Patent Litigation, Standard-Setting Organizations, Antitrust, and FRAND

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I. Introduction

There has been extensive discussion recently about the shortcomings of the patent system and how those shortcomings can lead to the creation of market power in standard-setting organizations (SSOs).[1] This article first describes some of the salient characteristics of the U.S. patent system as well as some of its shortcomings. It then turns to the role of SSOs, which are collective organizations that set standards that by their very nature will trigger certain patents.[2] Such patents are called standard-essential patents (SEPs).[3] This article discusses the key potential antitrust problems raised by collective standard-setting and the mechanisms that SSOs have used to address those problems. Specifically, it focuses on the requirement SSOs often impose on their members to commit to license SEPs on fair, reasonable, and nondiscriminatory (FRAND) terms. This article explains how those terms should be interpreted in an economic sense in order to mitigate the antitrust problems that are identified. It concludes with a discussion of the limitations of FRAND commit-

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1 Kai-Uwe Kühn, Fiona Scott Morton & Howard Shelanski, *Standard Setting Organizations Can Help Solve the Standard Essential Patents Licensing Problem,* 3 CPI ANTITRUST CHRON. (SPECIAL ISSUE) 1, 3 (2013).

2 *Id.* at 2–3.

3 *Id.*

ments to address all problems associated with market power in standard-setting situations, the way that patent system reforms might address some of the remaining concerns, and the likely response of institutions to the problems created by our patent system.

II. Patents Background

Patents are a form of property in that they allow the patent holder to use the courts to exclude others from using the patent, and they thereby enable the patent holder to avoid competition from someone else practicing the patent.[4] Patents are intended to create a financial incentive to invent without the inventor having to worry that someone will use his idea for free.[5] In return for the ability to exclude others, the patent holder reveals information about his innovation in a public filing.[6] Since patents involve information, there is no marginal cost for its use in the sense that the cost of using information is unchanged by whether one or two people use the knowledge. Information is a non-rivalrous good. This means that from an economic point of view, there is a well-known tradeoff between creating financial incentives to invent through the possibility of a non-competitive price and creating financial incentives for efficient use of the information through a low price.

For a patent system to work efficiently, it must be true that only useful, novel, and non-obvious ideas are patented. If every trivial idea could be patented, transaction costs would overwhelm every firm. For example, suppose that a firm received a patent for the use of addition. Suppose the firm is willing to license the use of the idea for one cent per use. Even though the amount may be small, having to pay anything for the use of addition would lead to fewer people doing arithmetic operations, and inefficiency would result. Moreover, the mechanism to collect fees could be unwieldy and costly. Although in a world of zero transaction costs such concerns may disappear, that is not the world we live in. If a firm is required to pay a royalty for every trifling thing it does, the firm will be deterred from entering those industries where such transactions are needed. There has been widespread criticism that the U.S. patent system has been granting too many obvious patents,[7] creating the environment just described, in which a firm wanting to innovate must negotiate with lots of firms who hold patents on obvious ideas. Such a situation obviously deters, not encourages, innovation.

Many have claimed that numerous U.S. patents are either likely invalid (weak) or of questionable value and that more such patents are being granted than in the

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4 FED. TRADE COMM'N, THE EVOLVING IP MARKETPLACE: ALIGNING PATENT NOTICE AND REMEDIES WITH COMPETITION 1 (2011).

