

Innovators, Implementers, and Two-sided Hold-up

Luke Froeb and Mikhael Shor

In February of 2015, the U.S. Department of Justice issued a Business Review Letter regarding proposed revisions to the Institute of Electrical and Electronics Engineers (IEEE) Patent Policy.¹ This policy focuses on commitments by firms contributing patented technology to standards promulgated by the IEEE to license their technology on reasonable and non-discriminatory terms. Two main proposals seem designed to shift bargaining rents toward implementers and away from the developers of technology: (1) curtailing injunctive relief and (2) basing adjudicated royalties on the “smallest salable Compliant Implementation.” While purportedly designed to solve the “hold-up problem” faced by implementers of patented technologies, we are concerned that such proposals are likely instead to reduce innovation. This article does not focus on the specific elements of the IEEE revisions but considers these types of hotly contested proposals generally as they are being thought about today.

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Background

A patent becomes a standard-essential patent (SEP) when compliance with an adopted standard necessitates use of the patent’s underlying technology. Out of concern that holders of SEPs could leverage the market power derived from essentiality, standard-setting organizations such as the IEEE and the European Telecommunications Standards Institution (ETSI) generally require holders of SEPs to make available a license on “reasonable and non-discriminatory” (RAND) terms.² This aims to reduce so-called patent “hold-up.”³ Patent hold-up may occur when the owner of a SEP makes demands for royalties after a potential implementer has invested in a product incorporating the standard. These royalties may be higher than what would have been negotiated before the implementer irrecoverably invested. If implementers foresee this possibility, they may under-invest or not invest at all.

¹ Business Review Letter from Hon. Renata B. Hesse, Acting Assistant Att’y Gen., U.S. Dep’t of Justice, to Michael A. Lindsay, Esq., Dorsey & Whitney, L.L.P. (Feb. 2, 2015) [hereinafter IEEE Business Review Letter], available at <http://www.justice.gov/atr/public/busreview/311470.htm>.

² In some cases, “fair” is added to RAND (FRAND). ETSI Rules of Procedure art. 6.1 (Nov. 26, 2008). Judge Richard Posner argues that “the word ‘fair’ adds nothing to ‘reasonable’ and ‘nondiscriminatory.’” *Apple, Inc. v. Motorola, Inc.*, 869 F. Supp. 2d 901, 912 (N.D. Ill. 2012). Others contend that there is a distinction between RAND and FRAND and that RAND “focuses on ensuring economic efficiency issues, leaving aside fairness considerations.” Pierre Dehez & Sophie Poukens, *The Shapley Value as a Guide to FRAND Licensing Agreements*, 10 REV. L. & ECON. 265, 267 (2014).

³ See IEEE Business Review Letter, *supra* note 1 (“[T]he Update’s provisions also may further help to mitigate hold up . . .”). What economists call “hold-up” (or “opportunism”) is defined generally in OLIVER WILLIAMSON, *THE ECONOMIC INSTITUTIONS OF CAPITALISM* (1985). For an application to patents, see, for example, Mark Lemley & Carl Shapiro, *Patent Holdup and Royalty Stacking*, 85 TEX. L. REV. 1991 (2007).

To mitigate potential hold-up, some parties suggest that RAND should be determined by “postulating a hypothetical negotiation”⁴ between innovators and implementers at the point immediately prior to the patent being incorporated into the standard.⁵

In addition to requiring a RAND commitment by holders of SEPs, two further measures that purport to reduce patent hold-up have gained favor among some courts and academics and are reflected in the IEEE revisions. First is the proposal to adjudicate royalties based primarily on the “smallest salable” patent-practicing unit (or “smallest component”) rather than the patent’s contribution to the entire market value of the product.⁶ This proposal stems from a fear that basing royalties on the full value of the implementing technology can lead to excessive payments by implementers. Second is the proposal to curtail injunctive relief for holders of SEPs. Proponents of this proposal argue that the threat of injunction can allow innovators to extract supra-RAND royalties when it is costly for implementers to switch to alternate technologies.

