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The Logic and Limits of Ex Ante Competition in a Standard-Setting Environment

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Some scholars have questioned the process by which cooperative standards are typically set, worrying about the potential for anticompetitive market power to come hand in hand with pro-competitive interoperability. To combat the perceived problems of ex post opportunism, the suggested solutions have focused on promoting procedures to facilitate ex ante competition. Since standards are generally desirable and competition often exists beforehand, many have argued that we need only formalize the ex ante competitive status quo to avoid any ex post market power trouble. Options proposed in the literature include ex ante auctions to be held during the standard definition phase or binding ex ante licensing commitments made before any vote on technologies occurs. We evaluate the various policy changes suggested with a particular eye to their unintended consequences and costs. Certainly the ex ante proposals would hold some appeal, if ex ante competition generally did not exist in their absence, but we find that they are problematic in important ways. We argue that not only are they not needed, they would tend to create more harm than good if implemented.

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I. Introduction

Few would question the pro-competitive effects that standards can bring. A standard can be defined as a set of technical specifications that seeks to provide a common design for a product or process.[1] For our purposes, we focus on standards that do not fully specify an end product, but rather specify key elements of that end product so as to enable various parts of such product and other products to successfully work together. A simple, but still high-technology, example would be modem protocols that allow PCs and server computers made by a wide range of firms to (more or less) seamlessly communicate with one another over a network, such as the Internet. When successful, such standards can improve the interoperability of complex technical products, enable welfare-enhancing cooperation among a host of disparate firms, increase consumer choice and convenience, reduce costs for consumers and producers alike, and broaden the size of the market (and thus profit opportunities) for participating firms.[2]

In order to achieve such benefits, complex standards, like modem protocols, require cooperative industry efforts. Firms—some of which produce complementary products and many of which compete against one another in various downstream markets—meet in a variety of forums to discuss and develop technical specifications to solve perceived industry interoperability problems. These forums are generally referred to as standard-setting organizations (SSO).[3]

Despite the clear benefits from the end results of SSO activities, some have begun to question the process by which cooperative standards are typically set. A number of firms and scholars have identified what they consider to be the potential for anticompetitive market power to come hand in hand with pro-competitive interoperability.[4] The concerns expressed above tend to rely on a number of theories that outline the risks that essential intellectual property (IP)

1 *See* H. Hovenkamp et al., IP and Antitrust: An Analysis of Antitrust Principles Applied to Intellectual Property Law § 35.1 (Supp. 2003-04). For alternative definitions, *see* D. Teece & E. Sherry, *Standard Setting and Antitrust*, 87 Minn. L. Rev. 1913 (2003).

2 *See FTC/DOJ Hearings on Competition and Intellectual Property Law and Policy* (2002) (statement of A. Marasco, Vice President and General Counsel, Am. Nat'l Standards Inst., Apr. 18, 2002), *available at* http://www.ftc.gov/opp/intellect/020418marasco.pdf:

> Standards do everything from solving issues of product compatibility to addressing consumer safety and health concerns. Standards also allow for the systemic elimination of non-value added product differences (thereby increasing a user's ability to compare competing products), provide for interoperability, improve quality, reduce costs and often simplify product development. They also are a fundamental building block for international trade.

3 *See* M. Lemley, *Intellectual Property Rights and Standard-Setting Organizations*, 90 Cal. L. Rev. 1889 (2002).

4 *See generally*, M. Lemley & C. Shapiro, Patent Hold Up & Royalty Stacking (Stanford Law and Economics, Olin Working Paper No. 324, Jul. 2006), *available at* http://ssrn.com/abstract=923468; C. Shapiro,

holders could impose excessively high royalty rates once their technologies have been embedded in a standard.

One such theory of ex post abuses is concerned with perceived hold-up problems. Before a standard is defined, firms compete on technology, offering different solutions to the proposed problems that standardization is intended to address. After a standard is defined, those firms that win technology selection votes within an SSO, it is argued, can potentially win market power as well. For example, it is alleged that if the circumstance arises where the firms that intend to implement the new standard already have made irreversible investments in plant and equipment, the firms holding patents on the technology comprising the standard could choose to hold up these implementers, asking more for licensing their patents than the patents' contribution to the standard warrants.[5] An implementer would be willing to pay this higher rate if it allows the firm to avoid the cost of switching to another technology—at least up to the point where the patent license fees equal the cost of moving to the next best alternative.

Part of the concern over ex post market power thus lies in the alleged unpredictable nature of the cost of licensing. Unless they enter into license agreements ex ante, implementers do not know the full cost of producing a standard, which may include royalty payments and other licensing fees. They are concerned that, for the reason expressed above, an essential IP holder may be in a position to impose excessive royalty rates, thereby negatively affecting the expected return of their investment.

Another theory points to the complex nature of technical standards that typically incorporates a multitude of complementary technologies. This is the classic Cournot complements point.[6] With many firms contributing technologies

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footnote 4 cont'd
Navigating the Patent Thicket: Cross Licenses, Patent Pools, and Standard-Setting, *in* Innovation Policy & the Economy, (A. Jaffe et al. eds., vol. 1, 2001); D. Lichtman, Patent Holdouts and the Standard-Setting Process (U. Chicago Law and Economics, Olin Working Paper No. 292, May 2006), *available at* http://ssrn.com/abstract=902646; R. Skitol, *Concerted Buying Power: Its Potential for Addressing the Patent Holdup Problem in Standard-Setting*, 72(2) Antitrust L.J. 727 (2005). For a rebuttal, *see* D. Geradin & M. Rato, Can Standard Setting Lead to Exploitative Abuse? A Dissonant View on Patent Hold-Up, Royalty Stacking and the Meaning of FRAND (Nov. 2006) (mimeo, Tilburg Law and Economics Center), *available at* http://ssrn.com/abstract=946792.

5 *See* Lichtman, *id.* at 2 ("In short, a patentee that comes into view only after a firm has invested in a given standard can hold hostage the firm's standard-specific investments. The result may be a royalty payment that far exceeds the inherent value of the underlying patented technology.").

6 *See* Lemley & Shapiro, *supra* note 4, at 16:

> The Cournot Complements effect arises when multiple input owners each charge more than marginal cost for their input, thereby raising the price of the downstream product and reducing sales of that product. Effectively, each input supplier imposes a negative externality on other suppliers when it raises its price, because this reduces the number of units of the downstream product that are sold.

that must work together in the final product, double (or more) marginalization can result. In the context of standards, this perceived problem is generally referred to as "royalty stacking" since each patent holder's royalty stacks up with all of the others to create one potentially excessive aggregate royalty for the firms hoping to implement the standard.[7]

To address these potential ex post problems, suggested solutions have focused on the promotion of procedures to facilitate ex ante competition. Since standards are generally desirable and competition often exists beforehand, many have argued that we need only create procedures to formalize the ex ante competitive status quo to assure that there will be no ex post market power trouble. Options proposed in the literature include ex ante auctions to be held during the standard definition phase or binding ex ante licensing commitments made before any vote on technologies occurs. Certainly these ex ante proposals would hold some appeal, if ex ante competition generally did not exist in their absence, but they also are problematic in important ways.

Following this introduction, Section II describes the main features of standard-setting processes, their significance, and the strategic battles that may affect them. Section III focuses on the fair, reasonable, and non-discriminatory (FRAND) licensing regime traditionally prevalent in SSOs. Under this regime, owners of intellectual property rights (IPR) that are essential to the standard typically commit to license such patents on fair, reasonable and non-discriminatory terms and conditions. The paper then turns to the theories of ex post problems and the proposed ex ante solutions. Section IV evaluates the logic behind the claims of ex post market power, including patent holdup, opportunistic behavior, and royalty stacking. Section V then assesses the limits of the suggested policy reforms meant to address ex post market power problems. Section VI concludes. We find that, while several of the proposals contain some attractive elements, most would either be difficult, if not impossible, to implement in practice or would entail a number of unattractive unintended consequences.

II. The Business of Standard-Setting

In today's technology-driven world, the importance of industry standardization, device interoperability, and product compatibility are critical for promoting innovation and competition in a number of industries.[8] To name just one example, standardization has been a key factor behind the significant growth in innovation and product differentiation in the information and communications technologies (ICT) sector.

7 *Id.*

8 *See* Marasco, *supra* note 2.

Of course, achieving product compatibility through standardization usually entails making choices, the effects of which will represent a cost. By design, after a standard has been defined it can constrain a variety of options and reduce competition between rival technologies.[9] When the technologies involved are covered by IPRs (usually patents), a standard may also raise issues related to access.[10] As will be seen below, holders of IPRs have the right to exclude others from their inventions. Those wishing to implement a standard should thus obtain a license from all the holders of essential IP.

