent holders, the Court has not directly cast doubt on the CSU case. More important, in Trinko,27 the Supreme Court expressed great skepticism about unilateral, unconditional refusal-to-deal cases. Trinko involved violations of regulatory duties imposed by the Telecommunications Act of 1996 and enforced by the Federal Communications Commission. The Court held that violation of a non-antitrust requirement is not sufficient to cause a refusal to deal to be deemed to be wrongful or anticompetitive conduct for antitrust purposes, and some have understood the decision to mean that termination of a prior course of dealing might be necessary for a successful refusal-to-deal claim.28

There is, however, another line of antitrust cases that would support finding antitrust liability for a refusal to deal that violates a FRAND commitment. Those are cases in which a refusal to deal is used by a monopolist to extend its regulated monopoly into an unregulated downstream market in order to exercise in the latter market power that it was unable to exercise in the regulated market. The Supreme Court embraced such a theory in Otter Tail Power Company v. United States.29 William Baxter, Assistant Attorney General for antitrust in the Reagan Administration, famously vowed to “litigate to the eyeballs” the government’s case against AT&T, which was based on this theory of regulatory evasion.30 The Department of Justice ultimately settled that case when AT&T agreed to be broken into 8 separate companies, each of which was subject to significant post-divestiture restrictions. By analogy, a SEP holder’s

25 In re Independent Service Organizations Antitrust Litigation, 203 F.3d 1322 at 1327 (Fed. Cir. 2000). “In the absence of any indication of illegal tying, fraud in the Patent and Trademark Office, or sham litigation, the patent holder may enforce the statutory right to exclude others from making, using, or selling the claimed invention free from liability under the antitrust laws.”
28 [Add cites.]
refusal to license in violation of a FRAND commitment under circumstances that enable or enhance the creation of market power in a related market not subject to a FRAND commitment would seem to violate Section 2. This would be true if the refusal to deal enhanced the SEP holder’s market power as an implementer of the standard or if the SEP holder’s refusal to deal enabled an unaffiliated implementer to gain market power for which it compensated the SEP holder by inflated royalties for a license to the SEPs or otherwise.  

A SEP holder’s violation of the non-discrimination requirement of a FRAND commitment could also violate Section 1 of the Sherman Act. If a SEP holder enters into one or more agreements with implementers that require it to give those implementers exclusive licenses or grant them preferential terms, those agreements could violate Section 1 of the Sherman Act if they injure or are likely to injure competition among implementers. The fact that the exclusive or preferential licenses violated the SEP holder’s FRAND commitment would not be material to the violation, but it would probably influence the antitrust decision maker and, by broadening the factual context, could undermine the SEP holder’s efforts to demonstrate that those licenses served some procompetitive purpose.

Similarly, a SEP holder’s insistence on tying SEPs together with other patents (or goods) in licensing deals with implementers could be seen as violating Section 1. The idea is that, by insisting that implementers that want a license to the SEPs also take a license to other patents, the SEP holder can extract more consideration for the other patents than would otherwise be the case. That extra consideration is properly attributable to the SEPs, so the scheme can be seen as a means of obtaining more than a “reasonable” royalty for the SEPs and thus a violation of the FRAND commitment, much like the regulatory evasion in the AT&T case. In most cases, there is separate demand for the SEPs and the other patents, so they are likely to be deemed to be separate products for tying purposes. Therefore, because the SEP holder has market power in the technology market in which the SEPs are licensed, the arrangement could well be deemed to be an unlawful tying arrangement.

The SEP holder might, however, point to language in Jefferson Parish suggesting that tying is unlawful only where the buyer (in this case, the implementer) does not want to buy the tied product (in this case, the license to the non-SEP patents) from the seller. On the basis of that language, the SEP holder might argue that the tying arrangement does not violate the antitrust laws if the implementer wanted a license to both the SEPs and the non-SEPs, even if the implementer would have preferred that they not be tied together. It is doubtful that the brief

31 Id., at 12 (an unlawful tying arrangement involves forcing a buyer to purchase something that the buyer “either did not want at all or might have preferred to purchase elsewhere on different terms”).

32 [Cite exclusive dealing cases.]

