

## COMPETITION POLICY, PATENT POOLS AND COPYRIGHT COLLECTIVES

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ABSTRACT. This paper analyzes and compares two types of cooperative agreements that combine Intellectual Property (IP): patent pools and copyright collectives. I evaluate antitrust policy in three environments in which owners of the intellectual property (IP): (1) are vertically integrated into the downstream (product) market; (2) face competition in the upstream (input) market and (3) own downstream products that do not require a license on the pooled IP but compete with products that do. Although patent pools and copyright collectives differ in purpose, membership size and market conditions, their efficiency implications are qualitatively similar in each of the three situations. Therefore, a uniform rather than IP-specific competition policy is appropriate for pools and collectives, thus lending economic support for the approach followed by antitrust authorities toward IP-related cooperative agreements.

### 1. INTRODUCTION

In the economics literature, Intellectual Property (IP) is the broad term given to the set of legal rights awarded to owners of intangible property: patents, copyrights, industrial design rights, trademarks and trade secrets. While conveniently summarized by this unifying term, the various rights represented under the IP rubric differ markedly in their purpose, breadth and length of protection, their eligibility criteria and their legal complexities. For example, the economic justification for patents and copyrights –

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to encourage innovation in exchange for eventual open access – contrasts with trade secrets that prohibit access indefinitely, or trademarks, which are awarded primarily to facilitate product identification. So, while IP is a convenient label, differences among its various forms make it conceptually less useful as a unit of analysis.

In the conventional economics literature, patents have received the dominant share of IP attention.<sup>1</sup> Applying theoretical results on patents to copyrights may not be inappropriate for some problems such as determination of the efficient length and scope of protection that balances the innovation-access tradeoff,<sup>2</sup> but can be misleading in other situations. For example, Lévêque and Ménière (2007) note that the convenient but misleading generalization of “patents” to “all IP” in the economic literature has incorrectly portrayed the open source movement as “anti-IP” when it is opposed only to patents (but not all IP) on software. Consequently, open sourcing has been held up as an example of why IP may not be necessary to spur innovation when, in fact, copyright protection may be necessary to enforce its licenses (e.g., General Purpose Licenses).

This paper examines two arrangements for combining IP – patent pools and copyright collectives – and in doing so, explicitly distinguishes between the two forms of IP around which they form. As noted in the next section, the two types of cooperative agreements differ in purpose, membership size

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<sup>1</sup>Posner (2002) claims that the economic literature has “slighted” copyrights in focusing on patents. In contrast, the law and economics literature has been rich and prolific in the study of copyrights. See for example, Merges (1996), Lemley, Menell, Merges (2006) and Lemley, Menell, Merges and Samuelson (2006), Posner (2005) and the references therein. Also, recent policy changes, which have extended patent eligibility to software and business methods, and the challenges brought on by new technologies have shifted attention to copyrights. See for example, research published in this Journal; also Bonaccorsi and Rossi (2003), Lerner and Tirole (2005) and Lévêque and Ménière (2007) for discussions of open source, Boyer (2007) on copyright and fair dealing, Katz (2005,2006) and Aoki and Schiff (2008) on copyright collectives, Towse (2002) on copyright in cultural industries, Lieberman and Margolis (1996) and Ramello (2002) on antitrust policy in copyright, Hui and Png (2002) on empirical impact of copyright policy, Watt (2004) and Varian (2005) for general discussions.

<sup>2</sup>Patents and copyrights are quantitatively distinct in features such as breadth and length of protection but this variation can be captured in a common framework.

and market conditions. I ask whether these differences call for a distinct economic framework for analyzing welfare effects, or whether patent pools and copyright collectives can be analytically interchangeable. This question is answered in context of three different environments. Drawing on a rich theoretical literature on patent pools, I ask to what extent the patent framework and results apply to copyright collectives and, based on these conclusions, whether competition policy toward these two types of agreements should be IP-dependent or uniform across IP.

In formulating competition policy toward cooperative IP agreements, the U.S. Department of Justice provides some guidance on the interchangeability between patents and copyrights. The 1995 United States Department of Justice (DOJ)-Federal Trade Commission (FTC) *Guidelines on the Licensing of Intellectual Property* (hereafter, the *Guidelines*) state that “although there are clear and important differences in the purpose, extent, and duration of protection provided under the intellectual property regimes of patent, copyright and trade secret, the governing antitrust principles are the same. Antitrust analysis takes differences among these forms of intellectual property into account in evaluating the specific market circumstances in which transactions occur.”

Implicit in the above statement is that patent pools and copyright collectives will, in principle, be evaluated similarly. However, asserting that the “governing antitrust principles are the same” provides no further insight into the relationship between patents and copyrights than it does between patents and sumo wrestling, for which the same antitrust principles also would apply. More informative is the assertion that “differences among these forms of intellectual property”, interacted with the “specific market circumstances in which transactions occur”, will be accounted for in the evaluation. But this guideline simply circles back to the question, posed earlier: What

are those “differences” and “specific circumstances” that would require a different (e.g., more or less restrictive) approach toward patent pools and copyright collectives?

Section 2 provides a comparison of patent pools and copyright collectives with regard to their purpose and design, and reviews briefly the history of antitrust policy toward these classes of agreements. Section 3 expands on an important difference between these two sets of arrangements for antitrust purposes: the competitive nature of components allowed in the agreement. For approval, modern patent pools are required to admit only patents that are complementary and essential to the implementation of a standard; in contrast copyright collectives often include creative works or software designs that are in competition with each other. I explore the economic rationale for this difference and its implications for efficient agreements. Section 4 evaluates antitrust policy towards patent pools and copyright collectives in context of three environments in which members: (1) are vertically integrated into the downstream (product) market; (2) face competition in the upstream (input) market and (3) own downstream products that do not require a license on the pooled IP but compete with products that do. Although patent pools and copyright collectives differ in purpose, membership size and market conditions, their efficiency implications are shown to be qualitatively similar in each of the three situations. Therefore, a uniform rather than IP-specific competition policy is appropriate for pools and collectives, thus lending economic support for the approach followed by antitrust authorities toward IP-related cooperative agreements.

## 2. PATENT POOLS AND COPYRIGHT COLLECTIVES: WHAT ARE THEY AND WHY DO THEY FORM?

### 2.1. Differences between Patent Pools and Copyright Collectives.

In the economic literature, patent pools are defined as “formal or informal

organizations where firms share their patent rights with each other and third parties.” (Lerner, Strojwas, Tirole 2007), whereas a copyright collective is an “association where authors transfer copyrights for purpose of monitoring use and granting licenses, negotiating, collecting and distributing royalties on behalf of members, and taking legal action against infringers.” (Hollander 1984) Although both patent pools and copyright collectives are cooperative agreements among IP owners for combining their IP and consolidating transactions, the definitions reveal differences in emphasis, with patent pools focused on the *sharing* of rights to create a new product or support a standard and copyright collectives on the *monitoring* and *appropriation* of rights.