Two-sided Hold-up

Concerns expressed regarding the potential for patent hold-up are generally one-sided, focusing on the incentives of the implementers of the technology while generally ignoring the incentives of innovators to create the technology in the first place.⁷ Such analysis takes the level of innovation as given, so that the only possible harm to competition is through the implementer’s decision to invest. The underlying incentive problem, however, is two-sided because an innovator’s incentives to engage in significant R&D may also be distorted by well-intentioned actions taken to correct the potential hold-up problem.

Once we consider not just the effects of the proposed revisions on prospective implementers of technology, but also on innovators, the problem becomes recognizable as one of two-sided hold-up.⁸ Just as implementers invest before knowing what end-product demand will be, so too must innovators invest before knowing whether an innovation will be implemented.

Our analysis draws from an economic model of two-sided hold-up by Ganglmair, Froeb, and Werden.⁹ The model’s primary message is that the innovator’s and the implementer’s hold-up

⁴ *Minco, Inc. v. Combustion Eng’g, Inc.*, 95 F.3d 1109, 1119 (Fed. Cir. 1996).

⁵ Letter from Michael A. Lindsay, Esq., Dorsey & Whitney, L.L.P., to Hon. William J. Baer, Assistant Att’y Gen., U.S. Dep’t of Justice at 15 (Sept. 30, 2014) [hereinafter IEEE Business Review Request], available at <http://www.justice.gov/atr/public/busreview/request-letters/311483.pdf> (defining reasonable rate as “excluding the value, if any, resulting from the inclusion of that Essential Patent Claim’s technology in the IEEE standard.”).

⁶ “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.” *Id.* at 16. Our focus is not on the specific implementation of the rule (whether smallest component is defined economically, technologically, or in some combination), but on its general implication potentially limiting the scope of bargaining to only some of the patent’s value to the final product.

⁷ “Simply put, the FTC is concerned that a patent holder may . . . ‘hold-up’ or demand higher royalties or other more costly licensing terms after the standard is implemented than could have been obtained before its IP was included in the standard.” Prepared Statement of the Federal Trade Commission Before the United States Senate Committee on the Judiciary Concerning “Oversight of the Impact on Competition of Exclusion Orders to Enforce Standard-Essential Patents” (July 11, 2012) available at http://www.ftc.gov/sites/default/files/documents/public_statements/prepared-statement-federal-trade-commission-concerning-oversight-impact-competition-exclusion-orders/120711-standardpatents.pdf.

⁸ The “one lesson of economics” is that to evaluate policy you have to consider all of its effects, both immediate and longer term, and not just for one party but for all parties. HENRY HAZLITT, *ECONOMICS IN ONE LESSON* (1946).

⁹ Bernhard Ganglmair, Luke M. Froeb & Gregory J. Werden, *Patent Hold Up and Antitrust: How a Well-Intentioned Rule Could Retard Innovation*, 60 J. INDUS. ECON. 249 (2012).

problems are not directly comparable. It is possible for negotiations to occur prior to the implementer's investment in the standard, but negotiations always occur after the innovator's investment in R&D is sunk.

If innovators can extract additional rents after implementers invest in a standard, implementers foreseeing this possibility may fail to adopt or adequately invest in the standard in the first place. However, this underinvestment is not the result of royalty payments that are too high or too low, but of the fact that any bargaining that carries the potential for hold-up occurs after the implementer's investments are sunk.¹⁰ Bargaining that occurs *ex ante*, before the implementer sinks its investment in the standard, can lead to high or low royalty payments (depending on bargaining power), but in all cases can induce optimal investment by the implementer.¹¹ This is because both the implementer and the innovator benefit from the implementer's investments, as they increase the value of the product and thus the surplus over which the parties bargain. Since both parties prefer to increase the surplus over which they are bargaining, the negotiation is likely to provide an incentive for the implementer to invest optimally. A number of contractual (and litigation) solutions are available to ameliorate the implementer's hold-up problem.¹² Conversely, we believe that the innovator's hold-up problem is more difficult to overcome. The challenge is to provide sufficient incentive for the innovator to invest in R&D in the first place.