33 See Jefferson Parish Hospital District v. Hyde, 466 U.S. 2, 19-22 (1984) (products are deemed to be separate products for tying purposes if there is separate demand for them).

34 See Jefferson Parish, 466 U.S. at 9, 13-14 (tying of separate products when the seller has market power at least one of them is unlawful per se.).
passage from *Jefferson Parish* on which the argument is based, which was written in a very different context, can properly be read so broadly. But even if that language might ordinarily preclude a tying claim involving multiple products that the buyer wants to purchase from the seller, it should not do so in the case of a tying arrangement that violates a FRAND commitment. The rationale for the *Jefferson Parish* dicta is a variation of the one-monopoly-profit theory – the idea that, if the buyer wants to purchase both the tying and the tied product from the seller, the seller cannot increase its market power by in effect allocating some of the consideration for the tying product to the tied product. That rationale has no application in the FRAND context, where the SEP holder has agreed to limits on its market power and the tying arrangement enables the SEP holder to violate the FRAND commitment and thus to exercise market power not otherwise available to it.

**B. Anticompetitive Conduct by SSOs and Their Members**

The courts have not yet had occasion to recognize that there is another important role for Section 1 of the Sherman Act, 15 U.S.C. §1, to help guard against *ex post* opportunism by SEP holders. This role is soundly based on well-established Supreme Court precedent regarding the application of Section 1 to activities by SSOs and their members.

The starting point in the analysis is the recognition that, while SSOs provide substantial economic value, they also inherently give rise to antitrust risks. SSOs are large, industry-wide organizations whose members include multiple competitors in various industry segments. Collaboration among competitors needs to be conducted with great care lest it reduce competition among them more than necessary to achieve benefits of greater value. It is inconceivable, for example, that competitors could in ordinary circumstances agree on product specifications without violating Section 1, which prohibits unreasonable restraints of trade or, as they are more commonly called, anticompetitive agreements. Public technology standards established by SSOs are nevertheless generally lawful because they are necessary to facilitate interoperation and interconnection of technology-dependent devices. They also can address problems of coordination among suppliers of complements, which does not ordinarily give rise to antitrust concerns. Trickier from an antitrust perspective, they also facilitate coordination among competitors in a way that can enhance competition and promote economic efficiency.

Despite the pro-competitive benefits generally associated with standard setting by SSOs, such activities do not fall into a safe harbor, insulated from the antitrust laws. To the contrary, the Supreme Court and the lower courts have repeatedly held that both SSOs and their members can violate Section 1 of the Sherman Act. Thus, for example, in *Allied Tube & Conduit Corp. v. Indian Head, Inc.*, the Supreme Court held that a group of manufacturers violated Section 1 when they manipulated the standard selection process in order to exclude a competing

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36 See, e.g., National Macaroni Manufacturers Assn v. FTC, 345 F. 2d 421 (7th Cir. 1965) (agreement among members of a trade association restricting the ingredients to be used in macaroni and other products violates the antitrust laws).

37 See, for example, Chapter 2 in the DOJ/FTC IP Report, “Competition Concerns When Patents Are Incorporated Into Collaboratively Set Standards,” op. cit.

38 See, for example, Chapter 3 of the DOJ/FTC IP Report, “Antitrust Analysis of Portfolio Cross-Licensing Agreements and Patent Pools.”
technology from the standard.\textsuperscript{39} And in \textit{American Society of Mechanical Engineers v. Hydrolevel Corp.}, the Court found that a scheme by a member company and an officer of the SSO to cause a competitor’s product to be deemed wrongfully not to comply with the standard violated both Section 1 and Section 2 of the Sherman Act.\textsuperscript{40} \textit{Radiant Burner, Inc. v. Peoples Gas Light & Coke Co.}, 364 U.S. 656 (1961), is to the same effect.

The key antitrust question, therefore, is how the law reconciles the legitimate purpose of collaborative standard-setting with its likely creation of market power for SEP holders.