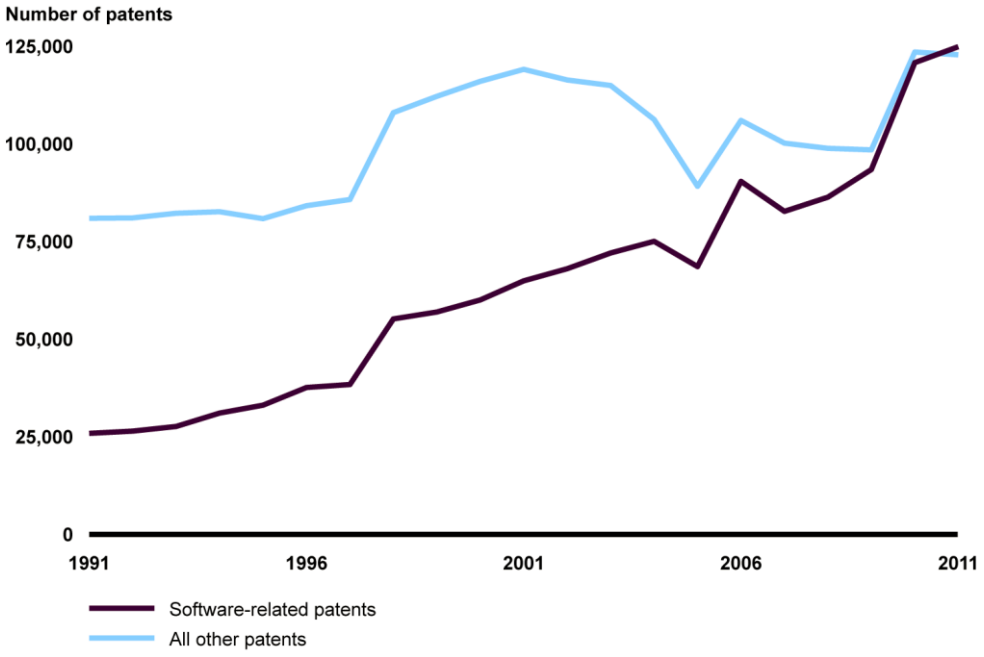
5 *Id.*

6 *Id.* at 2.

7 U.S. GOV'T ACCOUNTABILITY OFFICE, GAO-13-465, INTELLECTUAL PROPERTY: ASSESSING FACTORS THAT AFFECT PATENT INFRINGEMENT LITIGATION COULD HELP IMPROVE PATENT QUALITY 28, 30 (2013).

past.[8] For example, the U.S. Government Accountability Office (GAO) has recently noted that software patents that include business method patents have increased dramatically, both in absolute terms and relative to total patents granted.[9] Such patents have been the subject of much criticism for being obvious.[10]

Figure 1: Number of Patents Granted[11]



Source: GAO analysis of United States Patent and Trademark Office data.

As Figure 1 shows, the fraction of all patents that are software-related has risen from approximately 25% in 1991 to approximately 50% in 2011.[12] The number of patent cases has grown at the same time.[13] Figure 2 shows the number of patent cases filed by year from 1992 to 2012. Some commenters have claimed that the increase in patent cases in 2011 was due to pre-emptive filing in anticipation of the passage of the America Invents Act.[14] However, the trend appears to have continued in 2012.

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8 Adam B. Jaffe & Josh Lerner, *Innovation and Its Discontents*, *in* 6 INNOVATION POLICY AND THE ECONOMY 27, 29 (Adam B. Jaffe et al. eds., 2006).

9 U.S. GOV'T ACCOUNTABILITY OFFICE, *supra* note 7, at 12 fig.1.

10 *Id.* at 28, 30.

