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Collective Rights Organizations: A Guide to Benefits, Costs and Antitrust Safeguards

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A. INTRODUCTION

Collective rights organizations (CROs) include patent pools, copyright collectives and cross-licensing arrangements. These organizations may differ in important dimensions. Their members may offer licenses to non-participants or only license each other. One or more of the participating rights-holders or a third party may administrate the CRO's licensing program. Licensing terms may include royalties or be royalty free. Licenses may be exclusive or non-exclusive or include restrictions such as exclusivity and limitations on fields of use. The common thread is that separate firms or rights-holders cooperate to price and establish the terms of use for their intellectual property.

Patent pools and copyright collectives offer technology users one-stop shopping for the rights that the organizations manage and provide rights-holders with a mechanism to enforce their rights and collect royalties. Cross-licensing arrangements are limited to the parties to the cross-license and do not make licenses available to third parties. Nonetheless, they can provide benefits by resolving conflicting patent claims and by lowering royalty burdens when parties agree

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to cross-license royalty-free or at terms that net out the values of their respective intellectual property.

These services lower the transaction costs of obtaining access to required intellectual property rights and can reduce “royalty-stacking” that can occur when licensors independently determine royalty terms for complementary rights.¹ Complementary rights, such as patents that are essential to make or use a product, add value when licensed jointly. Royalty-stacking is also called the “Cournot-complements” effect, after Augustin Cournot, who in 1838 identified the tendency of competition between suppliers of complements to increase prices of products that employ the complements.²

The potential benefits from collective rights organizations do not come without potential competitive risks.³ Many patent pools and cross-licensing arrangements were thinly veiled cartels that fixed prices and excluded competition.⁴ Collective licensing risks elevating prices for intellectual property rights that are substitutes for each other.⁵ Although patent pools provide a vehicle to resolve costly litigation over conflicting claims to intellectual property rights, they can protect weak intellectual property rights whose scope and validity should be challenged.⁶ CROs can provide incentives for rights-holders to create intellectual property by facilitating the exercise and monetization of rights, but they can discourage subsequent innovation by limiting the ability of rights-holders to benefit from future discoveries.

Collective rights organizations have attracted much attention from antitrust enforcers and academics because they offer both large potential benefits and the danger of considerable harm to competition when firms that compete in the licensing of intellectual property rights or in product markets cooperate in the licensing of those rights.⁷ This chapter describes how antitrust enforcement has evolved to guard against the competitive risks from collective rights organizations while preserving their benefits. The focus is on patent pools, although many of the considerations apply directly to copyright collectives and cross-licensing arrangements.⁸

Related benefits and costs apply to other activities such as data pools⁹ and standard setting.¹⁰ However, these undertakings raise additional issues that are beyond the scope of this chapter. I also do not dwell in this chapter on obstacles to the formation of collective rights organizations.¹¹ My focus is on the potential efficiency benefits and competitive risks from collective rights organizations and on the path taken by courts and enforcement agencies to develop a coherent policy to evaluate these potential benefits and costs.

Section B highlights some of the key enforcement decisions that have shaped antitrust policy for collective rights organizations. A number of early patent pools and cross-licensing

¹ See, e.g., Shapiro 2001. See also, Heller & Eisenberg 1998, 698.

² Cournot 1838, 99–107. Cournot (1838) uses the example of copper and zinc to form brass.

³ I focus in this chapter on competition issues for collective rights organizations that charge royalties. However, the fact that a CRO offers a royalty-free license does not imply that the activities of the CRO can have no competition concerns. Royalty-free licensing can harm competition by making it difficult for innovators to profit from their discoveries and can have exclusionary consequences if CRO licenses are not universally available.

⁴ See, e.g., Carlson 1999; Gilbert 2004.

⁵ See, e.g., Shapiro 2001.

⁶ One of the first patent pools formed to resolve disputed claims to patents on sewing machines. See, e.g., Mossoff 2011.

⁷ See, e.g., Andewelt 1985; Aoki & Schiff 2008; Carlson 1999, 359; Gallini 2011; Gilbert 2004, 4; Gilbert 2010; Merges 2000; Merges & Mattioli 2017; Shapiro 2001, 119.

⁸ See *infra* Section B (discussing the Hartford-Empire cross-licensing arrangement).

⁹ See, e.g., Mattioli 2017.

¹⁰ See, e.g., Farrell 2007; Gilbert 2014.

¹¹ I note that collective rights organizations need not encompass all relevant rights to have significant efficiency benefits. See, e.g., Aoki & Nagaoka 2005; Gilbert 2010.

agreements fixed prices and excluded competition in “downstream” product markets. Courts properly challenged these arrangements. In contrast, the judicial treatment of the benefits and costs from the collective licensing of the “upstream” technology rights has been less consistent. In some cases, courts allowed agreements to persist after restrictions on downstream product market competition were remedied without paying attention to whether the agreements might increase upstream prices for technology rights or raise barriers to competition.

Section C reviews relevant policy statements by the Department of Justice and Federal Trade Commission in the *Antitrust Guidelines for the Licensing of Intellectual Property*, a sequence of Business Review Letters for proposed patent pools, and other publications. These policy statements provide a sound framework to evaluate the benefits and costs from collective rights organizations, albeit more than 90 years after the first patent pool case reached the U.S. Supreme Court.

Section D identifies competitive risks from collective rights organizations and conditions that mitigate these risks. These risks include joint pricing of rights that are substitutes for each other. The availability of independent licensing mitigates, but does not eliminate, this risk. Other risks include shielding weak patents, charging excessive royalties and slowing the pace of innovation.

B. THE LEGAL TREATMENT OF COLLECTIVE RIGHTS ORGANIZATIONS: A CONVOLUTED HISTORY

Courts and antitrust enforcement agencies have struggled to develop a coherent approach to evaluate patent pools and other collective rights organizations. The first patent pool case to reach the U.S. Supreme Court was *E. Bement & Sons v. National Harrow Company* in 1902.¹² National Harrow was created by six companies to license 85 patents on harrows, a cultivating implement used to pulverize and smooth soil. The licenses issued by National Harrow required licensees to make or sell only the licensed products and to adhere to uniform price schedules. In addition, licensees were not permitted to challenge the patents and were obligated to defend the patents if challenged by others. A State court held that the agreements were anticompetitive.¹³ The Supreme Court reversed, opining that:¹⁴

[T]he general rule is absolute freedom in the use or sale of rights under the patent laws of the United States. The very object of these laws is monopoly, and the rule is, with few exceptions, that any conditions which are not in their very nature illegal with regard to this kind of property, imposed by the patentee and agreed to by the licensee for the right to manufacture or use or sell the article, will be upheld by the courts. The fact that the conditions in the contracts keep up the monopoly or fix prices does not render them illegal.

The Supreme Court veered sharply from its decision in *Bement v. National Harrow* a decade later in *Standard Sanitary Manufacturing v. United States*.¹⁵ *Standard Sanitary* involved a joint licensing agreement for patents that covered machinery for the enameling of iron ware. The agreements established a standard royalty for the licensed patents, fixed discounts for product prices and prohibited the sale of articles marketed as allegedly inferior “seconds” that were not manufactured using the licensed patents. The Court ruled that the agreement violated the antitrust laws, analogizing the conduct to another case in which an association of manufacturers

¹² *E. Bement & Sons v. Natl Harrow Co.* (U.S. 1902).

¹³ *Natl Harrow Co. v. E. Bement & Sons* (N.Y.S. App. Div. 1897).

¹⁴ *Id.*; *E. Bement & Sons v. Natl Harrow Co.* (U.S. 1902).

¹⁵ *Standard Sanitary Manufacturing v. United States* (U.S. 1912).

imposed restraints on the use of rival products.¹⁶ Although that case did not involve patents, the Court said, “The added element of the patent in the case at bar cannot confer immunity from a like condemnation.”¹⁷

The *Standard Sanitary* decision is exceptional only to the extent that it contrasts with the Supreme Court’s earlier decision in *Bement v. National Harrow*. The patent pool in *Standard Sanitary* fixed prices and eliminated competition. Moreover, the pool had negligible efficiency benefits from one-stop shopping because it only included a few patents. The Court acknowledged the freedoms expressed in *Bement v. National Harrow*, but added that “While rights conferred by patents are definite and extensive, they do not give a universal license against positive prohibitions any more than any other rights do.”¹⁸

Standard Sanitary put to rest the concept of “absolute freedom in the use or sale of rights under the patent laws” expressed in *Bement v. National Harrow*. Following *Standard Sanitary*, the collective exercise of patent rights became subject to the same limitations that the Sherman Act imposed on other types of collective action, and courts routinely condemned patent pools or cross-licensing arrangements that fixed prices or eliminated competition in downstream product markets.