The answer is found in the fundamental principle of antitrust law that, when firms – and especially competitors – collaborate, even for a legitimate purpose, their collaboration must be no more restrictive of competition than reasonably necessary to enable achievement of the legitimate purpose. This principle has its origins in the common law\textsuperscript{41} and in some of the earliest U.S. antitrust cases.\textsuperscript{42} It means, not just that the collaboration in question – for present purposes, SSO rules and practices regarding the creation of standards and the licensing of SEPs – must on balance further the public interest, but rather that they are unlawful if there is a different set of rules and practices that could largely achieve the intended benefits with less harm.\textsuperscript{43} As the Court explained in \textit{Allied Tube}, “[a]n association cannot validate the anticompetitive activities of its members simply by adopting rules that fail to provide . . . safeguards” against conduct by members “with economic interests in restraining competition.”\textsuperscript{44}

The court put it this way in \textit{Kreuzer v. American Academy of Periodontology}, which concerned the lawfulness of a professional association’s rules of practice: “. . . [A] practice intended to benefit the public may have a collateral adverse effect on competition. If it does, then such a practice must be the least restrictive means of achieving the desired goal and the public benefit rendered must outweigh the adverse effect on competition.” 735 F.2d 1479, 1496 (D.C. Cir. 1984) (emphasis added). In other words, even if the collaboration has a legitimate purpose, the collaborators violate the antitrust laws if they harm competition more than reasonably necessary to achieve that purpose.

This fundamental legal principle was summarized in the U.S. enforcement agencies’ Competitor Collaboration Guidelines as follows. When a collaboration among competitors

\textsuperscript{39} 486 U.S. 492 (1988). The Court explained that industry-wide standard setting is permitted under the antitrust laws “only on the understanding that it will be conducted in a nonpartisan manner offering procompetitive benefits.” 486 U.S. at 507.

\textsuperscript{40} 456 U.S. 556 (1982).

\textsuperscript{41} See, e.g., Horner v. Graves, 7 Bing. 735, 743 (1831), which described a “reasonable restraint of trade” as not “larger than . . . necessary” or “so large as to interfere with the interests of the public.”

\textsuperscript{42} See, e.g., \textit{See United States v. Addyston Pipe & Steel Co.}, 85 F. 271, 282 (6th Cir. 1898) (Taft, J.) (“[N]o . . . restraint of trade can be enforced unless . . . it is merely ancillary to the main purpose of a lawful contract, and necessary to protect the covenantor’s . . . enjoyment of the legitimate fruits of the contract, or . . . from the dangers of an unjust use of those fruits by the other party.”).

\textsuperscript{43} See C. Scott Hemphill, “Less Restrictive Alternatives in Antitrust Law,” 116 Columbia. L. Rev. 927, 937 (2016) (explaining that the “less restrictive alternative principle” goes beyond a “net effects” test and asks whether there is an alternative to the conduct in question “that serves the same beneficial goal with less anticompetitive effect”).

\textsuperscript{44} 486 U.S. at 509.
harms competition – as the creation by industry-wide standard setting groups of monopoly power for SEP holders surely does – that harm must be justified by an offsetting, procompetitive justification. In the case of SEPs, that justification is the creation of the industry standard. But it is not enough to show some procompetitive efficiencies. To the contrary, if the participants “could achieve similar efficiencies by practical, significantly less restrictive means,” the enforcement agencies regard the competitive harm as not necessary to achieve the procompetitive benefits and thus not justified by them.\(^{45}\)

In the standard-setting context, this principle means that the SSO must take effective measures to prevent SEP holders from exercising the monopoly power created by the standard, unless the SSO can demonstrate that it would have been unable to promulgate the standard or a suitable alternative without permitting the opportunistic ex post exercise of market power by SEP holders. In effect, the law requires that the SSO and its members take effective steps to minimize the harm from the monopolies that their collaboration confers upon SEP holders.

Some SSO members have an interest in ensuring that the SSO takes such steps, and that no doubt explains in part why most SSOs have adopted FRAND policies or similar requirements designed to limit ex post opportunism by SEP holders. But, as shown in the economic model in the Appendix to this article, SSOs cannot in general be counted on to adopt effective FRAND policies. The bases for this conclusion, which is central to our argument for the applicability of Section 1 to SSO FRAND rules, can be summarized as follows.\(^{46}\)

- First, the SSO members collectively have an interest in permitting SEP holders to charge supra-competitive royalties that elevate the downstream price of compliant devices to the monopoly level. This observation alone should serve as a clear and strong signal regarding the dangers of counting on SSOs to implement effective FRAND policies: if the SSO members negotiate efficiently, the outcome will be just as bad for consumers as if the members agreed to fix downstream prices.\(^{47}\) The fundamental problem is that final consumers are not at the table when the SSO rules are negotiated.