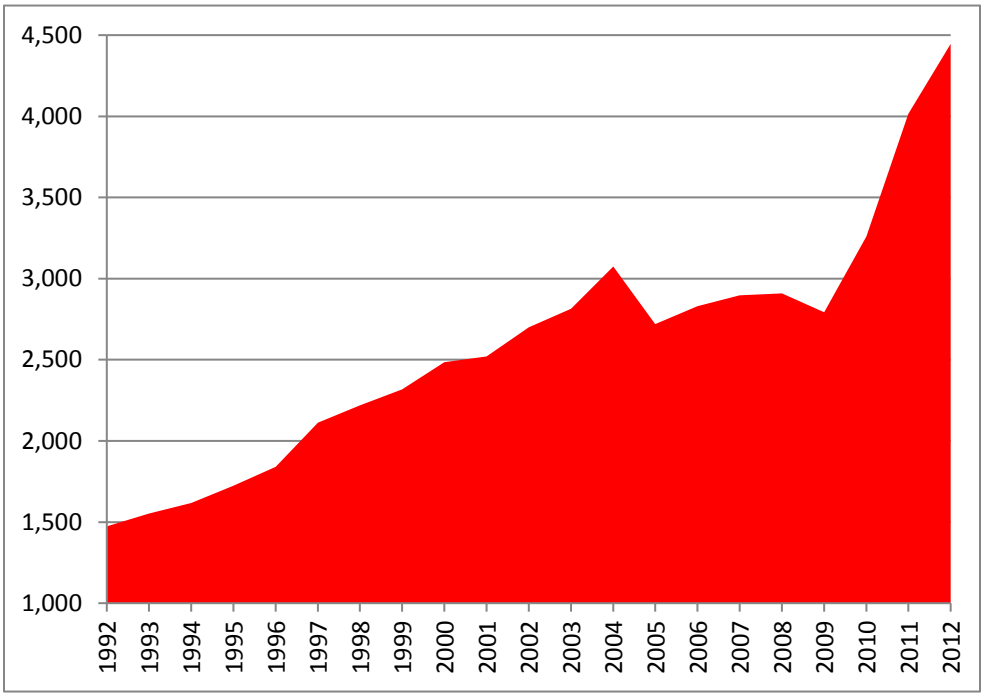
11 *Id.* at 12 fig.1.

12 *Id.*

13 *Id.*

14 *See, e.g.*, *id.* at 15.

Figure 2: U.S. Patent Cases 1992–2012[15]



As a proportion of suits filed, software-related suits (including those arising out of business method patents) have grown somewhat in recent years.[16] Much more dramatic is the increase in the proportion of defendants being sued with regard to software-related patents.[17] In 2007, there were slightly fewer lawsuits associated with software-related patents than other types of patents, and slightly fewer defendants in those lawsuits.[18] In 2011, while the number of software-related suits increased by around 40%, the number of defendants in those suits more than tripled—an increase not seen in other types of suits.[19] While there have been changes in the legal framework, such as the America Invents Act, statistics such as these are consistent with claims that weak patents are becoming more common and are more frequently being asserted against multiple defendants.

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15 Data from U.S. Courts, Judicial Business Archive, *available at* http://www.uscourts.gov/statistics/judicialbusiness/archive.aspx.

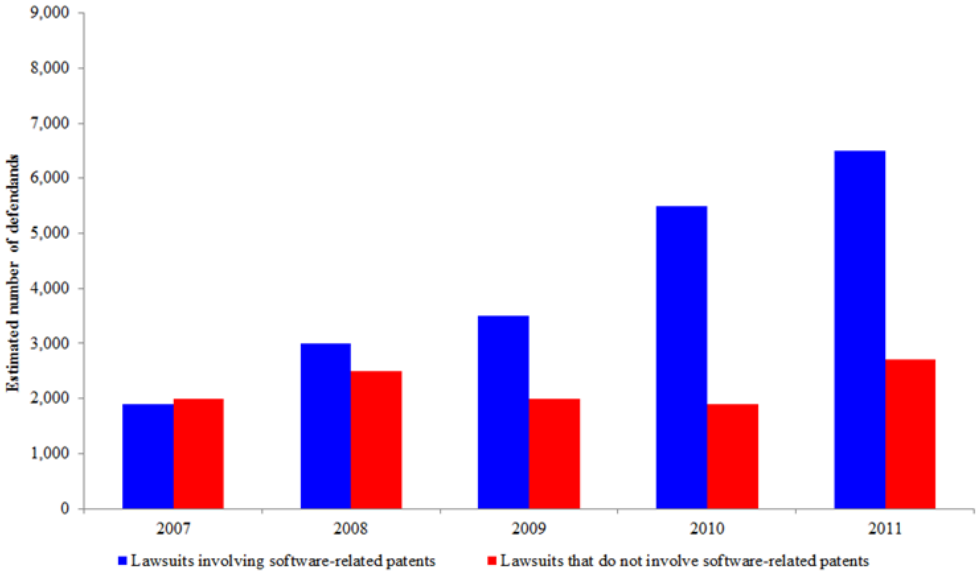
16 U.S. GOV'T ACCOUNTABILITY OFFICE, *supra* note 7, at 21.