A decade after the *Standard Sanitary* decision, courts addressed a broad cross-licensing arrangement among several companies that owned patents on machinery to manufacture glassware, including a group of patent owners associated with Hartford and Empire. In 1922 the companies cross-licensed their patents and formed the Hartford-Empire association. The cross-licenses gave Empire an exclusive license to use Hartford’s patents for pressed and blown glassware and gave Hartford an exclusive license to use Empire’s patents for the production of containers. In addition, Hartford and others cooperated with an industry association (the Glass Container Association of America, whose members produced most of the glass containers sold in the United States) to assign production quotas, discourage outsiders from increasing production of glassware and prevent newcomers from entering the field.¹⁹

The district court held that defendants violated the antitrust laws because the primary purpose of their agreements “was not merely to settle legitimate conflicts, Patent Office interferences or litigation in the courts, in the interest of efficient operation of the patents. The primary purpose was to achieve domination of the industry.”²⁰ The court ordered the dissolution of the Hartford licensing association, required the companies to sell glass manufacturing machines, imposed royalty-free licensing, and restricted the activities of the Glass Container Association.²¹ The Supreme Court concurred that the restrictive licensing practices were unlawful but permitted the parties to cross-license their patents and charge royalties after they removed the restrictions in their licenses.²² The Court did not investigate whether the aggregation and coordinated licensing of rights accomplished by these agreements allowed the parties to impose higher royalties than they would have charged in the absence of these agreements.

Similar judgments followed allegations that patent owners cooperated to divide markets, fix prices and exclude competition in other industries, including titanium pigments,²³ gypsum

¹⁶ *W.W. Montague & Co. v. Lowry* (U.S. 1904, pp.47–48) (holding that an association of manufacturers of tiles violated the Sherman Act by entering into agreements with dealers that required them to purchase rival tiles at elevated prices).

¹⁷ *Id.*; *Standard Sanitary Manufacturing v. United States* (U.S. 1912, p.49).

¹⁸ *Id.* (emphasis added).

¹⁹ *United States v. Hartford-Empire Co.* (N.D. Ohio 1942).

²⁰ *Id.* at 618.

²¹ *Id.* at 620–21.

²² *Hartford-Empire Co. v. United States* (U.S. 1945, pp.397–98).

²³ *United States v. Nat’l Lead Co.* (S.D.N.Y. 1945).

board,²⁴ machinery for manufacturing concrete blocks,²⁵ enamel finishes,²⁶ hydraulic pumps,²⁷ illuminating appliances,²⁸ and machine tools.²⁹ Along with *Standard Sanitary* and *Hartford-Empire*, these cases established that patent owners cannot employ a patent pool or cross-licensing arrangement as a veil to fix prices or eliminate competition in downstream markets.

However, these decisions did little to clarify when collective rights organizations had benefits or costs for upstream technology markets when the agreements did not restrict competition in downstream product markets. Courts often failed to investigate whether CROs licensed rights that were substitutes or complements. They endorsed benefits from resolving conflicting patent claims in cases such as *Standard Oil*³⁰ while challenging other arrangements that shielded weak patents, including *Mason City Tent & Awning Co. v. Clapper*,³¹ *United States v. Krasnov*,³² and *United States v. Singer Manufacturing*.³³ Greater clarity awaited a series of policy statements from antitrust enforcement agencies beginning in the mid-1990s, more than 90 years after the first patent pool case reached the U.S. Supreme Court.

C. THE U.S. ANTITRUST AGENCIES' POLICY STATEMENTS ON PATENT POOLS

The *Antitrust Guidelines for the Licensing of Intellectual Property*, released by the Department of Justice and Federal Trade Commission in 1995, set the stage to develop a set of policies to identify collective rights organizations that promote consumer welfare. The guidelines state:³⁴

[Cross-licensing and pooling] arrangements may provide procompetitive benefits by integrating complementary technologies, reducing transaction costs, clearing blocking positions, and avoiding costly infringement litigation. By promoting the dissemination of technology, cross-licensing and pooling arrangements are often procompetitive.

The Antitrust Division of the U.S. Department of Justice directly addressed conditions under which cross-licensing and pooling arrangements have procompetitive benefits in a series of Business Review Letters issued after the publication of the *Antitrust Guidelines for the Licensing of Intellectual Property*. A Business Review Letter is a response by the Antitrust Division to a request about whether the Department of Justice would likely challenge a particular combination or business conduct. In 1997 the Antitrust Division issued a Business Review Letter in response to a proposal to pool and jointly license patents necessary to comply with the MPEG-2 standard.³⁵ MPEG-2 is a video compression standard used in set-top boxes, DVD players and recorders, TVs, personal computers, game machines, cameras, DVD Video Discs, and other products.

The request for the Business Review Letter originated from nine different entities (the licensors) that owned 27 patents which the entities alleged were essential to use the MPEG-2

²⁴ *United States v. U.S. Gypsum Co.* (U.S. 1948).

²⁵ *United States v. Besser Mfg. Co.* (E.D. Mich. 1951).

²⁶ *United States v. New Wrinkle, Inc.* (U.S. 1952).

²⁷ *Kobe, Inc. v. Dempsey Pump Co.* (10th Cir. 1952).

²⁸ *United States v. Holophane Co.* (S.D. Ohio 1954).

²⁹ *United States v. Associated Patents* (E.D. Mich. 1955).

³⁰ *Standard Oil Company v. United States* (U.S. 1931).

³¹ *Mason City Tent & Awning Co. v. Clapper* (W.D. Mo. 1956).

³² *United States v. Krasnov* (E.D. Pa. 1956).

³³ *United States v. Singer Manufacturing* (U.S. 1963).

³⁴ DOJ-FTC 1995.

³⁵ DOJ Letter 1997.

technology. The proposal was for a licensing administrator, MPEG LA, to offer a package license for the licensors' patents and to distribute royalty income among the licensors based on their proportionate shares of the portfolio patents in the countries for which a particular royalty-bearing product is made and sold. Each licensor also retained the right to license its patents independently from the patent pool for any purpose, including for making MPEG-2 compliant products.

The package license administered by MPEG LA was to be non-exclusive, worldwide, and not discriminate among potential licensees. The proposal called for an independent expert to determine whether patents submitted to the pool are technically essential to implement the MPEG-2 standard and whether portfolio patents should be deleted because they are invalid, unenforceable, or otherwise not essential to the standard. A "grantback" provision required members to grant to the MPEG-2 licensors and licensees of the MPEG-2 portfolio a non-exclusive worldwide license on fair and reasonable terms and conditions for any existing or future patent deemed essential to the MPEG-2.

In its review of the MPEG-2 proposal, the Antitrust Division noted that patent pools "may provide competitive benefits by integrating complementary technologies, reducing transaction costs, clearing blocking positions, and avoiding costly infringement litigation" but also cautioned that pools can harm competition among intellectual property rights in the pool, downstream products, or innovation.³⁶ The Business Review Letter noted that the MPEG-2 pool would be limited to valid and technically essential patents, which are necessarily complementary. The review concluded that the license offered by the patent pool would not disadvantage downstream competition or discriminate among licensees, and highlighted the availability of independent licensing of patents in the pool as a valuable competitive safeguard. With regard to innovation the Department concluded that "nothing in the arrangement imposes any anti-competitive restraint, either explicitly or implicitly, on the development of rival products and technologies."³⁷

The Business Review Letter concluded that based on the represented facts, "the Department is not presently inclined to initiate antitrust enforcement action" against the pool.³⁸ Although the response does not foreclose subsequent enforcement action, it is about as strong a statement of judicial forbearance that is available from the Department of Justice and provides a measure of comfort for the pool sponsors.