Historically, patent pools have arisen for a variety of reasons, ranging from facilitating price fixing to supporting a technology standard. The latter typifies modern patent pools, which are approved by antitrust authorities if they include patents that are complementary and essential to the standard.<sup>3</sup> In contrast, a dominant form of copyright collectives has been in the cultural and arts industries, with the purpose of reducing transaction costs of monitoring and enforcing the rights of its hundreds of thousands of members. With the emergence of the open source (hereafter, OS) movement, copyright collectives have formed in both software and computer-related markets.

Although appearing to be motivated for different reasons, both types of cooperative agreements are about reducing transaction costs of an “IP thicket” that users would face in the absence of the agreement.<sup>4</sup> In many cases, the differences are quantitative in nature (for example, the size of

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<sup>3</sup>Components in a pool are essential to support a standard if there are no economically viable substitutes and so anyone implementing the standard would necessarily infringe the patent.

<sup>4</sup>Patent or copyright thickets, which have grown from policy changes that have strengthened and fragmented IP rights, refers to the complex web of negotiations innovators must enter into before introducing a new product/process. New consumer electronics, drugs, and modern technologies embody a large number patents; consequently innovators of new products must negotiate with multiple patentees, stacking up royalties or abandoning research altogether. A similar situation arises for copyrights, for example, in the case of performance rights in which the user would incur large transaction costs from negotiating with separate copyright holders. See Shapiro (2001) for further discussion of the patent thicket.

the pool). Modern patents pools (e.g., DVD-3G and DVD-6G, MPEG-2, MPEG-4 and the 3G Platform) typically do not have more than a few dozen patentees;<sup>5</sup> in contrast, the performing rights organizations (PROs) such as the American Society of Composers, Authors and Producers (ASCAP), Broadcast Music, Inc. (BMI) and the Society of European Stage Authors and Composers (SESAC) represent hundreds of thousands of composers, authors and publishers. The U.S. Department of Justice (DOJ) in its *amicus curiae* in *K-91, Inc. v. Gershwin Publishing Corporation* in 1967 articulates this nature of collectives in the music industry:

“The extraordinary number of users spread across the land, the ease with which a performance may be broadcast, the sheer volume of copyrighted compositions, the enormous quantity of separate performances each year, the impracticability of negotiating individual licenses for each composition, and the ephemeral nature of each performance all combine to create unique market conditions for performance rights to recorded music.”<sup>6</sup>

The observations by the DOJ reveal two important differences besides sheer size and the enormity of transaction costs. First, copyright collectives tend to be more inclusive than patent pools since the latter typically admit only patents essential to the standard. Second, the components in a patent pool have a well-defined productive relationship with the downstream products, in contrast to a collective’s copyrights, for which downstream uses (e.g., music played on radio or in a nightclub) may not be known in advance. These differences of size, inclusiveness, and nature of the product can have important efficiency implications for the antitrust treatment of copyright

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<sup>5</sup>DVD3C and DVD6C include four and nine leading patentees, respectively, the 3G Platform represents 19 telecommunication companies and MPEG-2 comprises patents from 26 licensors.

<sup>6</sup>Memorandum for United States as Amicus Curiae on Pet. For Cert. in *K-91, Inc. v. Gershwin Publishing Corp.*, O.T. 1967, No. 147, pp. 10-11.

collectives, especially regarding inclusion of substitute components in the pool/collective. The latter issue is explored in Section 3.

**2.2. Brief Overview of Antitrust Treatment of Patent Pools and Copyright Collectives.** Before turning to the analysis, I briefly compare the approach antitrust authorities have followed for identifying welfare-decreasing pools and collectives. As noted in Gilbert’s review (2004) of U.S. antitrust treatment of patent pools over the past century, the antitrust view has been “checkered”, oscillating from *per se* legality to *per se* illegality to the current, more balanced rule of reason approach.

Copyright collectives, particularly performing rights organizations appear to follow a similar pattern, starting with the introduction of ASCAP in 1914 and its relative autonomy during the leniency years of antitrust. As patent pools entered the era in which “antitrust trumped patents”, copyright collectives too came under attack. During this second phase, 164 operators of motion picture theatres brought a suit against ASCAP, claiming that ASCAP violated antitrust laws. This case, *Alden-Rochelle* (1948),<sup>7</sup> focused on ASCAP’s practices of separating the licensing of rights for synchronizing music in film from the rights to perform the same music (embedded in the film) in theatres; of prohibiting its members from licensing the performing rights to film producers; and of requiring distributors of the motion pictures to deal only with theatres holding an ASCAP license. Referring to “leading cases” involving patent pools,<sup>8</sup> the District Court ruled that ASCAP license both rights – synchronization and performance – to motion picture producers, thereby ending separate licensing of performance rights to theatre owners. During this era, the DOJ also brought suit against ASCAP

<sup>7</sup>*Alden-Rochelle Inc. v. American Society of Composers, Authors and Publishers* 80 F.Supp. 888 (1948).

<sup>8</sup>For example, it was noted in *United States v. Line Material Co. et al.*, 333 U.S. 287, 68 S. Ct. 550 – an important patent pool case – that the Court held “such a combination of patents constitutes an illegal restraint of interstate commerce.”

and its competitor BMI for violations of the Sherman Act, resulting in the consent decrees of 1941. This agreement, and those that followed in 1950 and 1966, required ASCAP and BMI to allow independent licensing by its members; to offer economically viable per program licenses; and to issue nondiscriminatory licenses to similar users.

In the current phase, antitrust policy toward patent pools has followed a balanced approach that weighs the benefits of reducing transaction costs against the potential anti-competitive harm from cooperative pricing. The latter is mitigated when the agreement combines complementary patents, for example, to support a standard.<sup>9</sup> Consistent with the evolving case law, the 2007 DOJ-FTC *Antitrust Guidelines for Collaborations Among Competitors* recognize that “such collaborations are not only benign but also pro-competitive” and “may enable participants to offer goods or services that are cheaper, more valuable to consumers, or brought to market faster than would be possible absent any collaborations.”<sup>10</sup>

The current rule of reason approach was evident in *Broadcast Music, Inc. v. Columbia Broadcasting System, Inc.* in which the Court of Appeals agreed with CBS in 1979<sup>11</sup> that the blanket license was a *per se* violation of the Sherman Act. In defense of ASCAP and BMI, the DOJ issued an *amicus brief*, urging that blanket licensing be reviewed under the rule of reason rather than be deemed in *per se* violation of the Sherman Act. The Supreme Court agreed that the blanket license is “economically beneficial in at least some circumstances”,<sup>12</sup> effectively concluding that the practice is more likely to “increase economic efficiency and render markets more,

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<sup>9</sup>See Shapiro (2003), Lerner and Tirole (2004), Gallini (2011a).