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The reason that innovators may have insufficient incentive to invest parallels the logic of the implementer's hold-up problem. Bargaining after the implementer invests leads to inefficient investment by the implementer. Similarly, bargaining after the innovator invests runs the risk of significantly altering investment away from what is socially optimal. Yet, what courts call an *ex ante* "hypothetical negotiation" is actually *ex interim*. It occurs before the implementer makes any irrevocable investments in the standard, but after the innovator has irrevocably invested in (and borne the risks of) research, development, and patenting of the innovation.¹³ Innovation costs are treated as "sunk" in the RAND *ex ante* model of hypothetical bargaining, but an innovator's investments depend crucially on the expected returns from its patent and the outcome of this bargaining. Because of the *ex interim* nature of bargaining, economic theory suggests that shifts in relative bargaining power have bigger effects on innovators' investments than on implementers' investments.¹⁴

Both the smallest component rule and curtailing of injunctive relief serve to shift bargaining power and profits from innovators to implementers. This shift weakens the value of patents and can significantly reduce the incentive to innovate.

¹⁰ *Id.* at 260–61.

¹¹ *Id.* at 256, 264.

¹² Several contractual forms, including RAND commitments, can resolve the implementer's incentive problem. For example, an option-to-license contract specifies in advance a maximum fee (whether a lump sum or an agreed royalty rate) that will be paid by the implementer if it uses the patented technology. Such a commitment made *ex ante* also provides the implementer with optimal incentives, but may offer the innovator a greater incentive to innovate than RAND does. *Id.* at 264 (Proposition 2). Additionally, an innovator's concern with its reputation and with future repercussions of any opportunistic behavior can ameliorate the hold-up problem. Damien Geradin, Anne Layne-Farrar & A. Jorge Padilla, *The Complements Problem within Standard Setting: Assessing the Evidence on Royalty Stacking*, 14 B.U. J. Sci. & Tech. L. 144 (2008).

¹³ Investments in R&D (as well as the innovator's investments in developing and marketing the resulting technologies and making specific investments toward incorporating the patented technology into the standard) are already sunk at the *ex interim* stage of negotiation, so, in our view, RAND incorporates a systematic "hold-up" of these investments.

¹⁴ Ganglmair, Froeb & Werden, *supra* note 9, at 260–61 (demonstrating that *ex interim* interpretation of RAND leads to the same optimal investment by the implementer for any level of bargaining power).

The Smallest Component Rule

The smallest component rule generally restricts the innovator to bargain only over a component for which it is “*the* ‘basis for customer demand.’”¹⁵ Technically, the smallest component rule does not constrain what parties could consider when negotiating but only changes what a court would consider if RAND terms were litigated. However, “all bargaining is necessarily done in the shadow of the law.”¹⁶ If the adjudicated RAND royalty is expected to rely on only the smallest component, then the implementer is less likely to accept royalty payments based on the entire market value as it can always (after a judicial proceeding) receive the smaller adjudicated royalty. The manufacturer is less likely to realize some or any of the increased demand generated by the patent beyond the value of the smallest component. This implies that the innovator will not consider this value when deciding whether or not to innovate.

Two conditions encourage optimal innovation. First, implementers and innovators should bargain over the entire additional value created by the patent.¹⁷ Second, innovators should have enough bargaining power to realize a significant enough portion of that surplus to make R&D worthwhile.¹⁸ The smallest component rule, by reducing the potential bargaining range and shifting bargaining power to implementers, fails both conditions.

The DOJ commented that a goal of RAND commitments is “assuring implementers that they will not have to pay any hold-up value connected with the standardization process.”¹⁹ We agree but, in our view, this is accomplished primarily not through any specific division of surplus but through ensuring the timing of negotiation (actual and hypothetical) is prior to the standardization and implementation.²⁰ Conversely, as negotiation cannot occur prior to innovation, the shifting of rents can adversely affect the innovator’s incentives. To put the economic argument simply, if a patent provides even a dollar of incremental value to the implementer beyond what is reflected in the smallest component, then that is a dollar that economic efficiency would require the innovator to appropriate in part. As the smallest component rule runs contrary to this, we expect its effect to be socially harmful—i.e., less innovation without any compensating increase in implementers’ investments.²¹