Two Business Review Letters for patent pools proposed for the collective licensing of patents covering digital versatile disc (DVD) technologies soon followed the MPEG-2 Letter. The first was for the collective licensing by Philips of DVD patents owned at the time by Philips, Sony and Pioneer, called the DVD3C pool.³⁹ The second was for the collective licensing by Toshiba of DVD patents owned at the time by six companies (Hitachi, Matsushita, Mitsubishi, Time Warner, Toshiba, and Victor), called the DVD6C pool.⁴⁰

Although the proposed DVD pools included many of the features and safeguards of the MPEG-2 pool, they differed from the MPEG-2 pool in important respects:

- The MPEG-2 pool employed an independent licensing agent. The licensing agent in each DVD pool was a patent owner vertically integrated into downstream production. This

³⁶ *Id.* (quoting DOJ & FTC 1995).

³⁷ *Id.* at 11–12.

³⁸ *Id.* at 16.

³⁹ DOJ Letter 1998.

⁴⁰ DOJ Letter 1999. Sanyo, Sharp and Samsung subsequently joined the DVD6C patent pool. *See* DVD6C Licensing Group 2016.

presents the concern that the licensor would set high royalties to raise the costs of firms that employ the licensed technologies in competition with the pool members.

- The DVD pools are restricted to essential patents, but the definition of essentiality differs from “technically essential” used for the MPEG-2 pool. The DVD_{3C} pool defines essential as “necessary (as a practical matter) for compliance with the DVD Standard Specifications.”⁴¹ The DVD_{6C} pool defines an essential patent as one for which “there is no realistic alternative” in implementing the DVD Standard Specifications.⁴² These definitions are less clear than technically essential and may encompass patents that have applications other than strict compliance with the DVD standards.
- The MPEG-2 pool provided for the independent expert to exclude from the pool any patents held to be invalid or unenforceable. The two DVD proposals included no such provision.⁴³
- Whereas a goal of the MPEG-2 pool was to provide one-stop licensing for MPEG-2 essential patents, the existence of at least two DVD pools negated that objective.

Despite these distinctions, the Antitrust Division issued Business Review Letters for both DVD pools that indicated no present intent to take antitrust enforcement action against the pools based on the representations by the parties.

In 2007 the Department of Justice and Federal Trade Commission issued a report on antitrust enforcement for intellectual property rights that affirmed the potential benefits from patent pools and identified conditions and safeguards to alleviate antitrust concerns.⁴⁴ The principles advanced in this publication are consistent with the guidance in the *Antitrust Guidelines for the Licensing of Intellectual Property* and with the views expressed in the MPEG-2 and DVD Business Review Letters. The Antitrust Division of the Department of Justice issued an additional Business Review Letter for a patent pool in 2008, this time for a proposal to jointly license patents related to ultra high frequency radio frequency identification (UHF RFID) standards.⁴⁵ UHF RFID is a type of automatic identification technology used to transmit and receive information stored in a chip on a label. The proposed structure for the UHF RFID pool was similar to other patent pools that received favorable reviews and the Department indicated no intention to take enforcement action.

Two other Business Review Letters addressed licensing arrangements that differed from patent pools. The 3G Partnership Platform (3GPP) was formed to identify and promote the licensing of patents that are essential to one or more of five third-generation mobile telecommunications standards.⁴⁶ The 3GPP comprises five platform companies. Each company evaluates whether patents are essential to one or more of the standards and specifies a standard contract that individual licensors can offer to potential licensees. The 3GPP is not a patent pool because the platform companies do not license patents or collect royalties. Nonetheless, the Antitrust Division evaluated the 3GPP under the same principles⁴⁷ and reached a favorable conclusion despite the fact that the five standards covered by the 3GPP are potential substitutes for each other.⁴⁸

⁴¹ DOJ Letter 1998, 3.

⁴² DOJ Letter 1999, 3.

⁴³ DOJ Letter 1998, 9; DOJ Letter 1999, 10–11.

⁴⁴ DOJ & FTC 2007.

⁴⁵ DOJ 2008 – RFID Letter.

⁴⁶ DOJ Letter 2002.

⁴⁷ *Id.* at 9.

⁴⁸ *Id.* at 10 (“[T]here is evidence that several of the five 3G radio interface technologies have been competing with each other for adoption by wireless system operators and could continue to be the basis for competition among operators once 3G wireless services are on the market.”).

In contrast, the Antitrust Division declined to issue favorable guidance in a Business Review Letter for Intellectual Property Exchange International (IPXI). IPXI proposed a financial exchange for patents that would offer standardized licenses for defined sets of patents contributed to the exchange under terms and conditions set jointly with patent holders.⁴⁹ As in the case of the 3GPP, the Division analyzed the IPXI proposal under the same principles it applied to patents pools.⁵⁰ IPXI anticipated licensing patent portfolios as well as individual patents. The proposal communicated IPXI's intent to identify and exclude competing patents from its licenses, but because IPXI was not designed to license patents for a particular technology, its proposal offered no specific criteria for "essential." Although the Division recognized that IPXI could potentially produce certain efficiencies, the Division identified potential antitrust concerns related to portfolios of substitute patent rights, the absence of provisions for independent licensing, and the sharing of competitively sensitive information. The Division decided that it did not know enough to conclude that IPXI's activities would not raise antitrust concerns, and consequently declined to state its enforcement intentions.⁵¹

The Business Review Letters published by the Antitrust Division of the Department of Justice and other policy statements provide a template for patent pools that should not run afoul of the antitrust laws. For arrangements such as the 3GPP, the Division concluded that the procompetitive benefits of standardized and transparent licensing terms outweighed the potential harms to competition, despite the lack of certain antitrust safeguards. After decades of inconsistent enforcement, the agencies now sent a clear message acknowledging the efficiency benefits from collective licensing and how the agencies would balance efficiencies and competition concerns.

More than 40 patent pools formed after the Antitrust Division published the MPEG-2 Letter in 1997,⁵² but not all escaped antitrust challenges. The Federal Trade Commission filed a complaint alleging that Summit and VISX participated in an anticompetitive arrangement to license their patents for photorefractive keratectomy (PRK), a form of laser eye surgery used to correct vision disorders.⁵³ At the time Summit and VISX were the only firms licensed by the Food and Drug Administration to market equipment for PRK surgery. The two companies agreed to pool their patents in a partnership called Pillar Point Partners (PPP). Their agreement required VISX and Summit to pay a fixed fee to PPP for each PRK procedure. The fee was set at the higher of the two proposals submitted by VISX and Summit to PPP and served as a floor for prices set by either company. In addition, the terms of the PPP agreement gave both Summit and VISX veto power over the licensing of patents in the pool.

The Pillar Point Partners patent pool had none of the competitive safeguards identified in the MPEG-2 and related Business Review Letters. The pool was not limited to patents that were essential to practice PRK. The FTC alleged that the Summit and VISX patent positions did not prevent the companies from competing with each other in the sale or lease of PRK equipment using technology embodied in their respective patents. The PPP governance rules effectively foreclosed independent competition between Summit and VISX in the licensing of PRK patents outside of the pool. The Federal Trade Commission also alleged that one of VISX's patents was invalid because the applicant withheld prior art from the Patent Office.

⁴⁹ DOJ IPXI Letter 2013.

⁵⁰ *Id.* at 8.

⁵¹ IPXI was short-lived. The exchange closed in March 2015. For a discussion of IPXI's business and eventual demise, see Contreras 2016c.

⁵² See Baron & Pohlmann 2015.

⁵³ Complaint at ¶ 9, *In re Summit Technology, Inc.* (F.T.C. 1998).

The statements and enforcement actions by the U.S. antitrust agencies helped to clarify antitrust policy for collective rights organizations, but they mainly addressed situations clustered near the extremes of benefits and costs. The Business Review Letters addressed proposals for patent pools that were limited to essential patents and, with the exception of IPXI, included safeguards such as independent licensing and limited grantbacks. The Pillar Point Partners pooled patents that the Federal Trade Commission alleged were substitutes for each other, and lacked these safeguards. The next section describes potential competitive harms as well as benefits from collective rights organizations with features that may fall in between these extremes and identifies measures and conditions that mitigate the risk of harm.

D. COMPETITION RISKS FROM COLLECTIVE RIGHTS ORGANIZATIONS AND CONDITIONS THAT MITIGATE THESE RISKS

Courts have identified harms from collective rights organizations that fix prices or eliminate competition in downstream markets. Various policy statements by the antitrust agencies describe conditions for which CROs have benefits in a market for licensing technology rights if they do not harm competition in downstream markets. For patent pools, these include limiting pools to essential patents, the availability of independent licensing, and provisions for grantbacks of licenses to essential patents. However, as I discuss below, these conditions are neither necessary nor sufficient to guarantee that patent pools – or other collective rights organizations – promote consumer welfare.