<sup>10</sup>Preamble and Section 3.36, respectively.

<sup>11</sup>*Broadcast Music, Inc. v. Columbia Broadcasting System, Inc.*, 441 U.S. 1 (1979).

<sup>12</sup>*Ibid* at 16.



rather than less, competitive.”<sup>1314</sup> Furthermore, several attempts during the current era to apply Alden-Rochelle to television broadcasts of films and pre-recorded music have been unsuccessful under rule of reason arguments.

The argument made for the efficiency of blanket licenses offered by copyright collectives, in principle, could apply to blanket licenses on components in a patent pool. Although not yet tested by the courts, the DOJ would likely argue that blanket licenses from the pools as well as collectives should not be *per se* illegal if large in number. However, since “extraordinary numbers” or “unique market conditions” are not as prominent in patent pools, antitrust authorities would likely be less adamant in defending such contracts in pooling arrangements. That is, while the same economic guiding principles apply to pools and collectives, differences in the nature of the IP involved and in the market conditions appear to have led to different degrees of tolerance toward the same licensing practice. Perhaps more significant is antitrust’s permissibility in allowing substitutes in copyright collectives but not in patent pools, a topic that is explored in the next section.

### 3. THE IMPORTANCE OF COMPLEMENTARITY AND ESSENTIALITY

As noted above, the modern antitrust approach toward patent pools has focused around the nature of the components included in the cooperative agreements: if the patents combined are complements, they are likely to be deemed beneficial. This view is based on the classic observation made by Cournot: If two inputs are perfect complements in the production of

<sup>13</sup>*Ibid* at 20 in reference to *United States v. United States Gypsum Co.*, 438 U.S. 422, 436n.13 (1978).

<sup>14</sup>A 1941 consent decree, amended in 1950, requires members of ASCAP to obtain only nonexclusive rights, thereby allowing individual members to retain rights to license their works for public performances or other uses. ASCAP must also offer per-program licenses so that the licensee has a “genuine” economic alternative to the blanket license. Nevertheless, the blanket license continues to prevail as the primary method of exchange. Similar decrees were issued against BMI in 1941 and 1966. As reported in *BMI v. CBS*, “the BMI decree does not specify that BMI may only obtain nonexclusive rights from its affiliates . . . . Nonetheless, the parties stipulated, and the courts below accepted, that ‘CBS could secure direct licenses from BMI affiliates with the same ease or difficulty, as the case may be, as from ASCAP members.’”

a downstream product, then price-setting by a single monopolist is both privately and socially preferred to uncoordinated pricing by two independent firms. In particular, a monopolist internalizes the externality of lowering the price on the demand for the other input, which places downward pressure on the prices. In other words, pooling complementary patents removes the double marginalization problem or, in IP parlance, it mitigates the *anti-commons* problem.<sup>15</sup>

Copyright collectives can be described in a similar way.<sup>16</sup> Parisi and De-poorter (2003) characterize the process of obtaining the rights to public performance as a *copyright thicket* through which PROs can create a clearing.<sup>17</sup> The copyright thicket is particularly dense when a user such as a radio station or nightclub owner requires licenses on a multitude of musical compositions. The costs per user of negotiating contracts would be prohibitive, as would be the costs per artist of monitoring and enforcing the copyright. Collectives can reduce transaction costs for both buyers and sellers and therefore input and downstream prices; the benefits are even greater if the bundle of rights comprises complements.

Indeed, copyright collectives often include complementary products, and therefore mitigate the anticommons problem. For example, in the case of performance rights organizations (PROs), performing an individual song requires rights to both the composition and lyrics. Moreover, many users require a package of songs that may be pre-recorded in a film, radio or TV broadcast, in which case the copyrighted songs are complements. Individually negotiated licenses would be inefficient relative to a blanket license. Even if the artists represented by the collective compete with each other, their music may be complementary to users such as radio stations, which

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<sup>15</sup>The anticommons problem arises when too many owners with exclusive rights (or “IP thickets”) lead to underutilization of a scarce resource. See Heller and Eisenberg (1998).

<sup>16</sup>See Einhorn (2006), Katz (2005,2006) and Handke and Towse (2007) for insightful discussions of the efficiency tradeoffs of copyright collectives.

<sup>17</sup>See Shapiro (2001).

require diversity within and across musical genres for the recordings aired each day.<sup>18</sup>

PROs also include substitutes, in representing sometimes hundreds of thousands of artists, publishers and composers, many who compete with each other within the same genre or in a relevant market. The DOJ expresses its view of this practice in its 2007 *Guidelines*: “Including substitute patents in a pool does not make the pool presumptively anticompetitive; competition effects will be ascertained on a case-by-case basis.”<sup>19</sup> While the statement applies to both pools and collectives, this rule of reason approach tends not to be the practice for modern patent pools in which *essentiality* – a stronger criterion than complementarity – is typically required for approval.

In contrast, under the rule of reason argument, substitutes have been allowed in copyrights collectives. This asymmetry between the two types of agreements is justified on transaction costs grounds.<sup>20</sup> Posner (2001) argues that the license fee that emerges from collective associations such as ASCAP or BMI is lower than the fees that users would have to pay “if licensees had to negotiate with composers separately, since the cost of those negotiations would be part of overall cost of acquiring those rights.” Therefore, he concludes, that as in the case of complementary pools, copyright collectives are another example “where the monopoly price is probably lower than the competitive price.”<sup>21</sup>

Moreover, the different nature of the demands arising from a technology patent pool and a music copyright collective could justify asymmetric treatment. For example, in the case of the DVD patent pools, licensees

<sup>18</sup>That is, according to Lerner and Tirole (2004), the “demand margin” binds.

<sup>19</sup>U.S. Department of Justice and Federal Trade Commission (2007), Ch. 3, p. 9.

<sup>20</sup>Artists incur transaction costs in monitoring performances in order to enforce their rights, and users in negotiating multiple contracts. The costs of these transactions could reduce incentives for the innovation and the diffusion of creative works.