Given the significant stakes frequently involved, the outcome of the debate over the most suitable technologies to be incorporated into any given standard have occasionally strained the SSO process.[11] Some tension is inevitable as each firm desires to promote its own solutions as part of the standard but also needs to work together with other SSO members to develop, establish, endorse, and promote the standard.[12]

Another factor contributing to SSO tensions relates to the fact that firms involved in standard-setting often wear different hats corresponding to the fundamentally different business models they adopt.[13] Consider a simplified categorization:

(i) Pure innovators or upstream-only firms (i.e., firms that develop technologies and earn their revenues solely by licensing them);

(ii) Pure manufacturers or downstream-only firms (i.e., firms that manufacture products based on technologies developed by others but that conduct no basic research of their of their own, limiting their activities to product development, and have no relevant IPRs);

(iii) Vertically integrated firms (i.e., firms that develop technologies and manufacture products based on those technologies and the technologies of others); and

(iv) Firms that do not create technologies or manufacture products, but buy products that are manufactured on the basis of patented technologies.

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9 On the other hand, standardization promotes competition within a standard (i.e., between products implementing the standard). *See* Teece & Sherry, *supra* note 1, at 1915.

10 *See* C. Shapiro, *Setting Compatibility Standards: Cooperation or Collusion?*, *in* Expanding the Bounds of Intellectual Property § 3 (R. Dreyfuss et al. eds., 2001).

11 For case study examples, *see* B. DeLacey et al., Strategic Behavior in Standard-Setting Organizations (May 2006) (mimeo), *available at* http://papers.ssrn.com/sol3/papers.cfm?abstract_id=903214.

12 *See* Shapiro, *supra* note 10, at 1-2.

13 *See* Teece & Sherry, *supra* note 1, at 1929.

These different firms operate in the downstream product market, the upstream technology market, or both. Naturally their incentives are asymmetric and their behavior in the standard-setting context diverges accordingly. While there is a certain degree of fluidity between the categories, the following structure of incentives can be identified:

- Pure innovators are entirely dependent on licensing revenues to continue their operations. Licensing revenues must be sufficient to cover the costs incurred in developing the technologies they seek or hope to license (including the costs of failed projects), as well as to give them sufficient incentives to engage in complex and risky projects.
- Pure manufacturers have converse incentives. As royalties represent a cost of production they have every incentive to reduce them. The lower the level of royalties payable to holders of IPRs essential to the standards they practice, the higher their potential level of profits.
- Vertically integrated firms that both develop technology and sell products have mixed incentives. On the one hand, they can draw revenue from their IPRs if they so choose. On the other hand, they will have to pay royalties to other firms holding IPRs essential to the standard for the products they manufacture. Since the bulk of the revenues (and profits) of these firms is usually made downstream through product sales, they are much less dependent than pure innovators on revenues generated by royalties.[14] In their licensing negotiations with other firms, they may well be more interested in protecting their downstream business from litigation than in charging royalties. They therefore tend to have stronger incentives to cross-license their own essential IPRs in exchange for essential IPRs held by other firms, instead of seeking royalty income.[15]
- The immediate incentives of buyers of products implementing standards relying on patented technologies are generally in line with manufacturers. They may consider that the royalties that manufacturers pay to IP holders will increase the price of the products they buy from such manufacturers. Generally, however, royalty payments and other direct licensing costs represent a small share of the total cost of production. Moreover, reducing royalty rates on some products might not necessarily lead to cheaper prices. As will be seen below, the extent to which royalty savings are passed on to buyers will vary depending on the state of competition in the downstream market. If that market is not competitive, royalty savings will not necessarily be passed on.

14 In 2004, for example, royalties roughly represented only 1.3 percent of Ericsson's total revenues. *See* LM Ericsson Telephone Company, Form 20-F: Annual Report 45 (2004), *available at* http://www.ericsson.com/ericsson/investors/financial_reports/2004/20f.pdf.

15 *See* A. Layne-Farrar & J. Lerner, To Join or Not to Join: Examining Patent Pool Participation and Rent Sharing Rules (Nov. 2006) (mimeo), *available at* http://papers.ssrn.com/sol3/papers.cfm?abstract_id=945189. Note that IP licenses can include a wide array of terms, from upfront lump-sum fees to technology milestone payments. We use royalties as shorthand for all such terms.

In light of these widely acknowledged tensions, most formal SSOs have written IPR policies whose primary goal is to address two fundamental issues: disclosing and licensing of IPRs incorporated into a proposed or adopted standard.[16] Although their scope may vary significantly across SSOs, these procedures usually seek to encourage IPR owners to make their proprietary inventions known and available for standardization, and to allow their use by those wishing to implement the standard—all without imposing undue obligations on SSO members. SSO IPR policies are thus studies in balance. While keeping members' diverse interests in mind, they also strive to accommodate the interests of implementers to obtain access to the standardized technology, avoiding situations where IPR owners refuse to license their technology essential to the implementation of a standard to protect, for example, their positions in downstream markets.[17]

Most SSOs encourage IPR owners involved in standardization to disclose upfront (i.e., prior to the adoption of a standard) the IPRs that they consider may be essential for its implementation.[18] Early disclosure of patents "is likely to enhance the efficiency of the process used to finalize and approve standards."[19] It also:

> "permits notice of the patent to the standards developer [...] in a timely manner, provides participants the greatest opportunity to evaluate the propriety of standardizing on the patented technology, and allows patent holders and prospective licensees ample time to negotiate the terms and conditions of licenses...."[20]

As a rule, however, SSOs do not impose an obligation on IPR owners to conduct a search for, or guarantee the disclosure of, all IPRs they own that may be essential to a given standard. In most instances, this would prove extremely difficult. For

16 *See* Lemley, *supra* note 3, at 20-21.

17 *See, e.g.,* Eur. Telecomm. Standards Inst., ETSI Guide on Intellectual Property Rights (IPRs), art. 1 (2006) [hereinafter ETSI's Guide on IPR], *available at* http://www.etsi.org/legal/documents/ETSI_Guide_on_IPRs.pdf ("The ETSI IPR Policy seeks a balance between the needs of standardization for public use in the field of telecommunications and the rights of the owners of IPR.").

18 ETSI defines "Essential IPR" as meaning "that it is not possible on technical (but not commercial) grounds, taking into account normal technical practice and the state of the art generally available at the time of standardization, ... [to] comply with a standard without infringing that IPR." *See* Eur. Telecomm. Standards Inst., ETSI Rules of Procedure, Annex 6: ETSI Intellectual Property Rights Policy, art. 15 (2006) [hereinafter ETSI PRI Policy], *available at* http://www.etsi.org/legal/documents/ETSI_IPRPolicy.pdf.

19 *See* Am. Nat'l Standards Inst., Guidelines for Implementation of the ANSI Patent Policy 3 (1997) [hereinafter ANSI Guidelines], *available at* http://www.niso.org/committees/OpenURL/PATPOL.pdf.

20 *Id.*

firms with large patent portfolios and widely dispersed development groups such a search would be impracticable and could restrict the willingness of firms to participate with the SSO in the first place.[21] Even without a large portfolio, though, determining which patents are essential for a standard typically requires a difficult, and subjective, patent-by-patent evaluation. Indeed, this determination may not be feasible as the scope of a standard evolves through its development or, if the relevant IPR is a pending patent application, as claims are modified during prosecution at the patent office. The fact that the scope of such disclosure and the obligations imposed on IPR owners by the policies of some SSOs have in certain instances been the subject of conflicting and ambiguous interpretations has led some commentators to decry "the inadequacy of typical SSO disclosure policies."[22] As we argue below, these concerns are generally misplaced.

Once disclosure is made, or contemporaneously with disclosure, IPR owners are typically asked to provide an assurance or undertaking that, should their IPRs turn out to be essential for the final standard, they will license them on FRAND terms and conditions to other members of the SSO and, as is often the case, to outsiders.[23] SSOs do not mandate such commitments—which could be interpreted as compulsory licensing—but if the owner of potentially essential IPR seeks to have its technology included in a standard it has a strong incentive to provide the SSO with the assurance that it will license on FRAND terms and conditions. Given the fundamental importance of FRAND assurances, we turn next to a more detailed discussion of the concept of FRAND in the context of IP licensing.