- Second, SSO members that own SEPs but earn little or no profits as implementers have a powerful self-interest in being able to exercise the ex post monopoly power associated with their SEPs. Because SSO policies are usually determined by a consensus process, one can predict that these members will be able to block the adoption of fully effective FRAND policies. Moreover, these SSO members often have the greatest interest in SSO


\(^{47}\) We are not saying that such efficient multilateral negotiations are common. They typically would require that SEP owners make side payments to downstream implementers so the latter will acquiesce to the supra-competitive SEP royalties. One way for SSOs members to make such side payments is through reciprocity across multiple standards. But our robust central point here is that there is an inherent danger in allowing a group of industry members to set rules that ultimately determine the prices that consumers will pay for their products.
patent policies. Much of their income or profits may be attributable to patent licensing. They can be expected to devote substantial resources to block the adoption of FRAND policies that effectively prevent patent holdup.

- Third, even SSO members that earn significant profits as implementers have mixed incentives if they also own SEPs, and this too can lead to weak or ineffective FRAND rules. In the Appendix, we show that, if the requisite share of votes in the SSO needed to establish rules are cast by firms whose share of SEP royalties is at least as large as their share of downstream profits, and if these firms can coordinate their voting over the FRAND rules, then an SSO not constrained by antitrust laws will establish FRAND rules leading to an outcome no better for consumers than would result from an integrated monopolist controlling all SEPs and all downstream sales.

- Fourth, even SSO members that are downstream implementers and own few if any SEPs may have only a modest interest in promoting effective policies to restrict ex post opportunism. This is so because all implementers will be subject to the opportunism, so all of them will face increased licensing costs, and therefore they will likely be able to pass most or all of the increased costs on to their customers.\(^\text{48}\) Furthermore, these implementers might not be especially active or effective in the standard-setting process, for free-riding/public good reasons, especially if SEP royalties constitute only a small portion of the costs of their standard-implementing products. Public choice theory predicts that the highly motivated SEP holders are likely to have the greatest influence over patent policies.

Empirical evidence bears out these concerns. As a starting point, we find it striking that SSO FRAND rules are almost always quite vague.\(^\text{49}\) More generally, SSOs in which SEP holders are more prevalent tend to have weaker FRAND rules.\(^\text{50}\) Plus, to our knowledge SSOs have made almost no effort to enforce their FRAND rules and have, instead, left enforcement efforts to others. All of this evidence raises serious doubts about the effectiveness of the existing FRAND rules in preventing ex post opportunism.

A strong case can thus be made that effective prevention of ex post opportunism by SEP holders requires antitrust enforcement to overcome the SSO problems associated with (a) attenuated incentives (implementers that also own SEPs), (b) the public-good aspect of stronger FRAND rules (the danger that implementers will free ride on others rather than expend resources

\(^{48}\) Farrell and Merges (2007) refer to this as the “pass-through problem,” which weakens the incentives of alleged infringers to challenge patents or resist excessive royalty rates that will apply widely.

\(^{49}\) Based on their study of the IPR policies of twelve major SSOs, Bekkers and Updegrove conclude that “none of the policies in the study set seeks to define the term ‘reasonable’ (and/or the term of ‘fair’ if the policy refers to FRAND). Likewise, ‘non-discriminatory’ also is left to the parties involved to agree upon (or to the courts, if they cannot).” See Rudi Bekkers and Andrew Updegrove, “IPR Policies and Practices of a Representative Group of Standards-Setting Organizations Worldwide,” 2012, available at [http://sites.nationalacademies.org/cs/groups/pgasite/documents/webpage/pga_072197.pdf](http://sites.nationalacademies.org/cs/groups/pgasite/documents/webpage/pga_072197.pdf).

to implement strong FRAND rules), and (c) externalities (the harm to consumers that results when implementers pass through higher royalties in the form of higher prices).