<sup>21</sup>Posner (2001), pp. 30-31. While Katz (2005) acknowledges that the anti-commons problem and economies of scale and scope in performance rights provide some justification for PROs, he does not agree that natural monopoly is the only way to organize these rights, arguing persuasively for increased competition among multiple intermediaries or less restrictive contracts.

that manufacture DVD players know well in advance which components are needed in production; in contrast, nightclub or radio station owners are not likely to know with certainty which music it will play that day or week. Without the flexibility to substitute across and within genres, the value of the product could be diminished. Even if the mix of music can be determined in advance, the lead time may not be sufficient, after settling on the desired mix of music, to identify and negotiate with multiple copyright owners for approval prior to the performances.<sup>2223</sup>

Finally, the presence of nonessential components may not imply that an agreement is welfare decreasing. To see this, suppose the standard requires a set of complementary components, which are included in the pool, but alternatives to some of those components exist (that is, they are non-essential). Gilbert (2010) shows that “over-inclusion” in the sense of admitting nonessential components may not harm competition as long as “(i) the pool includes at least one valid essential patent and (ii) licensees are free to license the intellectual property ... through independent negotiations with other rights holders.” The main risk, he asserts, is that owners of essential patents may not want to enter a pool with non-essential components because of the potential dilution in royalty income.

To see the impact of including nonessential patents in a pool, suppose  $n$  components are needed to support a standard, but alternatives exist for  $m < n$ . Suppose the prices for the nonessential and essential inputs are, respectively,  $p_j$ , for  $j = 1, \dots, m$  and  $p_k$ , for  $k = m+1, \dots, n$ . Suppose further

<sup>22</sup>Admitting substitutes would not be problematic if the copyright collective faced sufficient competition. Although music collectives in the U.S. face some internal and external disciplining forces (internally from independent licensing of members and externally through competition among ASCAP, BMI and SESAC), Katz (2005) argues that these forms of competition do not make the market contestable. Moreover, in many countries, artists within a particular trade are typically represented by a single collective rights organization.

<sup>23</sup>For example, even if copyright collectives were more specialized (for example, according to genre or era of music), such that the final product were well defined as in a patent pool, the transaction costs of negotiating with a large number of composers nevertheless could be prohibitive. In any case, this type of specialization has not occurred, the closest being when BMI split from ASCAP with a somewhat different mix of genres. I thank Richard Watt for this insight.

that the downstream consumer product,  $Z$ , which requires the upstream inputs, is sold in a competitive market and so  $p_Z = \sum_1^m p_j + \sum_{m+1}^n p_k$ . Finally demand for  $Z$  is given by:  $q = 1 - p_Z$ . If the nonessential inputs are homogeneous, then under Bertrand pricing,  $p_j = 0$ . Moreover, the equilibrium price of the essential input  $k$  is given by  $p_k = 1/(n - m + 1)$  and the downstream equilibrium price is  $p_Z^{NP} = (n - m)/(n - m + 1)$ . Under a pool, the price of  $Z$  is  $p_Z^P = \frac{1}{2}$ .<sup>24</sup>

Note that for  $m < n$ ,  $p_Z^P \leq p_Z^{NP}$ , supporting Gilbert’s observation that the pool is not anti-competitive as long as at least one essential component is in the pool. Alternatively, the difference in the non-pool and pool prices increases in the number of components required for the standard ( $n$ ), reflecting the benefits of pooling in the presence of an increasingly dense “patent thicket”, but falls in the number of nonessential components ( $m$ ). That is, if the nature of the components can be accurately measured, then including non-essential components reduces the value of the pool; however, under uncertainty regarding the competitive nature of the components, admitting nonessential components into the pool does not make the pool anti-competitive. Second, the benefits to each patentee from a pool in which it earns  $\frac{1}{n}$ th of the pool profits, compared to uncoordinated pricing (no pool), is defined by  $1/(4n) - 1/(n - m + 1)^2$ ; note that this expression falls in the number of nonessential components. That is, inadvertently allowing nonessential components could render a socially efficient pool unprofitable. This can be more harmful, as Gilbert argues, than the increase in market power from the coordination of substitute goods.<sup>25</sup>

<sup>24</sup>Each of the  $k$  owners of essential patents maximize the following expression for a representative patentee (which, without loss of generality, is taken to be the  $n$ th firm):  $\pi_n = p_n \times (1 - \sum_1^m p_j - \sum_{m+1}^n p_k)$ . The first-order condition is:  $1 - \sum_1^m p_j - 2p_n - \sum_{m+1}^{n-1} p_k = 0$ . In equilibrium,  $p_j = 0$  for all  $j = 1, \dots, m$  and  $p_k = p_n$  for all  $k = m + 1, \dots, n$ , and so the equilibrium price of essential inputs  $k$  is given by:  $1 - 2p_k - (n - m - 1)p_k = 0$  or  $p_k^* = 1/(n - m + 1)$ . Since there are  $n - m$  essential components,  $p_Z^{NP} = (n - m)/(n - m + 1)$ .

<sup>25</sup>These results are consistent with those in Lerner and Tirole (2004) in which patent pools are analyzed for the full spectrum of products from perfect complements to perfect substitutes.

In summary, patent pools with complementary components are generally viewed as pro-competitive. Furthermore, while copyright collectives differ in purpose and form (especially in admitting nonessential and competing IP), they too are viewed as pro-competitive when significantly reducing transaction costs. And so, even though the organizations are distinct, owing to “differences [in the] intellectual property” and “specific market circumstances in which transactions occur”, the adoption of uniform antitrust principles is economically justified.

#### 4. ANTITRUST CONCERNS AND COOPERATIVE IP AGREEMENTS

As noted in the previous section, patent pools with complementary components or copyright collectives with large transaction cost savings will typically be efficient from a social point of view. But, even with these features, agreements to combine IP can be problematic from an antitrust perspective. Three market/organizational environments, potentially conducive to anti-competitive behavior, in which cooperative agreements might arise, are explored in this section along with their implications for competition policy.<sup>26</sup>

**4.1. Competition Concern #1: Vertical Integration and Foreclosure in Downstream Market.** This section examines the potential for pools and collectives to foreclose rivals from the downstream market. Throughout the analysis upstream and downstream markets will typically refer to, respectively, markets for inputs (the IP) and for final consumer goods that

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Observing that the relationship between products may not easily be categorized as “substitutes” or “complements”, they consider a situation in which technology use is optimized with all  $n$  components but will function with a subset  $m$ , which is less than the full set  $n$ . Goods can be both complements and substitutes: if prices are low, all  $n$  components will be used (complements); whereas if prices are high then only a subset  $m < n$  will be used (substitutes). They show that even when the competitive margin binds in the absence of a pool, a pool can increase welfare; in other words, pooling can reduce prices even though the consumers would substitute between them in the absence of a pool.