III. IP Licensing under FRAND Commitments

IPRs are legitimate exclusive rights, which confer on their owners two basic prerogatives:

(1) the right to prevent any third party from applying or using the subject matter of the IPR;[24] and correlatively,

21 *See* Teece & Sherry, *supra* note 1, at 1946:

> An obligation to search for "implicated" IP can be extremely onerous. It is a major task to search a patent database and to compare it against the proposed standard. Patent searching is especially problematic when the standard evolves over time. Further, it is often difficult to know whether a patent "reads on" a proposed standard, as that may entail a major effort at claims construction and interpretation. A search requirement is especially onerous for IP owners who have substantial numbers of patents. Many firms in high-tech industries have thousands of patents, hundreds of which may be potentially relevant to a proposed standard.

22 *See* Skitol, *supra* note 4.

23 *See* Lemley, *supra* note 3, at 26.

24 *See* G. Masoudi, Intellectual Property and Competition: Four Principles for Encouraging Innovation, Remarks at Digital Americas 2006, São Paulo, Brazil (Apr. 11, 2006), at 3 ("In the world of physical

(2) the right to set the conditions of a license in consideration for use of the IPR and as a reward for the innovative contribution made.

Except for certain exceptional circumstances,[25] a patent owner may therefore decide not to grant any third party a license to practice the invention. These exclusive rights are recognized in all patent laws as well as in the TRIPS agreement.[26]

Modern standards typically include technologies protected by IPRs. In recognition of the exclusive rights, SSOs generally do not force their members with IPRs—usually patent holders—to grant a license for their patents. The European Telecommunications Standards Institute's (ETSI) IPR policy, for instance, does not contain any obligation to license essential IPR. Rather, it provides that a standard or technical specification may not be approved unless the owner of essential IPR provides an assurance of its intentions to license on FRAND terms. In particular, Section 6.1 of ETSI's IPR Policy states that when essential IPR is disclosed, ETSI will request—but not oblige—the owner of the IPR to undertake in writing that it is prepared to grant irrevocable licenses on FRAND terms and conditions, and as such to waive its right to refuse to offer a license to those seeking one. These waivers reflect a willingness by the patentee to forego its right to exclusivity in exchange for the opportunity to have its patented technology included in a standard. The FRAND undertaking is thus meant to ensure the dissemination of essential IPRs in a standard, keeping the standard available for adoption by members of the industry while at the same time making certain that the IP holders are able to be properly compensated for their innovations.[27]

THE FRAND UNDERTAKING IS MEANT TO ENSURE THE DISSEMINATION OF ESSENTIAL IPRS IN A STANDARD, KEEPING THE STANDARD AVAILABLE FOR ADOPTION BY MEMBERS OF THE INDUSTRY WHILE AT THE SAME TIME MAKING CERTAIN THAT THE IP HOLDERS ARE ABLE TO BE PROPERLY COMPENSATED FOR THEIR INNOVATIONS.

footnote 24 cont'd
property, enforceability means the right to exclude: for example, the ability to evict a person from your land. In the world of intellectual property, the fundamental right is similar: an enforceable IP right means the right to exclude others from using your intellectual property right at all.").

25 The European Court of Justice, for instance, has held that such exceptional circumstances may occur where the refusal to license cannot be objectively justified and would eliminate all competition in a downstream market for a new product for which there is customer demand not offered by the owner of the IPR. *See*, inter alia, ECJ Judgment of Oct. 5, 1988, Case 238/87, AB Volvo v. Erik Veng (UK) Ltd., 1989 4 C.M.L.R 122, at para. 8; Joined Cases C-241/91 P and C-242/91 P, RTE and ITP v. Commission of the European Communities (*Magill*), 1995 E.C.R. I-00743, at para. 50; and, ECJ Judgment of Apr. 29, 2004, Case C-418/01, IMS Health GmbH & Co. OHG v. NDC Health GmbH & Co. KG, at paras. 35 and 52.

26 WORLD TRADE ORG., MARRAKESH AGREEMENT ESTABLISHING THE WORLD TRADE ORGANIZATION, ANNEX 1C: AGREEMENT ON TRADE-RELATED ASPECTS OF INTELLECTUAL PROPERTY RIGHTS, art. 28 (signed Apr. 15, 1994).

27 The ETSI IPR Policy, for example, provides that IPR holders should be rewarded properly, explicitly recognizing that patent holders "should be adequately and fairly rewarded for the use of their IPR." *See* ETSI PRI Policy, *supra* note 18, art. 3.2.

If the owner of an essential IPR decides not to make a FRAND commitment, however, it does not necessarily follow that the relevant IPR will be excluded from the standard. Again using ETSI's IPR policy as an example, Article 8.1 provides that ETSI's General Assembly will examine whether alternate technical solutions exist. Where it concludes that this is not the case, the Director General may request the owner of the IPR to reconsider. However, the latter is not under any obligation to agree to license.[28]

Even with a FRAND assurance in place, standard implementers still need to negotiate and enter into license agreements with each essential IPR owner. In other words, a FRAND assurance is not, itself, a license. Actual licensing negotiations between IPR holders and each individual potential licensee is conducted outside SSOs. Most SSO IPR policies make clear that such discussions must not take place under the auspices of standard development activities, as SSOs view their role as directing technical rather than commercial issues.[29] Likewise, the reasonable and nondiscriminatory character of any license must be addressed in a commercial context. While some have tried to alter this demarcation, none have been successful. For instance, recent proposals made by some members of ETSI called for revising the current IPR policy in order to introduce the principles of "aggregated reasonable terms" and "numeric proportionality" into the definition of FRAND, but these efforts were rebuffed.[30] No consensus as to the need for or desirability of this proposed system of patent valuation could be achieved among ETSI members.

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28 This was recently confirmed by a Working Committee of the International Association for the Protection of Intellectual Property (AIPPI) which stated the following with regard to the relationship between technical standards and patent rights: "The owner of a relevant patent can, in principle, not be forced to grant licences to other members of the organization or to outsiders. Only in a few exceptional cases should compulsory licences be admissible according to the conditions of Art. 31 TRIPS or the respective national laws" and "... [a] patent right whether owned by a member of the organization or a third party, which has been identified as relevant for a 'de jure' standard, may be used in the standard only with the consent of the owner." *See* Int'l Ass'n for the Protection of Intellectual Property, Question Q 157 The Relationship between Technical Standards and Patent Rights (2001), at paras. 3.2 and 4, *available at* http://www.aippi.org.

29 For example, ETSI's Guide on IPR provides that:

> specific licensing terms and negotiations are commercial issues between the companies and shall not be addressed within ETSI. Technical Bodies are not the appropriate place to discuss IPR issues. Technical Bodies do not have the competence to deal with commercial issues. Members attending ETSI Technical Bodies are often technical experts who do not have legal or business responsibilities with regard to licensing issues. Discussion on licensing issues among competitors in a standards making process can significantly complicate, delay or derail this process.

See ETSI Guide on IPR, *supra* note 17, § 4.1.

30 Pursuant to this proposal, called "Minimum Change, Optimal Impact," aggregated reasonable terms would mean that:

> in the aggregate the terms are objectively commercially reasonable taking into account the generally prevailing business conditions relevant for the standard and applicable

As noted, the terms and conditions of any license negotiated under the umbrella of a FRAND assurance are the result of a normal arms-length process of commercial negotiations between the licensor and an individual licensee. A commercial market-driven negotiation of license terms is not only what FRAND suggests but is also justified from an economic perspective, as it supports dynamic competition and provides incentives to innovate. Firms engaged in the development of innovative technologies "must not be restricted in the exploitation of intellectual property rights" in case their incentives to innovate are hindered.[31] SSOs recognize that an IPR owner must be free to seek compensation that is sufficient to maintain investment incentives.[32]

Equally important, given the voluntary nature of participating in an SSO, allowing IPR owners to seek adequate compensation is paramount to ensuring that those who own valuable proprietary technology remain involved in the standard-setting process. Note that SSOs are not the only option for standards development. Firms with sufficient name recognition or with clearly superior products, depending on the circumstances, may be able to choose to opt out of an SSO and try instead for a market-defined de facto standard.[33] In such cases, they may no longer be bound by that SSO's IPR policy. Securing the participa-

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footnote 30 cont'd

> product, patents owned by others for the specific technology, and the estimated value of the specific technology in relation to the necessary technologies of the product.

In turn, numeric proportionality would mean that "compensation under FRAND must reflect the patent owner's [numeric] proportion of all essential patents." *See* Informa Telecoms and Media, Vendors Seek Compromise on LTE (Mar. 20, 2006), *at* http://www.informatm.com/itmgcontent/icoms/s/sectors/networks-infrastructure/20017342341.html.