17 *Id.*

18 *Id.*

19 *See infra* Figure 3.

Figure 3: Number of Suits and Defendants Associated with Software Patents[20]



III. Market Power Concerns with Collective Standard-Setting[21]

It is well understood that the collective action involved in standard-setting can raise the possibility of an antitrust violation, as when the standards are chosen to harm a rival.[22] In the presence of patents, collective standard-setting can also create problems of hold-up and discriminatory licensing.[23] Before being incorporated into a standard, the royalty a patent holder can earn from a license for its technology is constrained in part by competition from alternatives that may be available. Once a standard that incorporates a particular patented technology is adopted, those alternatives are not part of the standard and therefore may no longer constrain the ability of the patent holder to demand royalties in excess of what it could have obtained based on the value of the technology prior to its inclusion in the standard. When the patent holder succeeds in obtaining a royalty in excess of the *ex ante* royalty it could have obtained, patent hold-up has occurred.[24]

The creation of market power after the standard has been adopted is exacerbated when manufacturers make significant investments based on the standard. This

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20 Data from U.S. GOV'T ACCOUNTABILITY OFFICE, *supra* note 7, at 21 fig.5.

21 *See* Dennis W. Carlton & Allan L. Shampine, *An Economic Interpretation of FRAND*, 9 J. COMPETITION L. & ECON. 531, 534–45 (2013) (providing an extensive discussion on market power concerns with collective standard-setting).

22 *See* FED. TRADE COMM'N, STANDARDS AND CERTIFICATION, FINAL STAFF REPORT 157 (1983) (discussing standards groups being used to disadvantage competing producers).

23 Kühn, Morton & Shelanski, *supra* note 1, at 3.

24 *Id.*

article will refer to the period prior to the technology being incorporated into a standard as *ex ante* and the period afterwards as *ex post*. Once such sunk investments have been made, the manufacturers can become locked-in to the standard because the costs of switching to an alternative standard— assuming that one is available—can be prohibitively expensive. People could have to tear down their factories and build new ones. Holders of SEPs can exploit this lock-in by demanding royalties and other licensing terms that reflect not the incremental *ex ante* value of the patented technology to the licensee, but rather the *ex post* value derived from the market power that the holders of the SEPs have gained as a result of the inclusion of that technology in the standard and after sunk investments have been made by firms implementing that standard.

It is easy to understand how the inclusion of one technology instead of another in a standard can eliminate alternative technologies from a firm's consideration. In some cases, compliance with standards is essential to the ability of firms to participate in the industry.[25] Even if alternatives still exist after the SSO has adopted the standard and it has been implemented by the industry, it may be commercially infeasible for individual firms to use the alternative, non-compliant technology. Additionally, it can be very costly, if not impossible, to switch an entire industry to an alternative standard. Thus, once a standard is set, the holders of patents included in that standard may behave opportunistically to hold up those who manufacture standards-compliant products. In this way, the holders of SEPs can exercise market power that they would not otherwise have had but for the standard and can charge all users who comply with the standard a high royalty.

The fact that multiple competing firms participate in the standard-setting process through SSOs raises the additional potential problem of strategic behavior by a patent holder to manipulate the relative licensing terms of competing firms. There are two separate but related issues. First, by threatening to manipulate and raise the relative royalty rates of one rival compared to the other rival firms, the patent holder may be able to hold up one of the rival firms. Second, by using the market power that comes from holding SEPs to make a profit, the patent holder, together with the collaboration of a subset of rivals that can confer that market power on the patent holder, can benefit itself and the subset of rivals at the expense of other rivals (and consumers).[26] That is, the patent holder can offer to share some of its monopoly profits with the subset of firms that assist the patent holder with getting SEPs. In this case, the subset of rivals and the patent holder benefit and exploit the other rivals.[27]

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[25] *E.g.*, FTC, *supra* note 22, at 27.