<sup>26</sup>That is, I consider pools and collectives that are efficient relative to uncoordinated pricing. Alternative ways of organizing rights through less restrictive contracting or increased competition are not considered. For a comprehensive discussion of the latter, see Katz (2005, 2006).

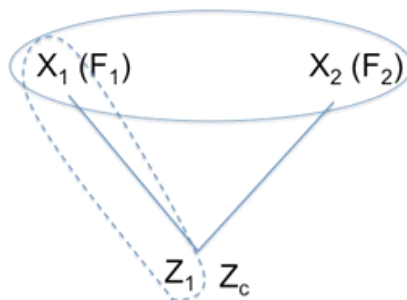


FIGURE 1. Pool with vertically integrated member

require the inputs. Examples of inputs and products at the two stages might be, respectively, semiconductor chips (upstream) and DVDs, smartphones or their applications (downstream) in the case of patents; and for copyrights, musical compositions (upstream) and music played in nightclubs, motion pictures or on iTunes (downstream).

We begin with patent pools. Consider a situation in which two firms,  $F_1$  and  $F_2$ , contribute one patented component,  $X_1$  and  $X_2$  respectively, to the pool;  $X_1$  and  $X_2$  are used in fixed proportions to produce differentiated products,  $Z_1$  and  $Z_c$ , illustrated in Figure 1. Suppose  $F_1$  is vertically integrated in that it produces  $Z_1$  as well as  $X_1$ . In the absence of a pool, vertical integration raises rivals' costs (Salop and Scheffman (1983)) but also reduces double marginalization. When a pool is formed, the latter downward effect on prices is reinforced, since each patentee internalizes the positive impact of reducing its input price on the demand for the other firm's component.

Kim (2004) shows that, when the patentees do not coordinate their prices, foreclosure can occur in equilibrium. In contrast, a pool of upstream inputs reduces the incentive to foreclose rivals since it internalizes the positive impact of a lower price on profits of vertically integrated members. But a lower price for vertically integrated members is a lower price for nonmembers as

well and so foreclosure is reduced. Since a pool with vertically integrated members reduces price and increases welfare, the introduction of vertical integration does not alter the welfare impact of patent pools on complementary inputs.<sup>27</sup>

In applying this analysis to the case of copyright collectives, I consider a specific market: Music included (or synchronized) in motion pictures. As shown in Figure 2, three market players are relevant: composers and publishers ( $M_1$  and  $M_2$ ), film producers ( $F_1$  and  $F_2$ ) and the movie theatres owners ( $T_1$  and  $T_2$ ). The three links in the chain are referred to as the upstream, intermediary, and downstream markets. Suppose that some firms in the intermediary market are backwards integrated into the upstream market, reflecting the integration of film studios into music publishing that occurred by the 1920s. For illustrative purposes, suppose further that the film producers are *undifferentiated* Bertrand oligopolists and, initially, that movie theatres, the third link in the chain, operate in a perfectly competitive market.

Also, suppose that the music provider sets a blanket royalty  $r_s$  to the film producers, who in turn lease their motion pictures to owners of movie theatres at royalty  $r_f$ , who then sell movie tickets at the competitive price  $p$ . The arrows on the right-hand side of Figure 2 represent this relationship. As in the case of patent pools, prices will likely fall and welfare increase under the collective organization with backward integration relative to no collective. In particular, if  $p_m$  is the monopoly price of movie tickets, the collective can maximize profits by setting  $r_s = p_m$  which, given the simplifying assumptions, yields a downstream price  $p = p_m$ .<sup>28</sup>

<sup>27</sup>Kim (2004) and Lerner and Tirole (2004) differ in the impact of vertical integration on the pooled price (the former showing it will fall; the latter than it can increase) but both show that pools with vertically integrated members will increase welfare for complementary patents (more precisely, if the demand margin binds in the absence of the pool).

<sup>28</sup>To see this more clearly, suppose demand is given by  $q = 1 - p$ . Then maximum monopoly profits can be achieved under a collective with royalties:  $r_s^1 = r_s^2 = \frac{1}{4}$ . Since the vertically integrated producer ( $F_1$ ) has a cost advantage in internalizing the cost of its own input ( $M_1$ ), it



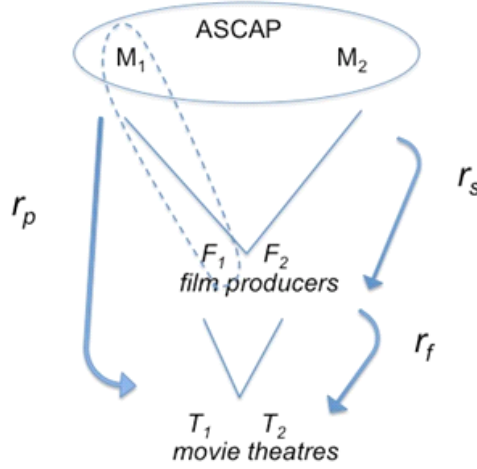


FIGURE 2. Copyright collectives and the film industry

While the above framework for copyrighted music in motion pictures reflect current practice in the U.S., that has not always been the case nor is it the practice in other countries. Prior to 1948 in the U.S., ASCAP offered separate contracts to each of the film producers and movie theatre owners, a practice that can be traced back to silent movies. At the time of silent movies, performance licenses were given to movie theatres to conduct live performance simultaneously while the movie played. When sound was introduced, the collectives continued to issue *performance* licenses to theatres while giving separate *synchronization* licenses to the film producers. The Alden-Rochelle class action case brought by 164 movie theatre owners against ASCAP in 1948 ended this practice. The court found ASCAP in violation of the antitrust laws and required ASCAP to offer only *source licenses* to film producers: contracts that combined synchronization

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can set its royalty  $r_f$  to the theatre owners slightly below  $\frac{1}{2}$  and foreclose  $F_2$  from the market. Alternatively, the collective can set  $r_s^2 = \frac{1}{2}$  and  $r_s^1 = 0$ , placing both motion picture producers in symmetric positions in the market. If, instead, the pool does not form, then the integrated firm will always be at a cost advantage and foreclose  $F_2$  in equilibrium; moreover, equilibrium prices will exceed those under coordinated pricing if  $M_1$  and  $M_2$  are complements or transaction costs savings are significant. Hence, a collective under these conditions increases welfare and can reduce foreclosure.

and performance rights (that is,  $r_s$  includes payment for both synchronization and performance rights to the music), while motion pictures producers continued to contract with theatre owners for rights to show the movies (for example, at royalty  $r_f$  in Figure 2). The U.S. is the only country to have adopted this rule, which applies to music performed in motion pictures but not, for example, in television broadcasts.