31 *Id.*

32 *See e.g.* ETSI IPR Policy, *supra* note 18, art. 3.2 ("IPR holders whether members of ETSI and their AFFILIATES or third parties, should be adequately and fairly rewarded for the use of their IPRs in the implementation of STANDARDS and TECHNICAL SPECIFICATIONS." (emphasis in the original) *See also*, Teece & Sherry, *supra* note 1, at 1934:

> The complaints of those who believe that they are being compelled to 'overpay' for the use of others' IP embedded in the standard are frequently and forcefully stated. The more reasoned and quieter countervailing arguments focused on the social benefits of innovation and the need to compensate inventors for their efforts often are downed out by this din. The tension between static and dynamic views of efficiency is nothing new in the context of IP. But it suggests that policies that further burden IP and IP holders will only exacerbate the problem.

33 *See* Teece & Sherry, *supra* note 1, at 1918:

> In addition, many "standards" are not set by SSOs at all. Rather, they reflect the market success of a particular product in competition with other competing products. Such "de facto" or "market" standards are common in what economists term "network industries" in which consumers benefit by adopting products or processes adopted by others. Well-known examples include VHS VCRs (which "won" a "market standards" war with Sony's Betamax VCRs) and Microsoft's DOS and Windows operating systems.

tion of holders of valuable IPRs allows SSOs to adopt standards based on the best available technological solutions. The adoption of a standard incorporating second-best technology would have potentially damaging consequences negating the purpose of standardization itself.[34] It could thwart the standard's acceptance by industry and consumers alike and, as firms outside the SSO introduced incompatible products, it could lead to conflicting technologies, thereby reducing the efficiencies fostered by standardization. The ability to license IPR on FRAND terms and conditions is, in this respect, a flexible tool which secures the availability of essential IPR without unduly constraining licensors.

IV. Assessing the Complaints against the Ex Post FRAND Licensing Regime

While SSOs have significantly contributed to the development of, and the growing competition within, high-tech sectors, as explained at the outset of this article some commentators nonetheless believe that the current disclosure and FRAND licensing commitments are insufficient.[35] Without regard for the realities of the ex ante market interactions that typically occur, it has been said that the existing FRAND regime—or more generally the procedures and IPR policies of the SSOs—is inadequate to give standard implementers a sufficient degree of predictability over the costs of implementing a proposed standard. It is also claimed that the current regime is unable to prevent essential IP holders from behaving opportunistically. Finally, because many standards involve a large number of patents held by different firms, some claim that the present regime can lead to cumulative royalty rates of such a level that implementing the standard would no longer be attractive and thus useful innovations would no longer make it to the marketplace. This latter problem is the royalty stacking issue discussed earlier. We address each of these three claims in order below.

A. LACK OF PREDICTABILITY

There is little doubt that predictability over costs is an important issue for firms intending to invest in the design and manufacture of new products. Those firms and commentators who complain about the lack of predictability offered by FRAND commitments generally argue for the need to obtain more precise information about the costs of the various technologies being considered for integration

34 *See* J. DeVellis, *Patenting Industry Standards: Balancing the Rights of Patent Holders with the Need for Industry-Wide Standards*, 31 AIPLA Q. J. 301, 343 (2003).

35 *See, e.g.*, G. Ohana et al., *Disclosure and Negotiation of Licensing Terms Prior to Adoption of Industry Standards: Preventing Another Patent Ambush*, 24 Eur. Competition L. Rev. 644 (2003) and Skitol, *supra* note 4.

within a standard before the standard in question is adopted.[36] They thus claim that essential IP holders should disclose their licensing terms on an ex ante basis, typically in the form of maximum royalty rate and most restrictive terms to be offered.

These criticisms tend to overlook the fact that voluntary ex ante disclosure of licensing terms by IPR owners and ex ante negotiations of license agreements with IPR owners are already regular occurrences.[37] Neither the IPR policy of ETSI, for instance, nor the policies of many other major SSOs prevent IPR holders from disclosing and negotiating licensing terms before a standard is adopted. Much to the contrary, rights owners have a strong incentive to enter into such ex ante negotiations as they increase the likelihood that their technology will be incorporated in the standard.[38] In order to have their technology embodied in a forthcoming standard, these firms must find support among the members of the SSO. Consequently, they will seek to assure the superiority of their technology, and may also want to show that the royalties they will charge if their technology is selected will be reasonable. When the process works properly, the firm offering the best overall package—in terms of technology, ease of use, royalty rates, and other licensing terms and conditions[39]—will find the greatest number of supporters and its technology will be incorporated in the standard. Furthermore, nothing prevents a standard implementer from approaching an owner of essential IPR to inquire what its licensing terms will be. In other words, nothing prevents firms that wish to obtain information about the costs of proprietary technologies to request essential IP holders to provide them with information about the royalty rates and the other licensing terms that would apply should the technology be embedded in the standard under consideration.

B. EX POST OPPORTUNISM

One of the criticized pitfalls of the current FRAND regime is the alleged risk that owners of IPR essential to a standard will be able to unduly capture some of the

36 *See FTC/DOJ Hearings on Competition and Intellectual Property Law and Policy* (2002) (statement of S. Peterson, Corporate Counsel, Hewlett-Packard Company, Nov. 6, 2002), *available at* http://www.ftc.gov/opp/intellect/021106peterson.pdf.

37 *See FTC/DOJ Hearings on Competition and Intellectual Property Law and Policy* (2002) (statement of R. Holleman, Apr. 18, 2002) 2, *available at* http://www.ftc.gov/opp/intellect/020418richardjholleman.pdf.

38 ANSI Guidelines, *supra* note 19, at 3-4 ("A patent holder may have a strong incentive to provide an early assurance that the terms and conditions of the license will be reasonable and demonstrably free of unfair discrimination because of its inherent interest in avoiding any objection to the standardization of its proprietary technology.").

39 Potential licensors and licensees may focus their negotiations on factors other than royalty rates, such as for instance cross-licensing of IPR or ex post implementation costs. It would, for instance, be too simplistic to believe that, because A offers on an ex ante basis a lower royalty rate than B, A's technology will overall be cheaper than B's. Differences in implementation costs may be a legitimate reason for B to charge higher royalty rate than A.

economic value attributable not to the intrinsic value of those rights but to standardization itself. It is argued that if members of an SSO had known ex ante a standard being set the terms under which IPR owners would license their rights, they might have chosen an alternative technology (provided, of course, such alternative technology existed).[40] But once the standard has been adopted and implemented, switching to an alternative technology may have become too onerous for those practicing it. The argument continues that the bargaining power of the owner of essential IPR will have thus increased and that it may be able to extract more favorable licensing terms ex post standardization than would otherwise have been the case.[41] This phenomenon can be described as ex post opportunism.

Attractive at first blush, the theory of ex post opportunism overlooks several critical issues.

The first is that this theory is based on the premise that alternative technologies existed at the time of adoption of a particular standard and that the successful technology would have been chosen notwithstanding any licensing disparity.[42] In many instances of standard development, however, no suitable alternative technology exists. In the absence of substitute technologies, it cannot be argued that the standard-setting process gives additional market power to the IP holder: the technology had no competition either before or after the standards vote. The market power pre-exists the standard and is due to the uniqueness of the technology in question. Fundamental economics maintains that firms with a unique product or IP will be in a stronger position than those with products or IP for which alternatives exist. The fact that the IP is embedded in a standard adds no market power. Instead, what standardization might do is to increase the value of the IP by allowing its holder to collect royalties on larger volumes.

Firms holding patents relevant for a standard also face a number of important constraints. Regardless of whether the patented technology faces viable substitutes, the licensing price is constrained by the prices commanded by complemen-

40 *See* Teece & Sherry, *supra* note 1, at 1938-39:

> Whether the SSO would have in fact adopted another alternative had it known of the patent claims raises a complex counterfactual question: 'What would the SSO have done if the world had been different?' The answer is likely to be hotly debated, and depends on the particular facts of the standard at issue. The greater the advantages of the (patented) standard over the alternatives that were considered and rejected at the time the standard was originally set, the less likely it is that an alternative would, in fact, have been chosen.

41 D. Lichtman, *supra* note 4; C. Shapiro, *supra* note 4, at 19-20.

42 *See* Teece & Sherry, *supra* note 1, at 1939.

tary patents within the standard.[43] That is, patent prices are limited by their context. In addition, patent holders without any downstream operations (upstream firms) are constrained by the elasticity of demand for the product in the end market.[44] While vertically integrated firms can have incentives to raise rival downstream firms' prices through their licensing terms, they may also be open to cross-licensing agreements with other integrated companies, which can hold down royalty rates as well. And lastly, all firms face dynamic constraints through the formal standard-setting process. Because standards evolve over time, and many high-technology standards pass through multiple versions—mobile telecom is on its third generation (3G) currently, with 3.5G, 4G, and beyond 4G already under development—any unreasonable pricing or abuse of market power can be punished in future iterations of the standard.[45] Firms that act opportunistically in today's version of a standard may find their technologies excluded, avoided, or at least minimized in votes on tomorrow's version of the standard.