Royalty Stacking. Aside from focusing royalties on the smallest component, the IEEE also proposes to set royalties “in light of the [smallest component’s] value contributed by all Essential Patent Claims for the same IEEE Standard.”²² The DOJ notes that proper apportionment of value

¹⁵ *Rite-Hite Corp. v. Kelley Co.*, 56 F.3d 1538, 1549 (Fed. Cir. 1995) (emphasis added). Some variations in language have also been proposed, allowing for the patent to constitute a “predominant” or “substantial” basis for demand. *Lucent Technologies, Inc. v. Gateway, Inc.*, 580 F.3d 1301, 1337 (Fed. Cir. 2009) (“the basis—or even a substantial basis—of the consumer demand”); Patent Reform Act of 2009, H.R. 1260, 111th Cong. § 284(c)(1)(A) (2009) (“[C]ontribution over the prior art is the predominant basis for market demand.”). Our discussion is meant to be illustrative of the general approach, and our conclusions do not depend upon these particulars.

¹⁶ James Ratliff & Daniel L. Rubinfeld, *The Use and Threat of Injunctions in the RAND Context*, 9 J. COMPETITION L. & ECON. 1, 2 (2013).

¹⁷ Ganglmair, Froeb & Werden, *supra* note 9, at 256.

¹⁸ *Id.* at 256–57, 261–62.

¹⁹ IEEE Business Review Letter, *supra* note 1.

²⁰ This is precisely the goal of the IEEE’s mandatory factor in determining a reasonable rate that excludes the value of standardization. It is unclear to us how the smallest component rule further contributes to reducing patent hold-up.

²¹ Some may argue that the smallest component rule might reduce the likelihood of hold-up of implementers. While we do not see why this would occur (aside from arbitrarily shifting rents to implementers), the smallest component rule will certainly reduce returns to innovators and hence incentives for innovation.

²² IEEE Business Review Request, *supra* note 1, at 12.

in the context of a smallest component rule may ameliorate royalty stacking.²³ Royalty stacking is a fear that the sum of royalties across multiple SEP owners will make the technology economically infeasible to market. It is especially acute when the patents are complementary, so that the product's total value is not merely a sum of the incremental values of each of its patents.

This complementarity problem is neither new nor unique to patents. It was first recognized nearly 200 years ago,²⁴ and economists have made significant progress in addressing it in the interim. Effectively, royalty stacking occurs if negotiated royalty rates are set without appropriate thought given to the rates of other, complementary patents. Real negotiations rarely proceed down such a naïve path; no hypothetical negotiation should either. Of course one should set royalties in light of other patents, but carefully. The smallest component rule can already reduce incentives to innovate by limiting the amount over which an innovator bargains; if a proposed solution to royalty stacking further reduces this amount, then it only exacerbates the problem.

Royalty stacking should be avoided in litigation not by artificially reducing what is bargained over but by more realistically thinking how *ex ante* bargaining would occur.²⁵ A number of economic approaches exist to determine the appropriate sharing of surplus between the multiple innovators and the implementer, including both strategic equilibrium-based theories from non-cooperative game theory²⁶ and bargaining-based theories from cooperative game theory.²⁷ These models can provide likely royalties from an implementer's independent but simultaneous negotiations with several innovators of complementary patents. These approaches, if adopted, would simply extend what courts already consider in bilateral hypothetical negotiations to multilateral (or simultaneous bilateral) settings, and also allows for asymmetries, bargaining power, and other real-world concerns.

Conversely, changing the royalty base to the smallest component by itself does not solve the allocation problem among complementary patents. First, when the smallest salable patent-practicing unit also contains multiple patented features or a mix of patented and unpatented features, it inherits the exact same economic challenges of the end-user product. Second, rather than solving the allocation problem, it simply sidesteps it by assuming that economic rents above those in the smallest component should flow primarily to the implementer of the end product. This "resolves" the allocation problem by allocating none of the surplus to innovators when no single patent can lay major claim to it.

²³ *Id.* at 13 ("Regarding the second recommended factor, appropriately apportioning the value of all essential patent claims in an IEEE standard addresses royalty stacking, which may hamper implementation of a standard.").