As noted above, blended contracts to film producers resulting from the Alden Rochelle case are effectively those analyzed above (the right-hand side of Figure 2). But as argued above, under simplifying conditions, they can achieve full monopoly profits. Hence, the pre-Alden Rochelle practice (and current practice outside the U.S.) of setting separate synchronization and performance contracts presents a puzzle. Since performance of the music is inseparable from the performance of the film, it appears that little could be gained from issuing separate licenses to movie theatres and to theatre owners. So then, why did ASCAP follow this practice and continue to do so where it is not proscribed? Since full monopoly profits can be achieved with a single contract, the separation of synchronization rights at royalty  $r_s$  from performance rights at royalty  $r_p$  (see Figure 2) cannot be explained within the above framework.

However, the pre-Alden Rochelle practice can be explained if a second level of imperfect competition is introduced at the downstream (movie theatre) level. To see this, assume that two theatre owners compete in quantities, given the royalties set by the motion picture producers. The demand for the final good (movies in theatres) is given by  $p = 1 - q$ , illustrated in Figure 3, and so the price at which industry profits are maximized is at  $p_m = \frac{1}{2}$ . If ASCAP is constrained to offer only source licenses to the film producers who then transfer movie rights to the theatres, the derived demand facing the film producers will be lower than the final demand, as

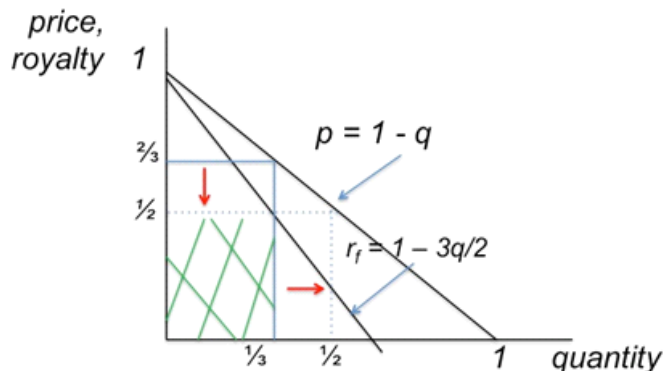


FIGURE 3. Strategic Contracting by Copyright Collectives

shown in Figure 3 by  $r_f = 1 - 3q/2$ . In taking the downstream mark-up into account, ASCAP sets a royalty of  $r_s = 1/2$  to film producers, which is passed on to theatre owners who then set a price and quantity of  $\frac{2}{3}$  and  $\frac{1}{3}$ , respectively. Together ASCAP and film producers earn the shaded section and the theatre owners receive positive profits.

Alternatively, if ASCAP can offer separate contracts for performance and synchronization rights (at royalties  $r_p$  and  $r_s$ , respectively), then industry profits and ASCAP’s share of them can increase. In this simple example, full monopoly profits are achieved.<sup>29</sup> Effectively, the collective sets both a royalty to film producers equal to  $r_s = \frac{1}{4}$  in order to generate a downstream price of  $p = p_m = \frac{1}{2}$  and a fixed fee to the theatres owners equal to their profits. This simple example provides a private rationale for the decoupling of contracts, which incidentally, benefits both consumers and members of the collective by reducing prices and increasing profits.

The decoupling of IP rights presents another distinction between patent pools and copyright collectives. Patents, in contrast to copyrights, confer a single, effectively indivisible, right of “exclusion”. In contrast, the U.S.

<sup>29</sup>Achieving full monopoly profits would not be possible if film producers were differentiated (rather than homogeneous as assumed) Bertrand oligopolists since a double mark up by film and movie producers would preclude the first-best outcome.

Copyright Code lists six exclusive rights held by the copyright owner.<sup>30</sup> Notwithstanding the different conditions and analysis, the antitrust conclusions around foreclosure and welfare are similar: An efficient pool of complements or an efficient collective with significant transaction cost savings, will continue to be efficient if a subset of its members become vertically integrated into the downstream (final goods or service) market. It should be noted, however, that if starting with a welfare-*reducing* pool or collective, the introduction of vertical integration could reinforce the negative consequences of the cooperative agreement.

**4.2. Competition Concern #2: Blanket Licenses and Foreclosure in the Upstream Market.** In this subsection, I consider a situation in which a substitute for one of the patented inputs exists. Denote the substitute by  $X_c$ , and assume it could replace  $X_1$  perfectly. If the patented components are bundled into a blanket license, then a potential antitrust concern arises since the competing component can be foreclosed from the market and consumer welfare compromised. Since the blanket license includes  $X_1$ , consumers may be inclined not to purchase  $X_c$  even if superior to the pooled component. However, allowing members to sell their components separately as well as in a bundle mitigates the potential for foreclosure. Lerner and Tirole (2004) show that independent licensing is both theoretically and empirically consistent with welfare-increasing pools but not welfare-decreasing pools, thereby justifying antitrust policies that insist on this feature.

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<sup>30</sup>In particular, as stated in Section 106 of the U.S. Code, subject to limitations in Sections 107-122, “the owner of copyright under this title has the exclusive rights to do and to authorize any of the following: (1) to reproduce the copyrighted work in copies or phonorecords; (2) to prepare derivative works based upon the copyrighted work; (3) to distribute copies or phonorecords of the copyrighted work to the public by sale or other transfer of ownership, or by rental, lease, or lending; (4) in the case of literary, musical, dramatic, and choreographic works, pantomimes, and motion pictures and other audiovisual works, to perform the copyrighted work publicly; (5) in the case of literary, musical, dramatic, and choreographic works, pantomimes, and pictorial, graphic, or sculptural works, including the individual images of a motion picture or other audiovisual work, to display the copyrighted work publicly; and (6) in the case of sound recordings, to perform the copyrighted work publicly by means of a digital audio transmission.”

Independent licensing has also been prominent in legal cases and consent decrees involving copyright collectives. However, the justification differs from patent pools; in particular, requiring independent licensing appears to be more about facilitating competition within the collective than in ensuring that outside composers and publishers are not foreclosed from the market (since collectives tend to be more inclusive than patent pools). Consistent with this, Parisi and Depoorter (2002) note that independent licensing may be useful for disciplining the collective: if the works included are complements, individual members will set a higher price than implicit in the blanket license and therefore will not improve welfare; however, if the IP are substitutes, the individual members will offer a lower price, thus disciplining the collective.