[26] *See generally* Carlton & Shampine, *supra* note 21.

[27] *Id.* Whether the subset of rivals benefits positively depends on the difficulty of recruiting marginal firms to vote for the standard. This issue is related to those that arise in exclusivity of dealers. *See, e.g.*, Eric B. Rasmusen, J. Mark Ramseyer & John S. Wiley, Jr., *Naked Exclusion*, 81 AM. ECON. REV. 1137 (1991); Ilya R. Segal & Michael D. Whinston, *Naked Exclusion: Comment*, 90 AM. ECON. REV. 296 (2000).

A patent holder may also be able to act strategically in the standard-setting context to take advantage of firms that *ex ante* have the same alternatives to the patented technology as their rivals but are more profitable than their rivals. For example, some firms may sell complementary goods that produce large profits, but those profits are unrelated to the use of the patented technology in the sense that the firm would make the same profits had an alternative technology been incorporated into the standard. However, after the standard is adopted and the alternative is eliminated as a feasible alternative, the patent holder can extract the entire profit of the one firm with the complementary good even though the profit of the complementary good is unrelated to the patent. This type of strategic behavior involving unequal treatment of rival firms that derive the same incremental value from the patent is inefficient because it will deter firms from investing in complementary areas.

IV. FRAND as a Response to Antitrust Concerns in Standard-Setting

A common response to the antitrust concerns is for SSOs to require members to disclose the existence of patents for technology that is relevant to the standard and agree to license SEPs on FRAND terms.[28] Requiring SSO members to disclose that they have patents that would be essential to a particular implementation of a standard before that standard is adopted can help prevent hold-up and strategic behavior by preserving the competitive process between alternatives. The failure by a patent holder to disclose its technology, or the false representation of a technology as unpatented, may result in that technology being chosen over alternatives when it would not have been chosen if the SSO had known that it was patented. This sort of "patent ambush" can be a serious concern.[29] SSOs might also address such concerns by negotiating or setting rates in advance but have generally not done so, presumably in part because of concerns about being accused of price fixing. Indeed, SSOs seem to place great concern on avoiding any collective *ex ante* royalty negotiations with SEPs for fear that it could be characterized as collective price fixing. This view seems to persist despite the fact that the Department of Justice issued two opinion letters stating that any *ex ante* price negotiations will not be treated as *per se* violations of the antitrust laws as the SSOs might have feared.[30] Even when firms do disclose patents and agree to charge FRAND royalties, litigation is common because SSOs do not typically define what FRAND means.[31] To assist in re-

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[28] Mark A. Lemley & Carl Shapiro, *A Simple Approach to Setting Reasonable Royalties for Standard-Essential Patents*, 28 BERKELEY TECH. L.J. 1135 (2013).

[29] *See generally* Dennis W. Carlton, *Patent Ambush in the US and the EU: How Wide Is the Gap? The Economics of Patent Ambush*, 2 CONCURRENCES 6 (2011) (discussing a patent holder's opportunities to acquire additional market power by abusing flaws in the patent system).

[30] Letter from Thomas O. Barnett, Assistant Attorney Gen., U.S. Dep't of Justice, to Robert A. Skitol, Esq. 8 (Oct. 30, 2006), *available at* http://www.justice.gov/atr/public/busreview/219380.pdf; Letter from Thomas O. Barnett, Assistant Attorney Gen., U.S. Dep't of Justice, to Michael A. Lindsay, Esq. 9 (Apr. 30, 2007), *available at* http://www.justice.gov/atr/public/busreview/222978.pdf.