²⁴ AUGUSTIN COURNOT, RESEARCHES INTO THE MATHEMATICAL PRINCIPLES OF THE THEORY OF WEALTH 99 (Nathaniel T. Bacon trans., 1838) ("Ordinarily . . . several raw materials are generally brought together in the manufacture of each of these products Hence it is necessary to inquire according to what laws the profits, which are made by all of the producers as a whole, are distributed among the individuals in consequence of the law of consumption").

²⁵ Here, artificial reduction refers both to the use of the smallest component rule and to potential naïve solutions to royalty stacking, such as limiting the bargaining range to $1/N$ of the total component value, where N is the number of patents. "There are at least 92 entities that own 802.11 SEPs. If each of these 92 entities sought royalties similar to Motorola's request of 1.15% to 1.73% of the end-product price, the aggregate royalty to implement the 802.11 Standard, which is only one feature of the Xbox product, would exceed the total product price." *Microsoft Corp. v. Motorola, Inc.*, Case No. C10-1823 (W.D. Wash. Apr. 25, 2013).

²⁶ Daniel Quint, *Pooling with Essential and Nonessential Patents*, 6 AM. ECON. J.: MICROECONOMICS 23 (2014); Carl Shapiro, *Navigating the Patent Thicket: Cross Licenses, Patent Pools and Standard Setting*, in 1 INNOVATION POLICY AND THE ECONOMY 119 (Adam Jaffe, Joshua Lerner & Scott Stern eds., 2001).

²⁷ See Dehez & Poukens, *supra* note 2; 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 (2007).

The correct solution to royalty stacking concerns is not artificially limiting the base for each patent royalty, but is the proper allocation of patents to the product's entire market value.²⁸

Product Design. While the smallest component rule, in our view, solves neither two-sided hold-up nor royalty stacking, it does create perverse and inefficient incentives. Economic analysis of bargaining generally contemplates two steps. In the first step, firms work to maximize the net value of the final product by, for example, producing components at lowest cost and providing consumers with products tailored to their needs. This provides the firms with more surplus (consumer value minus cost) to divide among themselves. In the second step, firms split the resulting surplus through a bargaining process that accounts for the bargaining strength of each party,²⁹ the value that each contributes, the availability of alternatives, and market and other factors.

Generally, economists are less concerned with the second stage—how firms choose to split the surplus—except when its procedures unnecessarily affect the incentives in the first stage. The smallest component rule does precisely this by introducing patent royalty issues into product design. This shifts incentives of the parties away from maximizing total surplus and towards designing products tailored to exploiting (or “gaming”) the smallest component rules.

This would cause at least two distortions, each reducing the normal bargaining incentives to maximize total surplus. First, to the extent that the choice of royalty base is a function of the importance of the patented technology to each component of the device, an implementer may desire to minimize the possibility that the patent constitutes a “substantial” driver of demand. This creates an incentive for the implementer to diminish the patent's importance to the final product, perhaps by inefficiently reducing reliance on the patented technology or by introducing other (perhaps unnecessary) product features to dilute a SEP's relative importance.

Second, both the innovator and the implementer have incentives to design intermediate products not only in terms of their effectiveness and ease of integration but also with an eye on whether they (or some alternatives) would constitute the smallest salable component. These design considerations create potential tradeoffs between the economic concern of increasing surplus and the entirely artificial concerns of product design for the sole purpose of skirting or tailoring the product to exploit or game the bargaining rules. Any such concerns (other than surplus maximization) create inefficient distortions, increasing costs or reducing the value of the product. The reduction of surplus inherent in designing around the smallest component rule is likely to lead to underinvestment by innovators in research and development of SEP technologies.

Multiple Valued Uses. A single patent may find itself in many applications with varied uses and values. But what if the same “smallest component” is used in every application? If the smallest component rule requires the innovator to charge each the same royalty or makes differential pricing more difficult,³⁰ then it limits the innovator's ability to internalize the variety of valued uses of the innovation by precluding cases where different types of contracts would be arranged with different types of implementers. If this is the case, then the smallest component rule runs contrary to the RAND principle of providing a reasonable return on the innovator's investment and would likely lead to an under-provision of innovation.

²⁸ Although the IEEE rule calls for a consideration of other patents, it does not specify how this is to occur other than limiting the size of the royalty base.