The antitrust principle is straightforward: it is not enough for an SSO to put in place FRAND policies on which it has been able to gain consensus among its conflicted and/or indifferent members. Industry-wide collaboration through SSOs to establish procompetitive standards is permitted only if it is no more restrictive of competition than reasonably necessary to enable creation of the standards. When standard-setting predictably creates technology monopolies that, if unrestrained, will enable anticompetitive ex post opportunism that would otherwise not occur, an SSO that does not take effective measures to prevent or minimize such ex post opportunism is engaging in conduct that is more restrictive of competition than necessary. In that case, the SSO and, in appropriate cases their members, may well violate Section 1 of the Sherman Act.

Under this principle, SSO procedures and FRAND rules are to be evaluated based on whether they lead to reasonable SEP royalties, using the competitive ex ante licensing standard discussed above, which has been embraced and adopted by the courts in patent law. Put differently, FRAND rules should be evaluated based on their ability to prevent SEP holders from obtaining from implementers more than the ex ante value of their technology. This limitation would not prevent a SEP holder from profiting, perhaps greatly, from participating in the SSO and having its patented technology included in the standard because such inclusion can greatly increase the volume of licensing opportunities available to the SEP holder. Those licensing opportunities are the reward to the SEP holder for its having developed or acquired the technology chosen for inclusion in the standard.

Whether a particular set of FRAND rules are sufficiently effective in preventing ex post opportunism will depend on the particular circumstances. Typically, we expect that the antitrust plaintiff would need to put forward, at least in general terms, an alternative, stronger set of FRAND rules that would do better in terms of leading to reasonable SEP royalties without sacrificing the pro-competitive benefits associated with the standard-setting activity. 51

Our overall sense, based on experience and the empirical literature, is that the extant FRAND rules are generally useful, but they are imprecise and leave many issues unresolved. Left unresolved are such critical issues as (a) what is a reasonable royalty, even conceptually; (b) just what does “nondiscriminatory” mean; (c) to whom must licenses be offered; and (d) under what

51 Those defending ineffective rules might argue that stronger rules would cause patent holders to withdraw from SSO membership and would thus impair the standard-setting activities. See, e.g., Richard A. Epstein and Kayvan B. Noroozi, op. cit., noting that 4 companies announced that they would not comply with the new IEEE policies discussed below. Under ordinary antitrust principles, the burden of proof on this point would be on the SSO advancing that justification, and we would expect the argument to fail in most instances. Among other things, SSOs have hundreds of members, so the recalcitrance of a handful is unlikely to stop the innovation or standard-setting process. Also, the payoff to SSO membership and inclusion of one’s patented technologies can be enormous, so large scale defections would appear to be very unlikely. Most important, stating an intention not to comply with effective rules is a much more likely as part of an effort to change the SSO rules in times of flux, or when other SSO alternatives have less effective rules, than when all SSOs strive for effective rules in order to comply with the antitrust laws.
circumstances may a SEP holder obtain an injunction. Both economic theory and experience suggest that these imprecise FRAND commitments are not sufficient to prevent ex post opportunism. The recent revisions to IEEE’s FRAND policy are a big step in the right direction, but even this advance leaves important questions unanswered.

As always, antitrust law can be and should be flexible and attentive to the specific factual circumstances on a case-by-case basis. What is best for one SSO or one kind of standard might not be best for another. Experience in the marketplace and the creativity of SSOs and their members can best determine which measures are most effective and efficient in any given case. One size does not fit all when it comes to FRAND rules, and antitrust law should welcome competition among SSOs to solve the problem of ex post opportunism by SEP holders. The role of antitrust law is not to prescribe how SSOs should solve this problem, but simply to require that SSOs and their members implement effective solutions that minimize ex post opportunism without sacrificing the many benefits associated with standard setting.

52 Many of these problems are not all that hard to fix. See Mark Lemley and Carl Shapiro, “A Simple Approach to Setting Reasonable Royalties for Standard-Essential Patents,” Berkeley Technology Law Journal (2013).