I begin by first addressing the general question of circumstances under which collective licensing of intellectual property rights is procompetitive when rights are complementary, but not necessarily essential, to make, use or sell a product or service.

1. *Substitutes and Complements*

A general principle is that rivalry lowers prices when firms offer products or rights that are substitutes for each other and increases prices when the products or rights are complements. If rights are substitutes, collective licensing can increase the royalties that technology users pay by preventing competition that could otherwise occur between alternative rights-holders, just as a cartel of rival sellers can raise prices for conventional goods and services. On the other hand, the collective licensing of rights that are complements can have efficiency benefits by reducing transaction costs and royalty-stacking. A corollary is that collective licensing of substitute rights should be avoided, while collective licensing of complementary rights should be encouraged. However, this obscures the complications of collective licensing in practical circumstances, because it is often unclear whether rights are substitutes or complements.

Consider the following example. Suppose two firms each hold a patent that covers a product. A licensee can obtain a value of 100 with licenses to both patents. The patents are clearly substitutes for each other if the licensee can obtain the same value by licensing only one of the patents. The patents are clearly complements if each is essential for the licensee to make, use or sell a product. In that case, the value of either one alone is zero.

More generally, suppose a licensee can obtain a value of 100 by licensing both patents and a value of $100 - X$ by licensing a single patent. The patents are perfect substitutes if $X = 0$: the licensee can obtain the full value with a single license to either patent. The patents are essential if $X = 100$: a single patent in isolation has no value. But what if X is neither zero nor 100?

For example, suppose $X = 20$ for a particular technology user. In that case a license to only one patent achieves most of the value from a license to both patents. Nonetheless, whether the licensee views the patents as substitutes or complements depends on their royalties. Ignoring transaction costs, suppose each patent can be licensed individually at a royalty R . Licensing both patents has a net value $100 - 2R$. Licensing a single patent has a net value $80 - R$. The technology user would license both patents if R is less than 20. In that case, this technology user views the patents as complements, because the user prefers the package of both patents to a license for a single patent. The technology user would license only a single patent if R exceeds 20, in which case this technology user effectively views the patents as substitutes.

A fundamental antitrust policy question for collective rights organizations is whether collective licensing of a portfolio of intellectual property rights is socially desirable compared to independent licensing by competing rights-holders. The answer depends on the extent to which rights are complements for each other (the value of X in the example), the portfolio royalty, the royalties that licensors would charge if they offer licenses independently, and transaction costs from independent licensing.

To explore this further, return to the example with two patents and ignore transaction costs. Suppose a CRO charges a portfolio royalty PR for a license to both patents. The portfolio license provides a technology user with a net value $100 - PR$. Absent the collective, the technology user can negotiate independently with rights-holders and license either a single patent or both patents.

Recall that X is the incremental value of a license to both patents. If X is less than or equal to 50, there is a stable competitive outcome in which both patent owners charge X and the technology user licenses both patents. There is no incentive for either patent owner to charge less than X when the technology user licenses both patents, and if either patent owner charges more than X , the technology user would only license the other patent.⁵⁴ In this case, technology users would be better off with a collective rights organization if the portfolio royalty is no more than $2X$. The CRO's portfolio license would be at least as valuable as two independent licenses and portfolio licensing saves transaction costs.

If X is greater than 50, there are many possible outcomes with independent licensing, all of which have a total royalty of 100 for both licenses.⁵⁵ In this case, the technology user is no worse off with a collective rights organization that charges a portfolio royalty of 100, and is better off if there are savings in transaction costs.

As discussed in more detail in Section D.3 below, the availability of independent licensing can be an effective constraint to discipline royalties charged by collective rights organizations. For independent licensing to constrain the royalty for a portfolio license, a patent owner must be willing to forego its share of revenues from the collective rights organization in return for the royalties it can earn as an independent licensor, and the licensee must be willing to transact with the independent licensor. In the example with two patents, this condition can be satisfied if $X < 50$ and if the CRO portfolio royalty exceeds $2X$.⁵⁶ Independent licensing requires additional conditions to prevent anticompetitive pricing by collective rights organizations when there are more

⁵⁴ The technology user can do better if it could commit to accept only a single license. Competition for a single license could drive the royalty to the marginal cost of a license, which can be close to zero. The user then would have a net value of approximately $100 - X$. However, this is not a stable outcome without a strong commitment mechanism, because the user would have an incentive to accept a second license if its royalty is no more than X .

⁵⁵ Again, the technology user can be better off if it could commit to accept only a single license.

⁵⁶ With equal royalty shares, a CRO patent owner receives $PR/2$. Suppose the patent owner offers an independent license at a royalty $PR/2$. The technology user would be strictly better off with this license instead of the CRO portfolio license if $100 - X - PR/2 > 100 - PR$, or if $PR > 2X$. Consequently, if $PR > 2X$, the patent owner can offer an independent license at a royalty that exceeds its share of CRO licensing revenue and the technology user would

than two patent rights-owners, although transaction costs weigh in favor of collective licensing if rights are dispersed among a large number of owners.

Antitrust authorities have responded favorably to proposals for patent pools that are restricted to patents declared by their owners to be essential to implement a standard. Essential patents are clearly complementary (corresponding to $X=100$ in the example). However, as discussed in the next section, not all patents are essential for all products and not all patents that are declared essential actually meet this test. The next section addresses the implications of these exceptions for pro-competitive patent pools.

2. *Limitation to Essential Patents*

A package license of essential patents can lower the transaction costs of assembling necessary intellectual property rights and lower royalty burdens compared to independent licensing. For a patent to be essential it must be valid and, absent a license, necessarily infringed by products covered by the pool's licensing program. Some pools have mechanisms to weed out invalid patents, but the incentives and mechanisms to do so can be weak.

It is likely that many patent pools include patents that are not essential. One technical study of patents declared essential to fourth-generation wireless telecommunications standards concluded that only about half of the patents were likely essential to implement the standards.⁵⁷

There are three types of competitive concerns from including non-essential patents in a package license. First, a package license may eliminate competition that would otherwise occur between patented technologies that are substitutes for each other. The Antitrust Division of the Department of Justice cautioned that pooling non-essential patents "would risk turning the pool into a price-fixing mechanism."⁵⁸ The previous section showed that collective rights organizations can benefit technology users even if they license rights that are not perfect complements. Moreover, as I discuss in more detail below, firms that hold patents on technologies that are substitutes for each other are not effective competitors if they also hold patents that would block their rivals.

A second concern relates to pools that, in addition to licensing technically essential patents, also license patents that are complements but not essential for all products. Suppose a pool offers a package license for patents that implement the 802.11 Wi-Fi standards. Some of the patents cover the core radio access technology and are technically essential for any Wi-Fi device. Other patents cover wireless computer networking. These patents are complements but they are not technically essential for every device. A package license lowers royalties by avoiding royalty-stacking that could occur if the patents were licensed separately. However, by lowering the royalties for patents that cover wireless computer networking, the pool can charge a higher profit-maximizing price for its radio access technology and charge some users a royalty for technology that they do not need. As a consequence, royalties can increase for users that employ only the core radio access technologies relative to a pool that licenses only the technically essential patents.⁵⁹

Differential impacts on technology users can occur even if a pool licenses only technically essential patents. For example, suppose a pool offers a package license for patents that are technically essential to manufacture digital versatile discs and DVD players. Relative to independent

prefer the single license to the CRO portfolio license. Unequal royalty shares strengthen the incentive for one of the patent owners to offer an independent license.

⁵⁷ Fairfield Resources International, Inc. 2010.

⁵⁸ DOJ Letter 1998, 10.

⁵⁹ See Quint 2014.

licensing, the pool lowers royalties for both discs and players for the usual Cournot-complements reason. Separate pools for discs and players would have different royalties. Although total per-unit royalties could increase relative to a single pool that licenses technologies for both discs and players, some consumers would be better off if separate pools result in lower royalties for either discs or players. Compared to the single pool, lower royalties for players would benefit consumers that buy few discs. Conversely, lower royalties for discs would benefit consumers that are intensive users of discs.