²⁹ “The precise point royalty within the bargaining range should be informed by the relative bargaining power of the infringer and patent holder.” J. Gregory Sidak, *The Meaning of FRAND, Part I: Royalties*, 9 J. COMPETITION L. & ECON. 931, 939 (2013).

³⁰ For example, it may be difficult to monitor contracts with a component manufacturer when those contracts stipulate different prices for the same device depending on their ultimate use.

The correct solution to royalty stacking concerns is not artificially limiting the base for each patent royalty, but is the proper allocation of patents to the product's entire market value.

For example, imagine that the same component (incorporating the same essential patent) is used to help stabilize flight of both commercial airplanes and toy airplanes. Clearly, these industries are likely to have different values for the patent. By negotiating over a single royalty rate based on the component price, the innovator would either fail to realize the added value of its patent to commercial airlines, or (in the case that the component is targeted primary to the commercial airlines) would not realize the incremental market potential from the patent's use in toy airplanes. In either case, the innovator will not be negotiating over the entirety of the value it creates, leading to too little innovation.

Cognitive Biases and Jurors. One argument made in favor of the smallest component rule is rooted in a concern that jurors may have preconceived notions of “reasonable” percentage royalty rates. For concreteness, note that 10% of \$100 is mathematically identical to 1% of \$1,000 and to 0.1% of \$10,000, and thus the same royalties (in dollar terms) can be computed from any of these three bases with a corresponding adjustment to the royalty rate. However, if jurors see rates like 0.1% as “too small,” then (the argument goes), using the entire market value—which may be associated with small royalty rates—will lead to overpayment when juries reject those rates in favor of more “focal” or “cognitively” reasonable ones.

There are several reasons why the smallest component rule is not an appropriate solution to this perceived problem. First, adjusting the “base” so that it leads to desired royalties when multiplied by the jurors’ preconceived royalty rate is entirely circular and presupposes that one has an idea of what the right royalties are. Second, this is not a problem unique to the use of the entire market value as the royalty base. Too small of a “smallest component” could require a correspondingly large royalty rate which exceeds jurors’ focal points and thus would be revised downward, underpaying the innovator. Third, the proper way to overcome biases is to mitigate them through juror education, not to tailor jurisprudence to them. Research in psychology and behavioral economics suggests some possible solutions.³¹ Sometimes something as uncomplicated as reframing the decision (“\$1 for every \$1,000” instead of “zero point one percent”) is sufficient to ameliorate such biases. Simply, this is a lawyering, not a law, problem.³²

Injunctive Relief

The proposal to weaken injunctive relief rests on a fear of hold-up by the innovator when implementers face switching costs to another technology. The innovator can, in theory, use the threat of injunction to extract fees in excess of those that might have prevailed if bargaining had occurred *ex ante*. Based on this reasoning, some economists have argued for curtailing injunctive relief. Often, these arguments ignore or downplay the importance of an innovator’s incentives.

For example, in an influential paper cited in the *IEEE Business Review Letter*, Lemley and Shapiro argue that injunctive relief leads to overcharges and therefore should be disallowed to certain classes of patent holders.³³ However, these purported overcharges are with respect to a

³¹ See, for example, Dale J. Cohen, Jennifer M. Ferrell & Nathan Johnson, *What Very Small Numbers Mean*, 131 J. EXP. PSYCHOL. 424 (2002).

³² Some experiments involving jurors have found that “debiasing” strategies can help overcome at least one form of cognitive bias (“hindsight bias”). D. Jordan Lowe & Philip M.J. Reckers, *The Effects of Hindsight Bias on Jurors’ Evaluations of Auditor Decisions*, 25 DECISION SCI. 401 (2007).

³³ Lemley & Shapiro, *supra* note 3.

“natural benchmark” that reflects the innovator’s bargaining power, and not with respect to the royalties that encourage socially optimal innovation.³⁴

Conversely, when the incentives to innovate are properly considered, royalties in the absence of injunctions are often well below those that encourage efficient, socially optimal levels of innovation.³⁵ As long as contracting occurs prior to the implementer’s investment, the implementer’s incentive to invest is not a function of bargaining power. However, the degree of investment in innovation is a function of each party’s bargaining power.³⁶ Therefore, policies that further reduce the innovator’s bargaining power can result in under-provision of innovation or a refusal to participate in standards that call for such reductions in bargaining power.³⁷ A reduction in the availability of injunctive relief shifts bargaining power away from the innovator.