53 The new policy states that a reasonable royalty excludes the value, if any, from inclusion of the patented technology in the standard and that its determination should include consideration of the value of the claimed invention in the smallest saleable implementation of the standard that practices the invention, the value contributed to that product by all other SEPs, and existing licenses obtained under comparable circumstances and not under threat of an injunction. It prohibits the SEP holder from seeking an injunction unless the implementer refuses to participate in an appropriate adjudication of the patent holder’s claims or to comply with the outcome of such adjudication. And it requires SEP holders to license their patents to any implementer of a standard-compliant product and prohibits an SEP holder from tying SEP licenses to licenses for other patents. See Letter from Renata B. Hesse, Acting Assistant Attorney General, to Michael A. Lindsay, Esq., (February 2, 2015), available at http://www.justice.gov/atr/public/busreview/311470.pdf.
Appendix: Economic Model of the Determination of SSO IP Rules

We study an SSO that is selecting its rules relating to the licensing of intellectual property, which we refer to here as FRAND rules. These rules will determine the royalties that SEP owners will be able to obtain from implementers in the ex post licensing that will take place subject to those FRAND rules. We denote by $R$ the resulting total royalty rate that each implementer will pay for the entire set of SEPs. Tighter FRAND rules will lead to a lower $R$. We study here how the SSO will set its FRAND rules for a given standard and thus for a given set of SEPs.

In this Appendix, we assume that there are no antitrust limits on the FRAND rules that an SSO and its members can select. Our central point is that the absence of antitrust limits can lead to highly undesirable outcomes, so some such limits are needed.

The total royalties paid by implementers to SEP owners are given by $T(R)$, which we assume is concave, reaching its maximum at $R^M$. $R^M$ is thus the most preferred royalty rate for an unintegrated monopolist controlling all of the SEPs. The total profits of the implementers are given by $V(R)$, which we assume is decreasing in $R$, reflecting the typical situation where industry profits decline if costs rise uniformly for all suppliers. Consumer surplus is given by $S(R)$, which we also assume is decreasing in $R$, as higher royalties lead to higher prices. Total industry profits are given by $W(R) = T(R) + V(R)$ which we assume is concave, reaching its maximum at $R^I$. Since implementer profits decline with $R$, it is immediate that $R^I < R^M$. If there are no effective FRAND rules in place and SEPs are owned by multiple owners, the royalty rate is at the Cournot Complements level of $R^C$ which exceeds $R^M$.

We take as our benchmark for $R$ the total royalty rate that would result from ex ante licensing. Ex ante, each SEP owner faces competition from other technologies that could be incorporated into the standard instead of its SEPs. We denote this competitive benchmark total royalty rate by $R^*$. This benchmark is very attractive from a normative perspective and from an antitrust perspective: it fully respects the intellectual property rights of patent owners, who obtain rewards based on the superiority of their inventions, and it captures the royalty rates resulting from technology competition without opportunism by SEP owners.\(^54\) This approach also is consistent with the approach to reasonable royalties for SEPs taken by the Federal Circuit in Ericsson.\(^55\)

Our competitive benchmark permits the owners of complementary SEPs to form a patent pool to


\(^55\) Ericsson v. D-Link, 773 F. 3d 1201 (Fed. Cir. 2014). “The essential requirement is that the ultimate reasonable royalty award must be based on the incremental value that the patented invention adds to the end product.” 1226 “We merely hold that the royalty for SEPs should reflect the approximate value of that technological contribution, not the value of its widespread adoption due to standardization.” 1233
license their patents collectively and thus overcome the Cournot Complements problem. This ensures that the royalty rate is no larger than the monopoly royalty rate: $R^* \leq R^M$.

Our first result applies in situations where the SSO members can bargain collectively amongst themselves to implement a set of FRAND rules that maximizes their combined profits. This might well require the SSO members to find mechanisms to make side payments. With efficient multilateral bargaining and side payments, the SSO will implement FRAND rules that lead to the total royalty rate of $R^I$, the rate that would be set by a monopolist controlling all SEPs and all downstream products. This deprives consumers of any benefits from competition at either level (SEPs or downstream products). In situations where each SEP owner faces significant ex ante competition from alternative technologies, this total royalty rate will far exceed the competitive benchmark royalty rate $R^*$. 