WHILE OWNERS OF IPR MAY BENEFIT FROM A BROADER ADOPTION OF THEIR TECHNOLOGIES, IMPLEMENTERS —AS WELL AS CONSUMERS— ALSO BENEFIT FROM THE OPPORTUNITY TO GAIN ACCESS TO AND USE INNOVATIVE SUPERIOR TECHNOLOGIES.

Finally, one last but important, overlooked issue relates to why, if standardization increased the value of a given IPR, the essential patent holder should not capture part of that value. The implicit assumption in the ex post opportunism claim is that all of the additional value created by the standardization process improperly accrues to patent licensors. But formal standardization is a costly cooperative effort that requires both innovators and implementers. There is no reason to assign all of the rents to one or the other. Thus, while owners of IPR may benefit from a broader adoption of their technologies, implementers—as well as consumers—also benefit from the opportunity to gain access to and use innovative superior technologies. This sharing of benefits helps to ensure participation incentives.

C. ROYALTY STACKING

Royalty stacking can be explained simply. A firm wishing to produce a good, especially one embodying a technical standard, typically needs to acquire rights to the intellectual property underlying the good. When that good is comprised of multiple complementary components, each of which is necessary for produc-

43 D. Geradin et al., Royalty Stacking in High Tech Industries: Separating Myth From Reality (Dec. 2006) (mimeo), *available at* http://papers.ssrn.com/sol3/papers.cfm?abstract_id=949599 .

44 K. Schmidt, Licensing Complementary Patents and Vertical Integration (Nov. 2006) (mimeo, University of Munich), *available at* http://papers.ssrn.com/sol3/papers.cfm?abstract_id=944169.

45 For a discussion of such dynamic and institutional constraints, *see* DeLacey, *supra* note 11.

tion and each of which is covered by patents held by separate firms, the aggregate royalty fees for licensing all of the required pieces can, it is sometimes suggested, add up to a very large amount—perhaps so large that it is no longer economical for the manufacturing firm to make the good.[46] This can allegedly happen even if each component's patent is offered on reasonable terms when considered individually because stacking up so many reasonable terms could lead to an unreasonable sum in the aggregate.

At least five factors are implicit in this royalty stacking proposition. First, innovation must be sequential and cumulative, so that the patents are overlapping and interrelated. Otherwise, the royalties could not stack up. Second, there must be many patents for a given product, such as one embodying a technical standard. Otherwise, the stack would be small and either inconsequential or relatively easy to negotiate out of. Third, the many patents must be held by numerous, distinct rights holders. Otherwise, negotiating the use of the many patents would be fairly straightforward, involving a limited number of bilateral discussions. Fourth, the given licensee or all licensees must have no patents to trade with licensors. Otherwise, cross-licensing would drastically reduce the risk of royalty stacking.[47] Finally, one additional assumption is required by the theoretical model to consistently predict royalty stacking: all patents should command identical rates.[48] That is, most discussions of royalty stacking (and the sole formal model) are based on inferences of one rate multiplied by all participants.[49] No allowance is made for heterogeneity among IP and IP holders.

While the first two assumptions, cumulative innovation and the presence of numerous patents, appear to hold in a great many high-technology industries, the remaining three assumptions are open to considerable debate. Assumption three, concerning fragmented rights holders, appears not to hold in some ICT industries. Empirical evidence is sparse, but existing papers on the software and

46 The roots of such propositions as royalty stacking and patent thickets can be traced back to Heller and Eisenberg who, in a seminal article published in 1998, suggest that the combination of pioneer and follow-on inventors could lead to "too many" patents in biomedical research, ending in a "tragedy of the anti-commons." *See* M. Heller & R. Eisenberg, *Can Patents Deter Innovation? The Anticommons in Biomedical Research*, 280 Sci. 698-701 (1998) (Patent policy might permit "...too many upstream patent owners to stack licenses on top of the future discoveries of downstream users."). The anti-commons claims have not gone unchallenged. *See* R. Epstein & B. Kuhlik, *Is There a Biomedical Anticommons?* Reg. 55 (2004). See also, R. Epstein, Studying the Course: Property Rights in Genetic Material (U. Chicago Law and Economics, Olin Working Paper No. 152, Mar. 2003).

47 This assumption raises the point that in most high-technology industries, most licensors are also licensees, and therefore will be able to reduce any eventual royalty stacking.

48 Lemley and Shapiro present the only formal model of the theory of which we are aware. *See* Lemley & Shapiro, *supra* note 4. In addition to assuming that all patents are of equal value, Lemley and Shapiro assume that all licensing negotiations occur simultaneously and that patent holders are unable to fully appropriate the rents generated by their inventions.

49 *Id.*

the mobile telecommunications industries suggest more concentration than the theoretical arguments suppose.[50] Regarding assumption four that cross-licensing is unavailable or inadequate, evidence that this is a widespread problem is again weak. For example, an empirical study of the semiconductor industry finds high levels of patenting and numerous distinct rights holders,[51] but also finds substantial evidence of cross-licensing.[52]

The last of the five assumptions, that all patents should command identical licensing rates, is the most restrictive. This view ignores the extensive literature on intellectual property valuation that makes clear all patents are not created equal.[53] When the crucial aspect of disparate patent value is incorporated into the royalty stacking theoretical model, however, the predictions are no longer so clear cut. While royalty stacking is still a possibility, it is not a foregone conclusion: some equilibria exhibit stacking while many others do not.[54] In other words, the royalty stacking theory is not robust. This finding is not surprising when you consider the ultimate goal for firms participating in standard-setting efforts: no one makes money if the product does not sell.

V. Proposals to Reshape the FRAND Model: Encouraging Ex Ante Competition

As the preceding section illustrates, many of the criticisms made against the present FRAND regime are based on inaccurate or incomplete premises. In particular, the alleged problems of hold-up and royalty stacking, while perhaps real problems in isolated incidents, do not withstand serious analysis when they try to move toward generally applicable theories. Despite the shaky underpinnings for broad application, however, in recent years a number of proposals have been made in a variety of settings to modify the current FRAND regime to mandate

50 *See* M. Noel & M. Schankerman, Strategic Patenting and Software Innovation (Center for Economic Policy Research, Discussion Paper No. 5701, June 2006); D. Geradin et al., *supra* note 43.

51 *See* R. Ziedonis, *Don't Fence Me In: Fragmented Markets for Technology and the Patent Acquisition Strategies of Firms*, 50(6) Mgmt. Sci. 804 (2004).

52 As Shapiro observes, "The impressive rate of innovation in the semiconductor industry in the presence of a web of such cross-licenses offers direct empirical support for the view that these cross-licenses promote rather than stifle innovation." Shapiro, *supra* note 4, at 13.

53 For different licensing approaches, *see* M. Kamien, *Patent Licensing*, *in* Handbook of Game Theory with Economic Applications 331-54 (R. Aumann & S. Hart eds., vol. 1., 1992); L. Johnston & R. Rapp, *Modern Methods for the Valuation of Intellectual Property*, 532 PLI/Pat 817, 817-42 (1998); G. Smith & R. Parr, *Valuation of Intellectual Property and Intangible Assets*, *in* The New Role of Intellectual Property in Commercial Transaction (M. Simensky & L. Bryer eds., 1994). F. Denton & P. Heald, *Random Walks, Non-Cooperative Games, and the Complex Mathematics of Patent Pricing*, 55 Rutgers L. Rev. (2003).

54 *See* Geradin et al., *supra* note 43.

ex ante licensing. The proposed reforms are offered as ensuring greater predictability for standard implementers, as well as a means for preventing hold up and royalty stacking scenarios by promoting ex ante competition between technologies. Many of these proposals, however, have not been carefully thought through, and would be difficult or impossible to implement. Moreover, some of the proposals could raise oligopsony power concerns and artificially depress the royalties that should be paid to innovators.