Prohibition of injunctions may or may not preclude any hold up of implementers, but will certainly reduce negotiated royalty rates. The resulting shift in bargaining power from innovators to implementers “reduces the payoff from R&D and makes some projects no longer worth pursuing.”³⁸

Injunctions are blunt tools that can negatively affect holders of related patents, non-infringing products, consumers, and manufacturers. The potential for efficiency loss and the importance of relative bargaining power speak to a careful balancing of effects on a case-by-case basis, as is already a cornerstone of jurisprudence relating to the granting of injunctions outside of SSOs.³⁹ Arbitrary restrictions or categorical bans are the opposite of balancing.

Access to Injunctive Relief Restores Ex-Ante Bargaining. One argument made in favor of curtailing injunctive relief is that it is inconsistent with RAND principles. Per this argument, the innovator has effectively relinquished the right to injunctive relief by agreeing to license the patent on RAND terms as a condition of its incorporation in the standard. Effectively, the argument is that the innovator has acknowledged that monetary damages are sufficient under RAND.

One often-overlooked aspect of the RAND commitment is that the innovator agrees to allow access to the patented technology to any and every firm, relinquishing one of the most important aspects of bargaining—the ability to refuse access. In *ex ante* bargaining before the patent became part of the standard, the innovator had the ability to make its technology unavailable to a potential implementer. In fact, *ex ante*, both the innovator and implementer of end-user products negotiate with full freedom to walk away. After the setting of a standard, bargaining becomes one-sided; the innovator must provide access, but the implementer has no obligation to market a product incorporating the standard or to pay a RAND fee.

³⁴ Mark A. Lemley & Carl Shapiro, *Patent Holdup and Royalty Stacking: Reply*, 85 TEX. L. REV. 2163, 2166 (2007). Other commentators also note that Lemley and Shapiro’s proposed remedy of removing injunctive relief “is not calculated to maximize any objective measure of welfare.” 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, 747 (2008). The royalty rates in Lemley and Shapiro often fall below socially optimal rates. Einer Elhauge, *Do Patent Holdup and Royalty Stacking Lead to Systematically Excessive Royalties?*, 4 J. COMPETITION L. & ECON. 535 (2008).

³⁵ Ganglmair, Froeb & Werden, *supra* note 9, at 261 (Lemma 5).

³⁶ *Id.* at 260 (Lemma 4).

³⁷ Benjamin Chiao, Josh Lerner & Jean Tirole, *The Rules of Standard?Setting Organizations: An Empirical Analysis*, 38 RAND J. ECON. 905 (2007).

³⁸ Ganglmair, Froeb & Werden, *supra* note 9, at 265.

³⁹ In the context of standard setting, it is “unlikely that a patent holder bound by a RAND commitment, even one that does not address explicitly the availability of injunctive relief, can secure an injunction (in addition to monetary damages) in an infringement action.” Therefore, the DOJ argues that “in practice, it [IEEE proposed rule limiting injunctive relief] will not be significantly more restrictive than current U.S. case law.” IEEE Business Review Letter, *supra* note 1, at 9–10.

RAND purports to reflect the negotiation and relative bargaining power that would have occurred absent the existence of a standard. Yet, the RAND commitment prohibits the innovator from withdrawing access to its technology, eliminating a major source of the innovator's bargaining power. Injunctions provide for very specific circumstances under which an infringer can be denied the access to the technology. Therefore, the possibility of injunction can be seen as partially restorative of the bargaining power that the innovator had before the existence of the standard.⁴⁰