**4.3. Competition Concern #3: Overlapping Ownership and Softening of Competition.** The third and final antitrust issue concerns pools or collectives that admit members with a financial stake in related goods outside the pool. The situation is similar to the case of vertical integration in that members are integrated into the downstream market, but in this case, the downstream products in which they are integrated do not rely on IP from the pool or collective. In particular, suppose a pool combines two components that support good  $Z$  using a particular standard as before, but another downstream good  $W$  (shown in Figure 4) competes with  $Z$  in the relevant market.  $W$  requires neither  $X_1$  nor  $X_2$  in production. Suppose also that  $F_1$  owns patents in both  $X_1$  and  $W$ . This situation of *overlapping ownership* occurs when the downstream product that requires a license on IP from the pool is a substitute for an outside product owned by pool members.<sup>31</sup>

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<sup>31</sup>That is, the set of owners of downstream products relying on the pooled IP overlaps with the set of owners of outside competing products. This type of structure is common. In the DVD 6C patent pool, for example, the members of the pool are primarily major semiconductor firms (Toshiba, JVC, Panasonic, Samsung, Time Warner, Mitsubishi, Sharp, Sanyo, Hitachi); the product  $Z$  are DVD players and discs, and examples of the  $W$  technologies that compete (or competed) in the same relevant market as DVDs and for which DVD pool members are (or were)

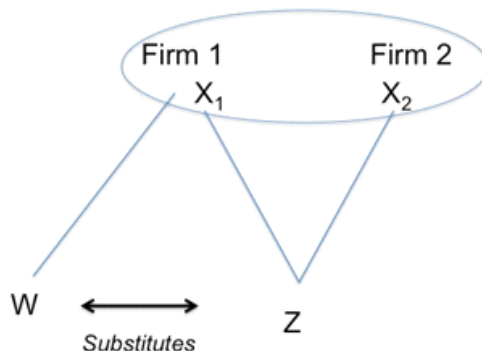


FIGURE 4. Overlapping ownership

Consequently,  $F_1$  and  $F_2$ , while having a vertical relationship with respect to their inputs  $X_1$  and  $X_2$ , are horizontally related through their respective ownership stakes in  $W$  and (indirectly through  $X_2$ ) in  $Z$ .<sup>32</sup> Therefore, a natural antitrust question is: Can patentees soften market competition by combining their IP in the presence of overlapping ownership? Gallini (2011a,b) provides some insights into this question, summarized below and compared to a parallel situation for copyright collectives.

Although many pools comprise large companies that compete with each other, antitrust authorities have permitted these agreements. The rationale given has been that the pooled patents are complementary and therefore members would not be competitors in these goods in the absence of the pool. But, as argued above, overlapping ownership can make the patentees horizontally as well as vertically related. Nevertheless, it is straightforward to show that a pool increases competition in the relevant market, resulting in lower input and downstream prices.<sup>33</sup>

involved through ownership or partnership include VHS (JVC and Panasonic), Blu-ray (Panasonic, Samsung, Toshiba) and Netflix (Samsung).

<sup>32</sup>For example, think of  $F_1$  as selling its input  $X_1$  to  $F_2$ , which then combines  $X_1$  and  $X_2$  to make  $Z$ ; hence,  $F_1$  and  $F_2$ , in selling  $W$  and  $Z$ , respectively, are horizontal competitors.

<sup>33</sup>In the absence of a pool, the owner of  $W$  and  $X_1$  takes into account the impact of an increase in the price of  $W$  on the demand for  $Z$  and its input  $X_1$ , thereby exerting upward pressure on the price of  $W$ . Since a pool internalizes the externality between complements, it exerts downward pressure on the pooled inputs and, if  $W$  and  $Z$  are strategic complements, this reduction in the price of  $Z$  will reduce the marginal profit of raising the price of  $W$ .

While a good outcome for pools, it may not pay  $F_1$  to join the pool if  $W$  and  $Z$  are strong substitutes. The patentee, although gaining from collaborations with other patentees, could lose too much in its outside ( $W$ ) market from joining the pool. In this case, an antitrust policy that permits pool members to coordinate prices on all their goods, including those outside of the pool, can be welfare enhancing in some cases. So, even when members of a pool are horizontally related, patent pools with complementary inputs can be socially beneficial. Are there parallel agreements in copyrights with overlapping ownership? If so, are the efficiency implications the same? To examine these questions I depart from analysis of music collectives to consider a different type of copyright collective: open source (OS) associations.<sup>34</sup>

For OS software collaborations, overlapping ownership exists when a firm is engaged in the production of both proprietary and OS software, the latter in cooperation with other developers. This *mixed sourcing* is common in the software industry (Casadesus-Masanell and Llanes (2010)), where the proprietary and OS software may be substitutes. For example,  $X_1$  might be code that is combined with other modules to develop new software for increasing interoperability between Microsoft and Linux operating systems; whereas the “outside product”  $W$  may be software with similar functions that works primarily on the Microsoft system.

Contributing software essential to an OS project may erode market share of the proprietary software. It can also be a commitment strategy when consumers must incur set-up or switching costs to adopt the firm’s hardware or complementary operating system. Related to this, Farrell-Gallini (1988) show that if consumers must incur set-up costs when adopting a new

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<sup>34</sup>I thank Cristina Rossi for pointing out this application to copyrights. OS associations can be interpreted as copyright collectives since, as Lévêque and Ménière (2007) observe, they may need to assert their copyrights in order to enforce their open source General Public Licenses.

product (period 1) and the patentee cannot commit *not* to gouge consumers in the future (on complementary software or improvements) after adoption costs are sunk (period 2), then prices in the two periods may not be a sufficient instrument for extracting maximum consumer surplus. Without commitment, consumers will anticipate that they will receive zero surplus in the second period and so will not be willing to bear adoption costs unless the first-period price fully compensates. If prices are constrained to be non-negative, it may not be possible to assuage consumers' concerns for large set-up costs in which case consumption would fall below the efficient level under commitment. Therefore, it may pay the firm to give away its product with a lag in order to assure consumers of lower second-period prices, thereby allowing it to extract full surplus through the first-period price.