[31] Jay P. Kesan & Carol M. Hayes, *FRAND's Forever: Standards, Patent Transfers, and Licensing Commitments*, 89 IND. L.J. 231, 245 (2014).

solving this problem, we have previously advocated for the following economic interpretation of the two components of FRAND.[32]

A reasonable royalty paid by a firm in the context of FRAND and SSOs is a royalty that does not include any hold-up value—the royalty that would have been negotiated *ex ante*, before the patented technology at issue had been adopted into the standard and prior to the licensee incurring sunk costs. The maximum royalty *ex ante* is based on the incremental value that the technology brings to the licensee compared to the next-best alternative available. No firm would pay more than that royalty in an *ex ante* negotiation where an alternative is available. This general approach has been widely, though not universally, accepted by economists.[33]

The definition of the non-discriminatory principle of FRAND is not widely agreed upon.[34] While many interested parties have suggested that similarly situated firms should pay the same rates,[35] the term "similarly situated" is undefined. We propose two possible interpretations. One sensible definition that prevents some of the inefficiencies discussed earlier is that competing firms are similarly situated if *ex ante* they expect to obtain the same incremental value[36] from the patented technology compared to the next-best alternative technology. Firms in different industries, such as a handset manufacturer and a maker of wireless heart monitors, might make devices that obtain different incremental values from the same patented technology and do not compete with one another. Thus, the two firms can pay different rates under this interpretation.

However, there are circumstances where there are good reasons not to interpret "similarly situated" in this way. For example, it may be difficult and costly to implement this interpretation, particularly when rival firms have significant differences with respect to complementary goods. For instance, the patented technology may improve the functioning of a product and there may not be alternative technologies available to do so. In this situation, the value of a technology to a firm depends on the incremental value that the technology brings to the firm by improving the demand for its product and thereby increasing its profits. Measuring that incremental value, especially when it could differ across firms because the product produced by the firms differs, could be a formidable task.

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[32] Carlton & Shampine, *supra* note 21, at 545.

[33] *Id.*

[34] Economists could define non-discrimination as occurring when two people who impose the same cost on the firm are charged the same price. That definition provides a sufficient but not necessary condition to address many of the competition issues discussed here. We propose an alternative definition of non-discrimination above.

[35] Carlton & Shampine, *supra* note 21, at 546.

[36] The discussion of value refers to the absolute value, not a percentage. Using a percentage royalty rate is different than an absolute rate and it is the absolute rate that matters. For example, applying the same percentage end product royalty to a radio installed in a truck and to one installed in a bicycle will lead to very different absolute amounts paid. *See* Carlton & Shampine, *supra* note 21, at 540 n.24 (discussing the variable effect that percentage royalties would have on basic versus advanced routers).

One alternative interpretation of non-discrimination that would address the strategic behavior concerns discussed above and might also be easier to administer and monitor would be to apply a uniform rate assessed against a common component incorporating the patent used by all competitors, assuming that one exists—that is, to define similarly situated as any firm that uses this common component even in cases where some firms derive greater value from the patent than others.[37] This interpretation of FRAND still allows some differences in royalty rates across industries if some industries do not use the common component or if different industries use different common components.[38]

V. Problems that FRAND Does Not Solve

It would be wrong to think of FRAND as a panacea for all the problems plaguing the patent system. For example, there are at least two other related economic problems associated with patents and the standard-setting process that are not readily addressed by FRAND. First, FRAND does not address the issue of double marginalization—the fact that both a patent holder and a downstream firm may possess some market power. The lack of coordination between the two leads to double marginalization and lower than efficient output. Second, the existence of multiple SEPs associated with a particular standard raises the problem of Cournot complements.[39] In the patent context, this problem is often referred to as royalty stacking.[40] Each firm with SEPs imposes a royalty that generates a negative externality on the other patent holders by reducing the output of the licensee. Since each firm does not take this effect into account when setting its royalty rate, the result is that output is generally lower than if there were a single holder of all the patents. This effect can be significant. With constant marginal costs, linear demand, and N patent holders, output will be only $2 / (N + 1)$ of the amount generated with a single firm holding all patents.[41] Some economists have suggested that FRAND should account for this effect by, for example, determining an overall royalty rate for all technologies involved in a standard and then allocating that rate among the different patent holders. Evaluation of the overall royalty rate is clearly relevant when contributions

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[37] We understand that some courts have adopted a similar perspective in cases addressing the concept of the "smallest salable unit" as the royalty base. *See, e.g.*, Douglas J. Kline, Jonathan W. Lent & Neil J. Zoltowski, Implications of Recent Court Decisions on the Application of the "Entire Market Value Rule" to Patent Damages Analysis, Intell. Prop. Roundtables (Nov. 15, 2010), *available at* http://apps.americanbar.org/litigation/committees/intellectual/roundtables/1110_outline.pdf.