Access to Injunctive Relief Encourages Negotiation. The potential implementer chooses between negotiating license royalties now and paying damages later, if found infringing by a court of law. As RAND damages are generally conceived as being equal to the royalties that would have been negotiated, the implementer chooses between licensing—paying a fee now for certain—and infringing—paying roughly the same fee later, but only if the infringement is discovered and proven. The absence of injunctive relief, coupled with an irrevocable RAND commitment, can imply that infringement is cheaper than licensing. This is likely to lead to a constructive refusal to negotiate by implementers. What should be actual *ex-ante* negotiations would be replaced with hypothetical ones at trial.⁴¹ For the innovator, this implies expected returns on innovation that are below RAND, as they must account for the necessary litigation costs.⁴²

This is not merely an academic concern. For example, the International Trade Commission concluded that, in its protracted infringement of Samsung's patents, "Apple has no intention of paying Samsung any royalties until after the conclusion of litigation"⁴³ even though Samsung negotiated in good faith.⁴⁴ The Commission noted that this unwillingness to negotiate in good faith forces the innovator to undertake "expensive litigation" or forgo royalties entirely.⁴⁵

Conclusion

Concerns that implementers may overpay for royalty licenses, thereby discouraging investments made to implement the standard, are often put forth without giving equal consideration to the possibility of underpayment and its impact on innovators' incentives to create the technology underlying the standard.

The absence of injunctive relief, coupled with an irrevocable RAND commitment, can imply that infringement is cheaper than licensing.

⁴⁰ For example, FTC Commissioner Joshua D. Wright called the presumption that injunctions lead to supra-FRAND royalties "dubious," noting that the threat of injunction can be used to achieve RAND royalty rates. Joshua D. Wright, Comm'r, Fed. Trade Comm'n, SSOs, FRAND, and Antitrust: Lessons from the Economics of Incomplete Contracts, Remarks at Center for the Protection of Intellectual Property Inaugural Academic Conference: The Commercial Function of Patents in Today's Innovation Economy 29–30, George Mason University School of Law (Sept. 12, 2013), available at https://www.ftc.gov/sites/default/files/documents/public_statements/ssos-frand-and-antitrust-lessons-economics-incomplete-contracts/130912cpip.pdf. See also J. Gregory Sidak, *supra* note 29, at 1008 ("There is consequently no valid justification to assume that royalties negotiated under the threat of an injunction necessarily violate FRAND.").

⁴¹ Injunctions can serve to encourage negotiation. "If used judiciously by the courts, the threat of the imposition of an injunction can serve, when needed, to move patent disputes towards resolution." Ratliff & Rubinfeld, *supra* note 16, at 22.

⁴² "[T]he SEP holder cannot refuse a license nor seek an injunction and instead can at best use infringement litigation to obtain the same FRAND rates and terms it would have gotten through good-faith negotiations (had they occurred), but only at a higher cost due to litigation." Anne Layne-Farrar, *Moving Past the SEP RAND Obsession: Some Thoughts on the Economic Implications of Unilateral Commitments and the Complexities of Patent Licensing*, 21 GEO. MASON L. REV. 1093, 1104 (2014).

⁴³ Certain Electronic Devices, Including Wireless Communication Devices, Portable Music and Data Processing Devices, and Tablet Computers at 62 (Investigation No. 337-TA-794, U.S. Int'l Trade Comm., July 5, 2013 Commission Opinion, Public Version).

⁴⁴ *Id.*

⁴⁵ "Apple's position illustrates the potential problem of so-called reverse patent hold-up, a concern identified in many of the public comments received by the Commission. In reverse patent hold-up, an implementer utilizes declared-essential technology without compensation to the patent owner under the guise that the patent owner's offers to license were not fair or reasonable. The patent owner is therefore forced to defend its rights through expensive litigation." *Id.* at 63.

Our analysis shows that underpayment is a greater threat to economic efficiency. The reason is that innovators and implementers can and do bargain prior to the implementer's adoption of and investment in a standard and courts impose such "hypothetical" bargaining when determining royalties. Therefore, the implementer's efficient investment, which benefits both parties, is an essential part of these deliberations. However, bargaining does not occur prior to the innovator's investment in R&D. In fact, all such "*ex ante*" bargaining occurs *after* these investments are sunk.

Curtailling injunctive relief and basing royalties on the smallest salable component both pose the risk of under-rewarding innovators for their investments. This is likely to retard innovation, reduce incentives to participate in standards, and reduce economic welfare. ●