A third competition concern is that a mandatory package license that includes non-essential patents might foreclose the development of other applications for which the pool's patents are not essential.⁶⁰ Suppose a pool that licenses patents for DVDs includes two different technologies, A and B, to encode information on the disc. A package license from the pool that includes technology B could foreclose the development of a new application that employs technology. If potential licensees of technology B for the new application also accept licenses from the patent pool and if the package license covers the use of B for the new application, then they get a license for the new application for free. Without a way to monetize the patent, its owner may have no incentive to promote development of the new application.

These concerns were the subject of protracted litigation involving patent licenses offered by Philips in its role as the licensing agent for the DVD3C patent pool. Philips offered a package license for patents deemed essential to the CD-R (Compact Disc-Recordable) and CD-RW (Compact Disc-ReWritable) standards set forth in a publication called the Recordable CD Standard, also called the "Orange Book." Several licensees, including Princo, argued that the Philips package license included patents that were not essential for manufacturing compact discs compliant with the Orange Book standards. Philips did not offer a license that excluded the alleged non-essential patents at a lower royalty. The licensees brought their case to the International Trade Commission, which initially ruled that Philips engaged in patent misuse by improperly tying patents that were not essential to the Orange Book standard to its license for essential patents.⁶¹

Philips appealed the Commission's decision. The Court of Appeals for the Federal Circuit reversed and ruled that Philips did not engage in patent misuse. The Court reasoned that Philips' package license was not analogous to a tying arrangement because, unlike a product tie, it did not require that licensees actually use the technology covered by any of the patents that the Commission characterized as non-essential. Furthermore, the Court observed that "[T]he Commission's assumption that a license to fewer than all the patents in a package would presumably carry a lower fee than the package itself ignores the reality that the value of any patent package is largely, if not entirely, based on the patents that are essential to the technology in question."⁶² The Court also noted pro-competitive benefits from package licensing, such as integrating complementary technologies, avoiding transaction costs by eliminating the need for multiple contracts, and reducing investment uncertainty because the patents that are essential to practice a technology can change as a technology evolves.⁶³

In a subsequent opinion on the same matter the Court of Appeals cautioned that its ruling regarding patent misuse did not extend to antitrust liability for an agreement not to license a patent other than as a component of a package.⁶⁴ The Court noted that an agreement not to license a patent separately could be anticompetitive even if the patent is an essential component

⁶⁰ DOJ Letter 1998, 10–11.

⁶¹ *In re Certain Recordable Compact Discs & Rewritable Compact Discs* (I.T.C. 2004).

⁶² *U.S. Philips Corp. v. ITC* (Fed. Cir. 2005, p.1188).

⁶³ *Id.* at 1192, 1197.

⁶⁴ *Princo Corp. v. Int'l Trade Comm'n* (Fed. Cir. 2009, p.1320).

of the package license (because the patent could be useful for a competing application), while also acknowledging that an agreement to pool non-blocking patents could be procompetitive under some circumstances by enabling licensees to obtain access to alternative technologies through one negotiation without determining at the outset which technology is the most efficient.⁶⁵

The Court reiterated that including non-essential patents in a package license does not necessarily change the profit-maximizing price for the essential patents.^{66,67} Moreover, including non-essential patents in a package license or refusing to license patents separately can foreclose competition only if the patents can support commercially viable applications that do not also require a license to the essential patents.

The Federal Circuit ultimately found that Sony had agreed with Philips not to license a Sony patent separately from the package license, but affirmed a ruling by the International Trade Commission that the agreement had no adverse effect on competition. The Court concluded: “The record, and the findings of the Commission, make clear that the [Sony patent] lacked both the technical and the commercial prospects that would have made it a possible basis for a product that could compete with Orange-Book-compliant discs in the data storage market.”⁶⁸

3. Independent Licensing as a Safeguard

As discussed above, the potential competition harms and efficiency benefits from collective rights organizations depend on the extent to which the organizations aggregate rights that are substitutes or complements for each other, but this relationship is often unclear. In particular, it depends on royalty levels and the preferences of technology users, which can change over time.

Performing rights organizations (PROs) such as the American Society of Composers, Authors and Publishers (ASCAP) and Broadcast Music, Inc. (BMI) illustrate the difficulties of neatly categorizing rights as either substitutes or complements. ASCAP and BMI collect and distribute royalties to songwriters, composers, and publishers for public non-dramatic performances of their music, such as radio and internet broadcasts and the use of music by restaurants and bars. ASCAP was formed in 1914 and by 2016 its members included more than 575,000 U.S. composers, songwriters, lyricists and music publishers.⁶⁹ BMI followed in 1939 and by 2016 counted more than 700,000 members.⁷⁰ In 2015, ASCAP and BMI each reported collecting royalties in excess of \$1 billion.⁷¹

The songs that are licensed by PROs such as ASCAP and BMI are neither pure complements nor pure substitutes for each other. Most music licensees value the ability to offer programs that contain many songs, and in this sense the songs licensed by these collectives are complements. However, unlike licensees of essential patents, music licensees generally do not require a license

⁶⁵ *Id.* at 1315–16.

⁶⁶ For contrasting discussions of whether patent pools should be limited to essential patents, see Lavine (2008) and Gilbert (2010).

⁶⁷ Including non-essential patents in a package license can be problematic if licensors have made a commitment to license the essential patents at royalties that are “fair, reasonable and non-discriminatory” (FRAND). In that case, the non-essential patents can be a device to extract higher royalties for the essential patents. See *infra* Section D.5.

⁶⁸ *Princo Corp. v. Int'l Trade Comm'n* (Fed. Cir. 2010, p.1339).

⁶⁹ ASCAP 2016.

⁷⁰ BMI 2016.

⁷¹ ASCAP 2016b; BMI 2015.

to every song in a copyright collective's portfolio. In this respect, some songs or collections of songs are partial substitutes for each other.

ASCAP and BMI survived challenges under the antitrust laws in part because courts recognized that the performing rights organizations offer large transactions cost savings from their portfolio licenses.⁷² In addition, the PROs entered into consent decrees negotiated with the U.S. Department of Justice to address concerns of music licensees and licensors.⁷³ Under these consent decrees, the PROs can only offer nonexclusive licenses and cannot prevent their members from licensing their rights independently from the PRO portfolio. Furthermore, the consent decrees authorize a court to establish royalties for ASCAP and BMI portfolio licenses in the event that the PROs and music users are unable to reach an agreement.

From a policy perspective, it is clearly desirable to have a mechanism that would prevent collective rights organizations from raising prices because they aggregate rights that are substitutes for each other and that does not rely on a detailed review of patent claims, copyrights or preferences for musical works. Courts have relied on the availability independent licenses from members of collective rights organizations as a check against high prices for portfolio licenses. In a 1980 decision, the Court of Appeals for the Second Circuit addressed whether ASCAP's blanket license eliminated competition and raised prices for performance rights. The Court opined that "if copyright owners retain unimpaired independence to set competitive prices for individual licenses to a licensee willing to deal with them, the blanket license is not a restraint of trade."⁷⁴

Business Review Letters issued by the Antitrust Division of the U.S. Department of Justice also note the availability of independent licensing as a competitive safeguard, as do various policy statements by the antitrust agencies. For example, the MPEG-2 Business Review Letter states:⁷⁵

[A]lthough a licensee cannot obtain fewer than all the Portfolio patents from MPEG LA, the Portfolio license informs potential licensees that licenses on all the Portfolio patents are available individually from their owners or assignees. ... the independent availability of each Portfolio patent is a valuable failsafe.

Josh Lerner and Jean Tirole formally demonstrated conditions under which the availability of independent licensing acts as a screen to identify anticompetitive collective rights organizations by making such CROs vulnerable to independent licensing by their members.⁷⁶ However, these conditions are limited. If there are more than two rights-holders, there are circumstances in which the availability of independent licensing does not prevent CROs from charging portfolio royalties that exceed the total royalties that licensees would bear without the CRO, ignoring the transaction costs of assembling licenses from independent rights-holders. If there are more than two rights-holders, independent licensing has to be supplemented with additional conditions to reliably screen anticompetitive collective rights organizations. Examples of such conditions include capping the royalties that rights-holders may charge as independent licensors⁷⁷ and requiring rights-holders to commit to exclusive membership in CROs along with their royalties for independent licenses, before the CROs

⁷² See, e.g., *Columbia Broad. Sys., Inc. v. Am. Soc. of Composers* (S.D.N.Y. 1975).

⁷³ *United States v. ASCAP* (S.D.N.Y. 1941); *United States v. BMI* (S.D.N.Y. 1966). Both decrees have been further modified since to address specific issues.