A. THE SWANSON-BAUMOL MODEL OF EX ANTE AUCTIONS

In a recent paper, Swanson and Baumol suggest that ex ante price competition could take place under a system of auctions run by the SSO.[55] They propose the following thought experiment to illustrate their ex ante approach. During the development phase of a standard, the SSO would hold an auction between different technologies. IPR holders vying to have their technology incorporated in the standard would submit offers to license it to downstream standard implementers for a fee (the royalty) calculated per unit of output. The SSO members would then choose which technology should win the auction and be embodied in the standard. Swanson and Baumol argue that the outcome of such an auction would provide a benchmark for what is a fair and reasonable royalty, as it would fully reflect the degree of competition between IPR holders existing prior to adoption of the standard. When two technologies compete against each other, competitive pressure would result in lower royalties since profits in license revenues would be competed away. This reasonable royalty would of course be constrained by the price of the final product in the downstream market. If a proposed royalty were too high, such that it would result in downstream manufacturers producing at a loss, they would simply veto the technology during the auction.

As a thought experiment, ex ante competition through SSO-sponsored auctions is theoretically attractive and has the potential to lead to efficiency-maximizing outcomes. The model propounded by Swanson and Baumol has, however, some inherent limitations, most of which relate to its practical application. First, their model is based on a simple structure that makes the modeling tractable: one company holds one patent defining one good. Unfortunately, this does not reflect the reality of modern standards, which are usually comprised of tens of firms that hold hundreds or thousands of patents that define one complex good with multiple facets or components. In such a multidimensional setting, auction design quickly gets extremely complicated.[56] It is not merely a matter of picking the lowest cost option for a well-defined product. Instead, auction bidders would need to evaluate the options on price plus a host of other dimensions, including technical superiority, ease of implementation, and so forth.

55 *See* D. Swanson & W. Baumol, *Reasonable and Nondiscriminatory (RAND) Royalties, Standards Selection, and Control of Market Power*, 73(1) ANTITRUST L.J. (2005).

56 *See, e.g.*, P. Dasgupta & E. Maskin, *Efficient Auctions*, 115(2) Q. J. ECON. 341-88 (2000); F. Branco *The Design of Multidimensional Auctions*, 28(1) RAND J. ECON. 63-81 (1997).

Related to this point, the engineers active in SSOs typically make hundreds of different technology choices on the path to a given standard. Hundreds of items, major and minor, need attention before the standard can be defined. Taking this point to its logical conclusion, an SSO would need to run hundreds of auctions—one for each component—to fully specify the licensing price of a standard. Moreover, since many of the components rely on other components, the various auctions would be linked in complicated ways, and might need to be conducted in a particular sequence. Even if it were feasible to arrange, a multi-tiered auction of this sort would require a tremendous ex ante investment from SSO members.

Nor is it entirely clear what ex ante really means in practice. As mentioned earlier, standards generally evolve over time. Would an auction need to be held each time a technology component were modified? Every time a new technological option surfaced? Just before the final vote for a new version of the standard? These timing decisions would likely have a significant impact on the outcome of the auction.

The second assumption embedded in the Swanson and Baumol model is that competing technologies for every relevant portion of the standard will be available. As noted above, a standard will usually comprise two categories of technologies:

(1) those for which there were, at the time of development, one or several alternatives and

(2) those for which there was no suitable alternative.[57]

While price competition may take place between competing technologies,[58] there is no place for such competition between peerless technologies for which no adequate substitute exists. In this (common) scenario, ex ante and ex post licensing will be identical, as holders of non-substitutable technologies will have the same level of market power before and after a standard is adopted.[59] The model therefore offers few insights on instances where complements are stan-

57 For simplicity we ignore the intermediate category of imperfect substitutes. In that case, competition of a sort does exist, but the superior option will nonetheless have some degree of market power before the SSO determines the standard.

58 *See* Skitol, *supra* note 4, at 734:

> a patent owner's own perspective on RAND terms can be expected to be quite different at the ex ante stage—when it may be competing with *alternative* technology offerings for the proposed standard—than ex post (after the standard has been adopted with the owner's technology and those alternatives are no longer viable). (emphasis added)

59 Note that holdup theory requires sunk investments, not standard approval necessarily. Knowing that a particular component has only one feasible technical solution, implementers would be unlikely to make irreversible investments in advance of securing access to the necessary IPRs. Holdup, then, would be possible only when the IP holder did not disclose its patents at all.

dardized, save for the possibility of reducing royalties for portions of the standard for which substitutes exist, but which will remain complementary to other IPR incorporated into the standard.

Another drawback of the Swanson and Baumol model of ex ante auctions, or of any ex ante approach for that matter, is that it may hinder innovation in those cases in which the value of an invention is unclear at the moment of standardization. The significance, technical merit, and full value of an invention covered by IPRs may only be revealed over time, as the standard is implemented and adopted by end users. Freezing royalty levels and other terms and conditions at a moment where imperfect information is available to SSO members has the potential to lead to suboptimal technological choices if firms were to vote on price and other tangible elements of an offering without fully understanding the differences across technology. Plus, as information developed over time parties could have strong incentives to renegotiate, which would mean incurring the transaction costs of licensing negotiations at multiple points. Furthermore, firms with unknown technologies can benefit from introductory pricing, where initial fees are set low to encourage adoption while later fees are higher to recoup investments.[60] This kind of dynamic pricing would be made more difficult by an ex ante auction.

The final limitation raises more serious concerns. The ex ante auction model assumes that owners of essential IPR will seek to charge a royalty that is high enough to compensate their research and development efforts and low enough to win the auction and see their technology embedded in the standard. Some essential rights holders may, however, behave strategically. For instance, implementers within an SSO may use their collective power by holding a mandatory auction (either in the SSO itself or through the facilitation and encouragement of the SSO) that drives royalties below levels sufficient to reward innovation. Alternatively, rights holders might commit to charge very low royalties in order to exclude competitors from the standard concerned.[61] As seen above, vertically integrated IPR owners, for instance, have a distinct advantage over pure innova-

60 J. Farrell & P. Klemperer, *Coordination and Lock-in: Competition with Switching Costs and Network Effects*, *in* Handbook of Industrial Organization (M. Armstrong & R. Porter eds., vol. 3, forthcoming 2007).

61 Swanson & Baumol assume that SSO members will not manipulate voting. *See* Swanson & Baumol, *supra* note 55, at 17 ("We further assume that the operative SSO voting (or other decision-making) process would not be unduly susceptible to being skewed or biased by one or more SSO members, much as many antitrust decisions in the area have effectively required."). Further, they assume the absence of vertically integrated firms among essential patent holders. *Id.* at 19 ("We further assume that many downstream firms use the IP to produce perfect substitutes, but that patent owners do not also produce final products."). This of course changes the dynamics of the model as pure innovators will have much lower incentives to game the auction process along the lines described above.

tors when it comes to setting royalty rates.[62] Their revenues do not depend on the royalties charged given that they can take their profit downstream in the market for the products embodying the standard. By eliminating the pure innovator's technology during an auction, vertically integrated IPR owners stand to gain in at least two ways:

(1) they would weaken a firm that would be a rival in future innovation races; and

(2) they would be best positioned to manufacture products implementing the standard embedding their own technology.

If such a scenario was to occur—not a remote possibility considering the asymmetry of interests between SSO members—it would amount to transforming standard-setting processes into a mechanism which renders a judgment on comparative value, favoring one business model (vertical integration) over another (pure innovator).

B. PROPOSALS FOR COLLECTIVE NEGOTIATIONS OF ROYALTIES

Other authors suggest an ex ante regime based on joint negotiations of royalties between and among potential licensors and licensees before a standard is formally adopted.[63] The main difference with the Swanson and Baumol model discussed above lies in the fact that royalties would not be determined ex ante in an auction, but through collective action in the form of joint negotiations. It is this element of collective action which renders it particularly problematic.

While, voluntary ex ante term disclosure may enhance the ability of licensors and licensees to negotiate mutually advantageous terms, mandatory term disclosure poses numerous perils. It can lead to a one-size-fits-all solution that would not only homogenize licensing conditions in inefficient ways, but would also distort the way standards development now fosters competition between and amongst implementing standards participants. In the absence of mandatory disclosure of licensing terms, standard implementers may make different strategic choices. For instance, an implementer may decide to negotiate a license for patents even before it is certain they will become essential, as early negotiations may allow it to obtain better license terms than those available after the standard is adopted. These advantageous license terms would then give the firm a competitive advantage over a late-to-license implementer, whose costs of implementa-

62 P. Klemperer, *Auctions with Almost Common Values: The "Wallet Game" and its Applications*, 42(3-5) Eur. Econ. Rev. 757-69 (1998); P. Klemperer, M. Huang, & J. Bulow, *Toeholds and Takeovers*, 107(3) J. Pol. Econ. 427-54 (1999).