We now discuss the individual members of the SSO and their interests. There are $N$ firms that participate in the SSO, $k = 1, 2, \ldots, N$. Each of these firms may own SEPs, or be an implementer, or both. Without loss of generality, denote firm $k$’s share of the SEP licensing revenue by $s_k$, and denote firm $k$’s share of the downstream (implementer) profits by $t_k$. With this notation, firm $k$’s overall profits are given by

$$W_k(R) = s_k T(R) + t_k V(R).$$

Denote by $R_k$ the royalty that maximizes firm $k$’s profits. If $s_k = 0$, then firm $k$ operates only downstream as an implementer, so firm $k$ prefers lower royalties: $R_k = 0$. If $t_k = 0$, then firm $k$ operates only upstream as SEP owner, so firm $k$ seeks to maximize the SEP royalty income: $R_k = R^M$. In between these extremes, the first-order condition for $R_k$ is given by $\frac{\partial R_k}{\partial s_k} = \frac{t_k}{s_k}$ so $R_k$ is determined by the ratio $z_k \equiv \frac{t_k}{s_k}$, which measures firm $k$’s stake in the downstream profits relative to its stake in SEP royalties. Totally differentiating this first-order condition with respect to $z_k$ shows that $\frac{dR_k}{dz_k} < 0$, i.e., that firms with a greater relative stake in the downstream profits prefer lower SEP royalty rates, as one would expect. We say that a firm has a greater relative stake in SEPs than in downstream profits if $z_k < 1$. We can rank the firms based on their relative stake in downstream profits vs. SEP royalties. Without loss of generality, we label the firms such that $z_1 \leq z_2 \leq \cdots \leq z_N$. This implies that $R_1 \geq R_2 \geq \cdots \geq R_N$. 

Our next result applies in situations where each SSO member is vertically integrated as between SEPs and downstream products and captures the same share of SEP revenues as it does of the downstream profits. (This does not require symmetry: some firms can be large and others small.) In our notation, this corresponds to $s_k = t_k$ for all $k$. This implies that firm $k$’s profits are $W_k(R) = s_k W(R)$, so each firm’s profits are maximized a $R = R^I$. Therefore, there will be

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consensus at the SSO to set SSO rules that lead to the royalty level that will support the same prices and outputs that a monopolist controlling all of the SEPs and all of the downstream production would choose. This is the same outcome discussed above.

When the interests of the various SSO members diverge as regards the FRAND rules, in order to obtain predictions about the resulting FRAND rules, one must model the SSO decision making process, and the status quo outcome that prevails if no new proposal garners sufficient support to be adopted. A full model of SSO decision making is beyond the scope of this article. For example, as noted above, if SEP owners have large incentives to block strong FRAND rules and implementers have weaker incentives to put strong FRAND rules in place, the SEP owners may have more influence in the SSO, for any given set of voting procedures. However, even without a full model of SSO decision making, we can make some observations about situations in which SSO member’s interests diverge, assuming no side payments among the members.

- **SSO Dominated by SEP Owners**: Suppose that “pure SEP owners,” i.e. firms that receive no share of the downstream profits, have enough power in the SSO to implement their preferred FRAND rules. Then the SSO will adopt FRAND rules leading to the monopoly royalty rate, \( R = R^M \), if these firms can coordinate to vote as a block. This will be the outcome unless implementers can effectively prevent this outcome by dropping out of the SSO and establishing a rival standard in another forum more favorable to them.

- **SSO Dominated by Firms With Greater Relative Interest in SEPs**: Suppose that firms with a greater relative stake in SEPs than in downstream profits have enough power in the SSO to implement their preferred FRAND rules. Since all of these firms prefer FRAND rules that lead to a royalty rate of at least \( R^I \), the FRAND rules will lead to a royalty rate at least that high if these firms can coordinate to vote as a block.

- **SSO Dominated by Implementers**: Suppose that “pure implementers,” i.e. firms that own no SEPs, have enough power in the SSO to implement their preferred FRAND rules. If these firms can coordinate to vote as a block, then the SSO will require SEPs to be licensed on royalty-free terms. This will be the outcome unless SEP owners can effectively prevent this outcome by dropping out of the SSO and establishing a rival standard in another forum more favorable to them.

With flexible side payments and efficient multilateral bargaining, we get the outcome discussed above, namely \( R = R^I \).