⁷⁴ *CBS v. ASCAP*, 620 (2d Cir. 1980).

⁷⁵ DOJ Letter 1997, 11.

⁷⁶ Lerner & Tirole 2004.

⁷⁷ See Boutin 2016.

are established.^{78,79} These conditions would require additional regulatory oversight to ensure compliance compared to the nominal requirement of independent licensing.

Although independent licensing cannot prevent anticompetitive collective rights organizations from operating in every possible circumstance, there are plausible antitrust concerns if a CRO refuses to allow its members to license their rights independently. Such concerns may be addressed with business justifications. For example, the integrity of a standard may require users to license all essential patents to avoid fracturing the standard into incompatible fragments. Absent such justifications, a prohibition on independent licensing raises the concern that CRO members' rights are substitutes for each other and that licensing these rights independently can undermine a high price for the CRO's portfolio. The availability of independent licensing should not threaten collective rights organizations that offer pro-competitive benefits because all or most licensees would prefer a package licenses from the CRO compared to a collection of independent licenses. The Federal Trade Commission cited the provision in the Pillar Point Partners licensing agreement that gave both Summit and VISX veto power over the licensing of patents in the pool as an indication that the agreement allowed Summit and VISX to elevate prices for their photorefractive keratectomy patents.

Without a failsafe mechanism to screen collective rights organizations that may raise prices or otherwise harm competition, antitrust enforcers have to deal with the gray areas where CROs appear to have both integrative benefits and potential competitive risks.⁸⁰ Clearly the avoidance of transaction costs must enter into this calculation and CROs that offer large portfolios for which there is licensee demand would score well on this dimension. Conversely, CROs that prevent their members from offering independent licenses would raise antitrust concerns if they do not have cognizable business justifications.

4. *Shielding Weak Patents*

Patents are “probabilistic” rights.⁸¹ Their validity and scope are uncertain until they are litigated to a final determination. Throughout history inventors have clashed over the scope of their patent claims.⁸² These battles incurred large litigation costs and sometimes delayed the progress of innovation. The *Antitrust Guidelines for the Licensing of Intellectual Property* note that pooling and cross-licensing arrangements can avoid costly infringement litigation, which has procompetitive benefits by promoting the dissemination of technology.⁸³ A number of patent pools were created to put an end to patent litigation. These include the Sewing Machine Combination of 1856,⁸⁴ the Standard Oil pool for gasoline cracking patents,⁸⁵ a pool for patents

⁷⁸ See, e.g., Brenner 2009; Lerner & Tirole 2015; Llanes & Poblete 2014.

⁷⁹ Requiring collective rights organizations to offer bundles of intellectual property rights at royalties that do not exceed the portfolio price can prevent the formation of anticompetitive CROs even if rights-holders coordinate royalties when they offer licenses independently. See Rey & Tirole 2013.

⁸⁰ Merges & Mattioli (2017) argue that adverse effects from patent pools can outweigh transaction cost efficiencies in part because the efficiencies are one-time savings while the competitive harms are persistent. However, transaction efficiencies from the pool's portfolio licenses are often realized over long periods as new patents join the pool.

⁸¹ See, e.g., Lemley & Shapiro 2005.

⁸² See, e.g., Khan 2013–2014 (noting many infant industries experienced patent wars, including but not limited to shoe-making, agricultural reapers, rubber products, sewing machines, automobiles, motion pictures, aviation, radio, electricity, and telecommunications).

⁸³ DOJ & FTC 1995.

⁸⁴ The Sewing Machine Combination was arguably the first patent pool in the United States. The pool buttressed patent claims by I. M. Singer & Co., Elias Howe, and two other parties. See, e.g., Mossoff 2011, 194–202.

⁸⁵ See *Standard Oil Co. v. United States* (D.C. Ill. 1929).

on synthetic yarns,⁸⁶ cross-licensing agreement for patents on covers for tractors⁸⁷ and furniture,⁸⁸ and the arrangement between Summit and VISX to license their patents for photorefractive keratectomy.⁸⁹

Avoiding costly and protracted patent litigation can be procompetitive by allowing manufacturers to get on with the business of producing new products. However, patent pools and cross-licensing agreements can shield weak intellectual property rights from challenges and require licensees to pay royalties for patents that they do not infringe. For illustration, suppose two firms each hold a patent that asserts one or more claims that can block the use of the other patent. At considerable expense, each firm could attempt to show that the other firm's patent is invalid or does not block the use of its patent. If a challenge demonstrates that one (or perhaps both) of the patents is not valid or not infringed, the result can be lower royalties and lower product prices when patent owners compete to license their technologies. Alternatively, they can pool their patents, abandon challenging each other's patents, and perhaps cooperate to defend their patents from external challenges. By doing so, the parties can charge higher royalties and share the bounty even if their patents have questionable validity.⁹⁰

Courts have condemned patent pools because they protected weak patents, while crediting other pools for resolving conflicting patent claims. For example, in *Duplan Corp. v. Deering Milliken, Inc.* the court ruled that patents in suit "were known ... to be weak"⁹¹ and that the agreement between two parties "with its cross-covenants not to sue... gave them the power to fix and maintain prices in the form of royalties which they consistently exercised thereafter,"⁹² while in *Standard Oil v. United States* the court ruled that agreements to resolve conflicting patent claims were not unlawful absent proof that the patents were invalid or not infringed.⁹³

Should authorities be more vigilant about policing the validity and scope of patent claims for patents licensed by pools or involved in cross-licensing agreements? To some extent, the authorities can rely on technology users and patentees to weed out weak patents. Technology users have incentives to challenge weak patents if a successful challenge would lower their total royalty burden. Challenging a pool's patents can lower a user's royalties if the pool has only a few patents or if the pool holds patents that are substitutes for each other and are not blocked by other patents. In the former case, invalidating one or more patents could undermine the ability of the pool to charge a high royalty if its remaining patents account for a small fraction of the rights necessary to make, sell or use a product. In the latter case, invalidating a patent undermines the pool's market power by giving users royalty-free access to a substitute technology. On the other hand, if the pool holds multiple patents that are essential to make, sell or use a product, the pool's profit-maximizing royalty may be unaffected if one or a few patents are found to be invalid or not infringed. Nonetheless, members of a patent pool that hold valid essential patents have incentives to challenge invalid or non-essential patents if the inclusion of these invalid or non-essential patents in the pool lowers their share of royalties.⁹⁴

⁸⁶ *Duplan Corp. v. Deering Milliken, Inc.* (D.S.C. 1977).

⁸⁷ *Mason City Tent & Awning Co. v. Clapper* (W.D. Mo. 1956).

⁸⁸ *United States v. Krasnov* (E.D. Pa 1956).

⁸⁹ *In re Summit Technology, Inc.* (F.T.C. 1998).

⁹⁰ See, e.g., Choi 2010, 450; Choi & Gerlach 2015.

⁹¹ *Duplan Corp. v. Deering Milliken, Inc.* (D.S.C. 1977).

⁹² *Id.* at 686.

⁹³ *Standard Oil Co., Ind. v. United States* (1931, p.179).

⁹⁴ However, members of a pool may refrain from challenging other members' patents if litigation would expose them to countersuits that challenge their own weak patents. See, e.g., Choi & Gerlach 2015.

The benefits and costs from a reduction in patent litigation incentives depend on several factors, including the number of patents at issue, the likelihood that they are valid complements, and the costs of patent litigation. For example, suppose a pool offers a portfolio license for a large number of patents that are alleged to be essential to a standard. A finding that some of these patents are invalid or not infringed is unlikely to lower the profit-maximizing royalty for the patents that remain in the portfolio. In this case shielding a few patents from litigation would have benefits by avoiding litigation costs while having little effect on the royalty for the pool's patents.⁹⁵

The harm from shielding weak patents is more likely to be high if a patent pool or cross-licensing arrangement includes only a few patents, so that invalidating patents can substantially lower royalty burdens. In contrast, efficiencies from coordinating the licensing of complementary rights and avoiding costly litigation are likely to prevail when patent pools or cross-licensing arrangements include many allegedly blocking patents. In that case, a finding that some patents are invalid or not infringed is unlikely to significantly change the profit-maximizing royalty or facilitate independent competition because technologies users would continue to require large numbers of patents from the pool. Furthermore, agreements to defend weak patents are more likely to fail if firms have economic incentives to challenge patents that are invalid or not infringed; for example, if a patent pool allocates royalties to patent owners based on their shares of essential patents.