[38] *See* Carlton & Shampine, *supra* note 21, at 549–52 (discussing the issues this interpretation raises regarding patent exhaustion, the treatment of patent portfolios, and inter-temporal rate variations).

[39] Mark A. Lemley & Carl Shapiro, *Patent Holdup and Royalty Stacking*, 85 TEX. L. REV. 1991, 2013 (2007). (defining the Cournot complements effect as "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. . .").

[40] *Id.* at 2010, 2011.

[41] *Id.* at 2014. Note that this comparison assumes the patent holder's royalty rates are not constrained by FRAND.

to a licensee's profitability cannot readily be assigned to individual patents in an unambiguous way.

More generally, FRAND does not address problems generated by weak patents that are not standard-essential. The U.S. Patent and Trademark Office has engaged in some efforts in recent years to tighten its examination process in general and the treatment of software patents in particular, but has indicated that its ability to do so is limited by the existing legal structure.[42] The patent system itself could be reformed in a number of ways that could help address these general problems. For example, filing fees for patents could be significantly increased. This would encourage inventors only to file for strong patents with significant commercial implications. Alternatively, entire classes of inventions, such as software, could be made ineligible for patent protection.[43] The rationale behind such an approach would be that patent protection is most efficient when protecting inventions that are very expensive to make and hard to independently replicate, but easy to copy, *e.g.,* pharmaceuticals. By contrast, many software and business method inventions are claimed to be easy to replicate and frequently independently created.[44] Firms often claim to have been unaware of the infringed patents and to have independently arrived at the invention.[45] While that may not be a valid legal defense, it is important to the economic analysis, as there was no technology transfer. The patent in this situation imposes a tax on the downstream firm without producing a social benefit from dissemination of the knowledge in the patent. However, it can be difficult to draw clean distinctions, and there is the risk of deterring innovative activity. Before undertaking such reforms it would be helpful to analyze the degree to which patents in various industries and of various types result in technology transfers. Finally, altering the legal rules so that the loser pays attorney's fees could also help deter litigation over weak patents.

VI. Conclusion

The recent upsurge in patent litigation, especially involving SEPs, is creating widespread problems. We envision that some will be addressed by reform of the patent system, but if not, we expect to see SSOs becoming more active in defining exactly what FRAND means. Failure to do so could subject the SSO to an antitrust suit on the grounds that the SSO provided a forum for the exercise of collective market power through standard-setting. We expect that exposure to such a risk will alter the reluctance of SSOs to encourage *ex ante* royalty setting. Although unrelated to FRAND, we also expect the rise of either 1) SSOs requiring all SEPs to be licensed pursuant to some aggregate constraint on royalties to deal with the Cournot complements problem and/or 2) the amalgamation of complementary patents into

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42 U.S. GOV'T ACCOUNTABILITY OFFICE, *supra* note 7, at 39–45.

43 Joe Mullin, *In Historic Vote, New Zealand Bans Software Patents*, ARS TECHNICA (Aug. 28, 2013, 2:50 PM), http://arstechnica.com/tech-policy/2013/08/in-historic-vote-new-zealand-bans-software-patents.

44 *See, e.g.*, Stephen McJohn, *Scary Patents*, 7 NW. J. TECH. & INTELL. PROP. 343 (2009).

45 *Id.*

single licensing entities to lower transaction costs much like ASCAP and BMI have done.[46]

[46] *See, e.g.,* Robert Norton, *Who Pays the Piper*, FORTUNE (1986), http://archive.fortune.com/magazines/fortune/fortune_archive/1986/06/23/67739/index.htm (explaining that ASCAP and BMI collectively own the rights to ninety-five percent of American musical compositions).