63 *See, e.g.*, Ohana et al., *supra* note 35; *See* Skitol, *supra* note 4, at 727.

tion might be higher. Compulsory disclosure of licensing terms would eliminate that competitive aspect of standardization processes.[64]

Joint ex ante negotiations of royalties before the adoption of a standard also could trigger serious antitrust concerns to the extent they require competing downstream firms to collaborate during royalty negotiations.[65] Such collaboration could involve restrictions of competition and could therefore fall foul of Article 81(1) of the EC Treaty and Section 1 of the Sherman Act in the United States, or equivalent antitrust provisions in other jurisdictions on several grounds.

JOINT EX ANTE NEGOTIATIONS OF ROYALTIES BEFORE THE ADOPTION OF A STANDARD ALSO COULD TRIGGER SERIOUS ANTITRUST CONCERNS TO THE EXTENT THEY REQUIRE COMPETING DOWNSTREAM FIRMS TO COLLABORATE DURING ROYALTY NEGOTIATIONS.

First, joint negotiations could lead to serious anticompetitive exercises of oligopsony power.[66] As in classic examples of the exercise of buyer power,[67] the negotiations would be primarily aimed at depressing the royalties (i.e., the price) which standard implementers would pay for gain-

64 *See* R. Taffet, Ex Ante Licensing in Standards Development: Myths and Reality, Remarks at the American Intellectual Property Law Association Spring Meeting, Chicago, IL (May 4, 2006), at 9-10.

65 *See* Swanson & Baumol, *supra* note 55, at 12-13:

> The standardization process typically involves consultation and agreements among firms that are often competing buyers of IP and also may be competing sellers in the downstream product markets. While joint decision making by competitors can sometimes promote the general welfare, it always entails the danger of misbehavior for anticompetitive purposes, such as the threat of behavior aimed at collusively reducing the price paid for intellectual property.

Nonetheless, as noted by Chairman Majoras of the U.S. Federal Trade Commission, "joint ex ante royalty discussions that are reasonably necessary to avoid hold up do not warrant per se condemnation. Rather, they merit the balancing undertaken in a rule of reason review." *See* D. Majoras, Recognizing the procompetitive potential of royalty discussions in standard setting, Remarks delivered at Stanford University (Sept. 23, 2005), *available at* http://www.ftc.gov/speeches/majoras/050923stanford.pdf.

66 *See* Swanson & Baumol, *supra* note 55, at 12-13; Teece & Sherry, *supra* note 1, at 1955:

> The SSO members would, in effect, say to the patent holder, 'We will collectively reject a standard that incorporates your patented technology unless you agree to license it to us at pre-specified rates that we collectively find acceptable.' In other contexts, this clearly would amount to a group boycott.

For a perfect example of this risk, *see* Skitol, *supra* note 4, at 729, who considers that potential licensees should make use of their buyer power to extract what they consider as a reasonable royalty rate from a potential licensors ("A patent owner's refusal to accept terms satisfactory to the group as a whole would cause the group to consider alternatives to the use of that owner's technology.").

67 *See* U.K. Office of Fair Trading, The Welfare Consequences of the Exercise of Buyer Power, no. 16 (1998).

ing access to essential IPR.[68] This would diminish the licensors' incentives to invest in research and development (R&D) and could therefore potentially hamper innovation. Joint ex ante negotiations could also give rise to the risk that potential licensees would threaten to opt for an alternative technology unless the potential licensor offered a royalty they considered appropriate. Such a threat could amount to a collective boycott.

Second, required ex ante negotiations generating uniform licensing terms would lead to a homogenization of the conditions of competition and could facilitate collusion in the downstream product market. This is a risk in any collective price negotiation, but within standards it is a special concern in light of the different objectives of firms according to their business model. Vertically integrated firms have an incentive to raise the prices facing their downstream competitors without any relevant IP in the standard. Integrated firms could therefore use the ex ante collective bargaining to signal high royalties to be charged to other downstream players, with the effect of either limiting the competition downstream (if royalties were high enough) or at least disadvantaging other downstream rivals.

Finally, if joint negotiations produce a one-size-fits-all approach, it would prevent efficient discrimination in licensing conditions. Because standard implementers are not all equally situated (as, for instance, some have wider patent portfolios to offer in exchange than others, or cover broader geographic areas, etc.), charging a similar level of royalties to all of them would prevent the adoption of flexible deals that take into account their meaningful differences.

The question then arises whether, even assuming that a proposed joint negotiations regime could survive summary condemnation under per se rules, does it benefit from the application of Article 81(3) of the EC Treaty or generate sufficient countervailing efficiencies under a rule of reason regime?[69] A detailed analysis of these requirements goes beyond the scope of the present paper, so we address only certain features that, in our view, temper a finding that such collec-

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68 *See* Teece & Sherry, *supra* note 1, at 1955:

> One key issue concerning patents is whether the patent holder must announce the terms for a patent license in advance. If so, there are potential antitrust concerns. Typically, the other participants in the SSO are the most likely potential licensees for the patent. This raises the potential for collusive, oligopolistic 'price fixing' in the technology market.

For a different view, *see* Skitol, *supra* note 4, at 739.

69 In a December 2005 press release, the European Commission took note of the fact that ETSI's General Assembly had established a group with the mission to examine possible changes to ETSI's standard-setting rules, in particular on the issue of ex ante licensing. It stated that it had "indicated in its Guidelines on the application of Article 81 of the EC Treaty to technology transfer agreements (see IP/04/470) that such *ex ante* licensing can have pro-competitive benefits when subject to appropriate

footnote 69 cont'd on next page

tive negotiations could be deemed, on balance, to be in line with competition law.[70] For instance, the discussion that follows suggests that such negotiations could not be justified under either.

First, a collective ex ante negotiation system would have an adverse impact on the rewards granted to licensors, in particular those obtainable by non-vertically integrated holders of essential IPR. This is a particular threat in SSOs because non-vertically integrated IPR holders are virtually always in the minority.[71] It is therefore possible that a collective negotiation regime would not promote technical innovation or economic progress, but on the contrary negatively affect these objectives by under compensating innovators. It also is far from certain that end consumers would benefit from what would essentially amount to an exercise in rent-shifting between innovators and implementers. There is no empirical foundation to the proposition that the payment of lower royalties to innovators would automatically lead to lower selling prices of the products implementing the standard. Prices at the end-user level depend on a complex number of factors, not the least of which is the extent to which licensing terms impact incremental costs and the level of competition between standard implementers at the downstream product level.[72] Just as higher royalties could be internalized by such manufacturers, lower royalties would not necessarily be passed along to consumers. Nor is it clear that a system of joint negotiations of royalty rates is necessary (i.e., the least restrictive means available) to achieve the stated objective of the proponents of this ex ante regime (i.e., preventing perceived risks of ex post opportunism and increasing certainty as to the implementation

footnote 69 cont'd
safeguards" and that it would follow ETSI's forthcoming discussions with interest. *See* Press Release, European Commission, IP/05/1565, Commission welcomes changes in ETSI IPR rules to prevent 'patent ambush', (Dec. 12, 2005).

This statement from the Commission cannot be interpreted as meaning that it is prima facie favorable to the joint negotiations approach or to any of the other reforms proposed by firms and commentators in the framework of this ETSI group. It only suggests that the Commission will carefully review the various proposals made to ETSI to ensure their compatibility with EC competition rules. In fact, the same press release made clear that the Commission had carefully reviewed under Article 81 EC a prior amendment to the ETSI IPR rules designed to limit the risk of "patent ambush" and that it had cleared it subject to some modifications of its content.

70 *See* Swanson & Baumol, supra note 55, at 13-14 ("In the case of the typical SSO [...] the integration and efficiencies needed to justify outright collective bargaining on royalties are in short supply."). *See* Shapiro, *supra* note 10 ("While the law has typically looked for integration and risk-sharing among collaborators in order to classify cooperation as a joint venture and escape per se condemnation, [...] the essence of cooperative standard setting is not the sharing of risks associated with specific investments, or the integration of operations.").

71 Teece & Sherry, *supra* note 1.

72 J. Tirole, The Theory of Industrial Organization 66-75 (MIT Press 1997).

cost of a given standard).[73] As discussed, bilateral ex ante discussion, negotiation, and licensing often occurs today. In light of this, joint negotiations produce no pro-competitive benefits.

C. MANDATORY EX ANTE DISCLOSURE OF LICENSING TERMS

Recognizing the significant antitrust liability inherent in joint negotiations, some proposals have been made within SSOs for the adoption of a policy of mandatory ex ante disclosure of licensing terms. Under such an ex ante policy, SSO members would be required to disclose, prior to the adoption of a given standard, the upper limit of the consideration they would expect in order to license their essential IPRs, perhaps along with the most restrictive terms the licensor would seek. It should be noted that mere royalty rate disclosure is likely to be misleading. The picture it would convey would necessarily be imprecise, as the rate itself is but one of the various elements of consideration that need to be agreed on by licensor and licensee.