5. "Excessive" Royalties

Firms that are in the business of creating and licensing intellectual property rights often desire high royalties to monetize their rights, while firms that sell products covered by those rights typically want low royalties. Collective rights organizations can promote the interests of both licensors and licensees by reducing transaction costs and royalty stacking, thereby lowering costs for licensees while allowing licensors to earn higher profits.

Nonetheless, firms that participate in patent pools may have strategic incentives to charge high royalties. This can occur because technology users are locked into a standard for which the pool licenses essential patents or because pool members desire high royalties to disadvantage competing manufacturers.

Downstream firms that sell standard-compliant products and the consumers who purchase these products often face high costs if they have to switch to an alternative technology. This creates a risk that patent holders can raise royalties after firms and consumers have made investments that are specific to the standard.⁹⁶

The Business Review Letters that addressed the MPEG-2 and DVD patent pools discussed the concern that licensees may be at risk from being locked into the standards. In the MPEG-2 letter, the Antitrust Division of the Department of Justice was satisfied that the MPEG-2 royalty rates "are likely to constitute a tiny fraction of the MPEG-2 products' prices, at least in the near term."⁹⁷ This did not prevent challenges to the MPEG-2 royalty rates. A complaint alleged that the MPEG-2 royalty rates are excessive because they have not been reduced commensurate with the rapid and dramatic decrease in cost of the products that implement the MPEG-2 standard – i.e., DVD players, digital and flat screen televisions, and the software that support such products – since the pool's inception. The court was not persuaded and rejected the complaint on summary judgment in part because the plaintiff did not establish that it lacked a realistic

⁹⁵ For an example in the context of package licensing, see Gilbert & Katz (2006).

⁹⁶ See e.g., Farrell, et al. 2007.

⁹⁷ DOJ Letter 1997, 11.

opportunity to obtain individual licenses instead of accepting a package license from MPEG LA.⁹⁸ That is, the court concluded that competition from individual licensors is an effective constraint on the ability of MPEG LA to charge excessive royalties for the package license.

The court did not specifically address whether the MPEG-2 portfolio royalties were reasonable. Nor did the court consider whether competition is an effective constraint without additional conditions, as discussed in Section D.3. The MPEG-2, the DVD, and several other patent pools that formed in relatively recent times have no requirement for court-imposed determinations of royalty levels.⁹⁹ Although the antitrust authorities do not regulate the royalties that patent holders or patent pools may charge,¹⁰⁰ they have expressed concerns that patent holders may charge excessive royalties for standard-essential patents.¹⁰¹

Patent holders that cooperate in the development of a standard often agree to license their patents at terms that are “fair, reasonable and non-discriminatory (FRAND).” The FRAND commitment limits the ability of a patent holder to disrupt the adoption and utilization of the standard by refusing to offer a license.

Patent pools and other collective rights organizations have the potential to generate large consumer benefits, but they also have the potential to charge high prices, particularly for patents that cover standards when firms and consumers face high costs to switch to an alternative technology. In these situations, courts have a role to ensure that patent pools offer portfolio licenses at terms that are consistent with their members’ FRAND commitments.

Collective rights organizations have to balance complex incentives when they include members who are both intellectual property licensors and sellers of products that employ the licensed technologies. Vertically integrated CRO members can have incentives to charge high royalties to disadvantage their downstream rivals. High royalties impose costs on an integrated firm’s downstream rivals, which allows the firm to profit by increasing its share of downstream production.¹⁰²

However, there are costs to this strategy. By elevating the portfolio royalty, the integrated firm faces higher licensing costs for the share of the total portfolio royalty that does not accrue to its own patents. High royalties also reduce downstream demand for the portfolio license and the income that the integrated firm can collect from its membership share in the CRO. The fact that most CROs offer royalty schedules that do not discriminate according to the identity of the licensee makes it more difficult for integrated firms to target downstream rivals by charging high royalties or by imposing onerous licensing terms.

There are contrasting effects when pool royalties do not discriminate according to the identity of a licensee. A pool that offers a portfolio license for complementary patents lowers licensing costs by eliminating royalty-stacking and reducing transaction costs. Furthermore, vertical integration avoids the double-marginalization that occurs when downstream firms mark up product prices to reflect royalty costs.¹⁰³ On the other hand, vertically integrated members of the pool can

⁹⁸ Order Re: Defendant MPEG LA, L.L.C.’s Motion To Dismiss And Plaintiff’s Motion To Strike Evidence, *Nero AG v. MPEG LA, L.L.C.* (C.D. Cal. 2010).

⁹⁹ In contrast, pools such as the Manufacturers’ Aircraft Association that formed in 1917 and the radio technology pool that formed in 1919 included provisions to govern the pool royalties. See Gilbert 2004, 13, 44-44. Consent decrees negotiated with the performing rights organizations, ASCAP and BMI, established the right of music licensees to ask a court to set “reasonable” fees for licenses in the event that the PROs and licensees are unable to reach an agreement. See ASCAP 2016; BMI 2016.

¹⁰⁰ Attorney General William Baer said that “[w]e don’t use antitrust enforcement to regulate royalties.” Baer 2015.

¹⁰¹ See, e.g., Baer 2015; DOJ & FTC 2007; DOJ & PTO 2013; Hesse 2014.

¹⁰² See, e.g., Reisinger & Tarantino 2016.

¹⁰³ See, e.g., Schmidt 2014.

have incentives to increase the portfolio royalty to raise their rivals' costs. The net effect depends in part on the pool's flexibility to design licensing terms.¹⁰⁴

The evidence from most patent pools does not support a theory that integrated firms encourage pools to impose high royalties to disadvantage their downstream competitors.¹⁰⁵ There is a tug of war between patent owners, who prefer high royalties, and patent users, who prefer low royalties. Patent-centric firms often choose not to join pools, which suggests that the patent users are winning this struggle. For example, a patent pool managed by VIA Licensing for third and fourth generation LTE cellular patents includes major telecommunication operators such as AT&T, China Mobile, Deutsche Telekom, NTT Docomo, Telefonica and Telecom Italia. Also included are equipment manufacturers such as HP and ZTE. Absent are firms with relatively large patent portfolios compared to their presence in downstream markets, including Qualcomm, Nokia, Ericsson and Huawei.¹⁰⁶ Anne Layne-Farrar and Josh Lerner surveyed firms' decisions to participate in nine patent pools that formed to license standard-essential patents. They found that vertically integrated firms were more likely to participate in these pools compared to firms that only owned relevant patents.¹⁰⁷

Although factors such as pool revenue-sharing rules affect participation decisions, the absence of patent-centric firms from many patent pools does not support a theory that integrated firms choose high portfolio royalties. The likely explanation is that integrated firms prefer low royalties to contain the costs they incur to manufacture and sell downstream products. In contrast, patent-centric firms prefer to remain outside a pool, which affords flexibility to charge higher royalties or negotiate for a larger share of total royalties.

6. Innovation

The early history of antitrust enforcement for collective rights organizations focused on whether CROs acted as cartels to fix prices and harm competition in downstream product markets. More recently, enforcement addressed whether CROs jointly administered licensing for rights that are complements or substitutes and whether package licensing foreclosed competition, as in the *Princo* cases.

A separate question is whether the aggregation of intellectual property rights harms innovation. The Department of Justice challenged a type of collective rights organization for its effect on innovation as early as 1969 in a decision involving a joint venture by automobile manufacturers for research, development, manufacture, and installation of motor vehicle air pollution control equipment. The Department alleged that the joint venture acted to impede rather than promote progress in motor vehicle air pollution control.¹⁰⁸

The Business Review Letters issued by the Antitrust Division of the Department of Justice for several proposed patent pools cautioned that patent pools can harm innovation in addition to harming competition among intellectual property rights in the pool and downstream products, but did not identify issues that raised significant innovation concerns. For example, the MPEG-2 Business Review Letter concluded that, "It further appears that nothing in the arrangement

¹⁰⁴ Compare Reisinger & Tarantino (2016) (pools can increase prices for complementary patents when they include vertically integrated firms and charge both fixed and per-unit royalties) with Kim (2004) (pools with integrated firms lower prices for complementary patents if they only charge per-unit royalties).

¹⁰⁵ See, e.g., Gilbert 2014.

¹⁰⁶ See VIA Licensing 2016.

¹⁰⁷ Layne-Farrar & Lerner 2011.

¹⁰⁸ *United States v. Automobile Mfrs. Ass'n* (C.D. Cal. 1969).

imposes any anticompetitive restraint, either explicitly or implicitly, on the development of rival products and technologies.”¹⁰⁹

The Business Review Letters specifically addressed whether grantback requirements, which obligate pool members to grant non-exclusive licenses to existing patents and any future patents they file that are deemed essential for the technology covered by the pool, create disincentives for innovation. The Antitrust Division reacted favorably to the grantback requirements, noting that they address the concern that, without the grantback, a patent holder may be able to “hold up” technology users by demanding an unreasonable royalty after the technology has achieved widespread acceptance.¹¹⁰

Nonetheless, mandatory grantbacks along with the obligation of pool members to share licensing revenues with their fellow members may discourage innovation by limiting the ability of innovators to capitalize on new discoveries. This concern has some empirical support. Ryan Lampe and Petra Moser studied innovation in the sewing machine industry following the formation of the Singer Sewing Machine patent pool in 1856.¹¹¹ The pool formed to resolve interfering claims by holders of patents on sewing machines that employed the “lockstitch” method. Lampe and Moser found that following the formation of the pool, patenting related to the lockstitch sewing method fell relative to patents on alternative technologies using the “chain stitch” method. The authors also found that during the period when the Singer pool was active more new firms entered with machines that employed the chain stitch method and that this pattern reversed after the pool dissolved in 1877.

Lampe and Moser extended their study of the effects of patent pools on innovation to pools formed in 20 industries from 1921 to 1948. This period spanned the National Industrial Recovery Act, which temporarily exempted the majority of U.S. industries from antitrust oversight and allowed collective rights organizations to form with little scrutiny.¹¹² As in their study of the Singer pool, they found that the average effect was a significant reduction in patenting by pool members following the creation of the patent pools compared to the rate of patenting in similar technological fields by firms that did not participate in the pools. A more contemporary study of patenting related to the MPEG-2 and DVD pools found that the number and quality of patents issued to pool members and licensees fell relative to non-participants after the pools were formed.¹¹³

These observations raise significant concerns but do not prove that patent pools are inimical to innovation, for several reasons. First, many of the pools studied by Lampe and Moser combined substitute technologies and engaged in restrictive licensing practices that harmed competition in product markets. They were classic cartels, and many of them were challenged after courts ended the New Deal’s antitrust exemptions. Indeed, Lampe and Moser found that the negative effects of pools on patenting were almost entirely limited to pools with two or more firms that owned patents in the same technology classes, which suggested that they may have combined of technologies that are substitutes for each other.¹¹⁴ An example is a patent pool

¹⁰⁹ DOJ Letter 1997, 11–12.

¹¹⁰ See, e.g., *id.* at 12–13.

¹¹¹ Lampe & Moser 2013. See also Lampe & Moser 2010.

¹¹² Lampe & Moser 2016.

¹¹³ See Joshi & Nerkar 2011. Another study found that the announcements of these pools stimulated unusually high levels of patenting activity by their future members *before* the pools were established. See Baron & Pohlmann 2015. This could indicate a burst of creative activity prior to pool formation or wasteful competition by firms to build patent portfolios and stake claims to pool revenues.

¹¹⁴ Lampe & Moser 2016, 6 (“patenting declined most significantly when historical pools reduced competition in research and development by combining patents by multiple pool members in the same subclass”).

that combined alternative technologies for filming movies in color and allegedly slowed the development of a cheaper alternative to Technicolor until the pool was abandoned.¹¹⁵ Modern antitrust enforcement would not tolerate a pool that combines technologies with different owners that are clearly substitutes for each other, and therefore the negative effects of such pools for innovation should be avoided.

Second, patent pools, and particularly pools that license technologies covered by a standard, typically form after a burst of innovation. It is therefore not surprising that patenting activity would slow after the formation of these pools. A third reason for the observed effect that pool members engage in less patenting than non-members is that owners of important technologies often choose to remain outside a pool so that they can command higher licensing fees or obtain a larger share of licensing revenues. The fact that non-participants file more and higher quality patents does not imply that innovation and the adoption of technologies covered by the pooled patents would have been lower if the pool had never formed in the first place.

It is not surprising that patent pools can create disincentives for their members to patent new technologies because they have to share licensing revenues with their members. However, the central question is not whether patenting occurs at a different rate inside the pool. The key question is whether the ability to collectively manage patent rights by forming a patent pool or engaging in cross-licensing harms innovation when members do not own rights that are substitutes for each and do not otherwise or harm competition in downstream markets. Modern patent pools appear to have a good record of supporting the adoption of new technologies, particularly for technologies that cover new standards. Collective rights organizations that allow firms and consumers to assemble complementary rights can clear bottlenecks and enable progress that would not have occurred at the same pace in their absence.

Without the Singer Sewing Machine patent pool the industry might have been mired in litigation for many years with adverse consequences for innovation. Robert Merges showed that competition in the sewing machine industry flourished during the tenure of the Singer Sewing Machine patent pool.¹¹⁶ New firms entered using both the lockstitch and chain stitch methods. While the share of new chain stitch patents increased when the pool was operative, patenting flourished for both technologies. Merges concludes that “Invention was robust; the pool did not cause a stagnation in the evolution of lockstitch technology.”¹¹⁷

More specifically, with regard to mandatory grantbacks of rights to future discoveries, these obligations can harm competition if the grantbacks enable a firm or a collection of firms to prevent the development of rival technologies. This concern has more weight if the grantbacks are exclusive and cover patent rights that can enable competing technologies. Grantbacks of non-exclusive patent rights for a narrow technology, such as MPEG-2, are unlikely to inhibit competition and have the beneficial effect of preventing a patent owner from charging royalties that interfere with the adoption and utilization of products covered by the pool’s package license.¹¹⁸ Furthermore, any possible negative effect on innovation incentives has to be contrasted with the benefits from coordinating the licensing of complementary rights, reducing transaction costs,

¹¹⁵ *Id.* at 30–32.

¹¹⁶ Merges 2015.

¹¹⁷ *Id.*

¹¹⁸ DOJ & FTC 1995 (noting a non-exclusive grantback allows the licensee to practice its technology and license it to others. Such a grantback provision may be necessary to ensure that the licensor is not prevented from effectively competing because it is denied access to improvements developed with the aid of its own technology. Compared with an exclusive grantback, a non-exclusive grantback, which leaves the licensee free to license improvements technology to others, is less likely to have anticompetitive effects).

and avoiding costly and time-consuming litigation that can delay the adoption and utilization of new technologies.

CONCLUSIONS

Collective rights organizations have the potential to create large consumer benefits by providing one-stop shopping for rights necessary to supply products and services and by avoiding royalty-stacking that can occur if many rights-holders independently set licensing terms when technology users desire licenses to complementary intellectual property rights.

However, collective rights organizations can harm competition if they combine rights that are substitutes for each other or impose restrictions on downstream competition. Courts and enforcement agencies have relied on the availability of independent licensing to constrain the ability of CROs to increase royalties by establishing fees for rights that are substitutes for each other. The availability of independent licensing is not a failsafe guarantee against the formation of anticompetitive collective rights organizations unless it is supplemented with other measures that may require regulatory oversight. Nonetheless, agreements by members of collective rights organizations that prevent independent licensing should be viewed with suspicion unless the parties can offer consumer-friendly reasons why the CRO and their members should only offer portfolio licenses.

Patent pools also can raise competition concerns by shielding weak patents from antitrust challenges and in some cases can slow the pace of innovation by allowing pool members to share the benefits from new discoveries. In addition, courts have a role to ensure that patent pools honor their members' licensing commitments, such as obligations to license patents at FRAND terms.

The policy statements by the Department of Justice and Federal Trade Commission detail the conditions under which collective rights organizations do not raise antitrust concerns, but they leave open the question of whether CROs are procompetitive if they lack some of these safeguards. As a general statement, patent pools and other collective rights organizations are more likely to be procompetitive when they aggregate large numbers of rights-holders, a significant fraction, if not all, of their rights are highly complementary, the pool has narrow and non-exclusive grantback provisions and the collective rights organization does not inhibit its members from offering licenses independently. Antitrust enforcers should be vigilant about collective rights organizations that may harm competition, while also respecting the large benefits that these institutions can create for consumers.