Although the resulting antitrust risk is markedly lower than that arising from joint negotiations, mandatory ex ante disclosure also has the potential to run afoul of competition provisions. If disclosure led to inefficiently uniform licensing terms and homogenous conditions of competition, the same complaints as for joint negotiations would hold. Moreover, term disclosure could facilitate anti-competitive cooperation designed to put pressure on the potential licensor to lower its royalties. Such a threat could create oligopsony concerns. Ex ante term disclosure could also facilitate collusion in the downstream product market, in that the announcements could be used as price signals obviating the need for any explicit coordination.

To illustrate this last claim, consider an industry where downstream manufacturers require various complementary patents to operate lawfully. Suppose further that the industry is populated by a number of firms where some are vertically integrated, some are pure innovation (upstream) companies, and some are pure downstream manufacturers (with no IP). In an industry like this, the vertically integrated firms have incentives to discriminate against their downstream competitors.[74] Each of the vertically integrated companies would like to see its downstream competitors pay a very high aggregate royalty rate. This could hap-

73 Deborah Majoras made this very point in a recent speech: "It may also be appropriate to consider whether joint ex ante royalty discussions are reasonably necessary to mitigate holdup." *See*, Majoras, *supra* note 68, at 10. *See, e.g.,* U.S. Fed. Trade Comm'n & U.S. Dep't Justice, Antitrust Guidelines for Collaborations among Competitors § 3.36(b) (Apr. 2000) (noting that "[t]he Agencies consider only those efficiencies for which the relevant agreement is reasonably necessary") and U.S. Fed. Trade Comm'n & U.S. Dep't Justice, Antitrust Guidelines for the Licensing of Intellectual Property § 4.2 (Apr. 1995) ("If it is clear that the parties could have achieved similar efficiencies by means that are significantly less restrictive, then the Agencies will not give weight to the parties' efficiency claim."). *See* Majoras, *supra* note 65, at 9-10.

74 *See, e.g.*, Schmidt, *supra* note 44.

pen if each of the vertically integrated companies sets a moderately high royalty rate for its patents, or alternatively if a subset of those IP holders set very high royalty rates for their patents. To achieve that end, each vertically integrated firm could use the obligation to disclose its maximum royalty to the SSO as a device to signal to the other vertically integrated firms what it intends to charge to the downstream competitors. Disclosure of the maximum royalty rate would thus allow the vertically integrated companies to collectively raise their downstream rivals' costs. This signaling device not only suppresses the need for explicit collusion, it would also allow the vertically integrated companies to justify their common rate as reasonable.

A more subtle, but equally troubling, possibility of mandatory ex ante licensing disclosures relates to those firms that hold patents for defensive purposes only. For instance, some firms focus on downstream operations and take patents only as bargaining devices should they find themselves, say, sued for patent infringement by another firm. These firms have no active plans to license their patents, and instead operate on an implicit cross-licensing basis for rival firms that might infringe their IPRs. If declaration of maximum terms is mandatory, however, declaring royalty-free and permissive terms and conditions would eliminate a patent portfolio's worth as a defensive mechanism for cross-licensing and lawsuit avoidance. At the same time, declaring high royalty rates and restrictive terms can lead to a firm's technology being bypassed during standard development stages. Mandatory disclosure therefore cuts out a great deal of operational flexibility, all for a group that would likely not contribute to any royalty stacking or hold-up even if it were able.

MANDATORY DISCLOSURE CUTS OUT A GREAT DEAL OF OPERATIONAL FLEXIBILITY, ALL FOR A GROUP THAT WOULD LIKELY NOT CONTRIBUTE TO ANY ROYALTY STACKING OR HOLD-UP EVEN IF IT WERE ABLE.

One SSO is already implementing an ex ante licensing term disclosure policy. The VMEbus International Trade Association (VITA) recently received a business letter review from the U.S. Department of Justice stating that it had no present intention to challenge, unless anticompetitive in practice, a proposal for their SSO arm (VSO) to execute a significant new patent policy requiring upfront disclosure of patents and patent licensing terms in connection with VMEbus standard-setting activities.[75] Under VSO's new policy, each member must, inter alia, declare the maximum royalty rate for all the patent claims that it represents, owns, or controls and that may become essential to implement the standard in question. In addition, each VITA member company must disclose

75 VSO is a non-profit organization that develops and promotes standards for VMEbus computer architecture. *See* VITA Patent Policy, at http://www.vita.com/disclosure/VITA%20Patent%20Policy%20section%2010%20draft.pdf; Letter from T. Barnett, Assistant Attorney General, U.S. Department of Justice, Antitrust Division, to Robert A. Skitol, Drinker, Biddle & Realth (Oct. 30, 2006), *available at* http://www.usdoj.gov/atr/public/busreview/219380.htm.

the most restrictive non-royalty terms that it will request. Such declarations are irrevocable, although patent holders may submit subsequent declarations with less restrictive licensing terms (including lower royalties). In other words, the disclosure is intended as a binding price cap for licensors. Any further joint discussion of terms within the SSO was prohibited in this proposal.

Nonetheless, a danger of such a policy, as mentioned above, is under-compensation of IP holders. For example, suppose that two firms have patented technology relevant for some component of a new standard. In this case, the ex ante disclosure process could easily resemble the ex ante auction along the lines of Swanson and Baumol. This raises several issues. First, if one technology option were superior to another, unless this fact was widely known by SSO members the lesser technology would drive the license pricing. The firm with the better, but perhaps less-known, technology would have the choice of pricing its IP below the actual contribution value to the standard or losing the auction. Even if this under-compensation were not an issue in practice for VITA, the SSO members will still face a complex set of comparisons, needing to evaluate one multidimensional option against another. Moreover, as we have observed in our discussion of the Swanson and Baumol model, there could be significant risks that some IP owners could game the disclosure process by disclosing low royalties for the sole purpose of eliminating upstream firms that rely on royalties to fund their innovation. Such a predatory approach could be funded by the rents generated on downstream markets. Disclosure of licensing terms that would be taken into account for technology selection may also induce collusion as can often be observed in bidding processes. We are not suggesting that these gloomy predictions would necessarily materialize (it is in fact too early to say), but VITA-type disclosure may increase the risk of anticompetitive behavior.

It remains to be seen whether VITA's new policy will work as planned, avoiding the potential anticompetitive consequences discussed above. It is possible that VITA will manage to balance the restrictive features of its new policy with alleged pro-competitive aspects, so that the overall effect will not be anticompetitive. Regardless of this one case, however, it would be dangerous to make sweeping statements about such ex ante term disclosure policies. The devil, as they say, is in the details, so that assessments will need to be conducted on a case-by-case basis.[76]

VI. Conclusions

Concerns over possible abuses of the formal standard-setting process continue to generate significant debate. Among the topics are the risks perceived by some for opportunistic licensing behaviors, patent hold up, and royalty stacking. While a potential for such behavior exists, at this point it appears unlikely that any of

76 In fact, the U.S. Department of Justice's review and decision not to oppose VITA's proposed plan illustrates the application of a rule of reason approach.

these problems is in fact widespread. Regardless of the extent of any ex post standardization problems, however, many of the proposed ex ante solutions would likely cause more difficulties and unintended consequences than they could correct—even assuming the solution could be implemented in practice.

In this paper we have assessed various proposals for addressing supposed ex post opportunism within standard-setting and have found most of them lacking. Systems of ex ante auctions and joint negotiations appear far too dangerous a road to take, with more potential to cause harm than to fix any ex post problems with market power. Ex ante licensing term disclosures emerge as the most sensible of the proposals, but such conduct already occurs, and imposing more onerous requirements than already exist could cause more harm than good. The trick will lie in a prudent execution of term disclosure programs, and then only where the SSO members as a whole deem the risks of ex post abuse great enough to warrant instituting mechanisms that go beyond the guarantees provided by existing FRAND commitments and voluntary ex ante licensing.

In the end, the extant FRAND regime typical of modern SSOs appears a remarkable compromise. It balances the danger to standard implementers that IP holders might refuse to license or offer only unreasonable terms against the danger to IP holders that standard implementers might press for unreasonably low royalty rates that prevent an adequate return on R&D investments. Before we replace this flexible arrangement that appears to work in the majority of instances, we should be sure that the perceived problems are indeed widespread and that the proposed solutions to them represent genuine improvements. ◀