To see this more clearly, consider the market situation in Figure 5. Consumers are assumed to be heterogeneous, represented by the downward sloping demand curve. If the monopolist cannot commit to future prices, then it faces demands in periods 1 and 2 that differ by the set-up costs  $F$  (the high and low demands in Figure 5). Under commitment, the set-up costs would be spread between periods, attracting the profit-maximizing number of consumers  $n^*$  in both periods (the middle demand curve in Figure 5). Since in the absence of commitment, consumers anticipate zero surplus in period 2, the monopolist must set  $p_1 = 0$  and  $p_2 = F$  (assuming nonnegative prices). Alternatively, it can commit to a low future price by giving away the second period product for free, or open source its product. For small set-up costs, the two strategies generate the same profits but for  $F$  sufficient large (as shown in Figure 5), the latter (OS) strategy dominates and yields profits equal to the full surplus  $v(n^*)(1 + \delta) - F$ .<sup>35</sup>

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<sup>35</sup>If an enforceable licensing contract with a per period royalty  $r = v(n^*) - F/(1 + \delta)$  is possible, then the monopolist could also achieve first-best profits by committing to low future prices through licensing.



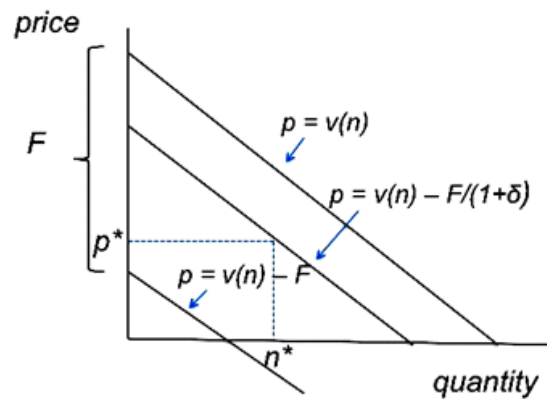


FIGURE 5. Monopoly pricing with and without commitment

The above discussion shows that open source can be a commitment mechanism not to raise prices after consumers bear the costs of adoption. If a firm with proprietary software sells in multiple periods or, alternatively, sells complementary products (hardware and software) and consumers must incur high set-up costs, the monopolist is better off to give away the technology with a lag or, equivalently, contribute its complementary software to an OS project. Giving its software away, free of charge, can be more profitable than setting a low first-period price (or price on the hardware) and high prices later. The monopolist, in committing to future prices, gains since additional consumers are willing to purchase the product.

The above analysis concerns only the patentee's decision to convert its proprietary software to open source. If the example is expanded to allow overlapping ownership in which the innovator has *both* proprietary and open software that compete in the relevant market, the efficiency results on patent pools apply: the prices of proprietary software fall due to the formation of the OS pool, thus reducing commercial software prices and triggering an increase in the demand for complementary products (computer hardware in this example).

Again, the nature of copyrights and patents give rise to different motivations for sharing IP, but the antitrust conclusions appear to be similar: pools or collectives with complementary products or large transaction cost savings are generally welfare-enhancing even when overlapping ownership creates a horizontal relationship among members of the agreement. If, however, the horizontal relationship arose directly from combining competing downstream products  $W$  and  $Z$  or if the owner of proprietary  $W$  integrated into an open source product in order to foreclose rivals from the market, then in the absence of any efficiency benefits, the anti-competitive effects would be worrisome, as in the case of any horizontal merger or attempts to “raise rivals’ costs”.<sup>36</sup>

## 5. CONCLUSIONS

This paper attempts to provide insights into the relationship between patent pools and copyright collectives, accounting for their differences in purpose, the nature of the IP, and the markets in which they operate. The structure and motivation of patent pools and copyright collectives are contrasted, along with their welfare and antitrust implications.

The agreements analyzed are patent pools with complementary inputs and copyright collectives with competing works. This is a notable distinction in their fundamental design, the latter justified by large savings in transaction costs. Three environments with potential anticompetitive effects are examined for both types of agreements. In the first, a subset of members is assumed to be vertically integrated into the downstream market that relies

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<sup>36</sup>For example, IBM’s commercial WebSphere competes with open source JBoss in the application server market. In order to compete more aggressively with JBoss, IBM bought and open sourced Gluecode, a strong competitor of JBoss. The CEO of JBoss noted that “Gluecode could hurt sales of IBM’S WebSphere as much as it hurts JBoss...” (“Open Source Smack-Down”, Forbes.com, June 15, 2005). As in other contexts where “raising rivals’ costs” strategies are used, overlapping ownership can raise antitrust concerns if it leads to welfare-reducing foreclosure of stand-alone open source software companies. See Casadesus-Masanell and Llanes (2010) for analysis of this organizational form, which they refer to as mixed sourcing.

on the pool or collective; in the second, competition is introduced in the upstream market in which the IP operates; the third, similar to the first, considers members that are integrated into the downstream market but in products that do not rely on the pool's or collective's IP.

Although the framework required for examining the antitrust concerns differ markedly between patent pools and collectives, the welfare consequences and therefore the recommended antitrust treatment is surprisingly uniform. First, pools and collectives that are welfare-enhancing in the absence of vertical integration are likely to continue to be efficient if some members become vertically integrated. Second, the potential for the agreements to foreclose competitors in the upstream market is mitigated if members retain the right to license separately outside of the pool or collective. Third, pools and collectives are welfare enhancing when facing competition in the downstream market even if some members have an ownership stake in those competing products. It is important to note, however, that although the pool is efficient, its social value declines in the degree of overlap.

This paper can be extended in several directions. Most importantly would be an analysis, theoretical and empirical, of the impact that the Internet and new technologies such as digital rights management have on the value of patent pools and copyright collectives.<sup>37</sup> If these technologies are effective in lowering the cost of licensing, monitoring and enforcement, and facilitating the administration of copyrights, then more decentralized alternatives to collective administration may evolve. But if new technologies have facilitated the reproduction of IP, then collective administration of copyrights could become more important. That is, the impact of new technologies on the future relevance of collective societies is ambiguous if both monitoring

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<sup>37</sup>See Besen and Kirby (1989), Kretshmer, Klinis and Wallis (2001), Watt (2004), Katz (2006), and Handke and Towse (2007) for thoughtful discussions on the impact of new technologies on the effectiveness of collective rights societies.

and piracy become easier. This contrasts with patent pools, which appear to be increasingly important instruments for supporting standards especially in high technology innovations. One proposal, advanced in the literature, that deserves further attention, calls for a separation of the licensing of music from monitoring and enforcement with the former under the control of artists and the latter centralized under collective management (Hollander (1984); Besen, Kirby, Salop (1992)). More generally, as Katz (2006) urges, “any theory based on transaction costs should be revisited when new technology dramatically changes those costs.”

Given the ambiguity in results, improved understanding of these issues requires extensive data and empirical analysis. Png (2006) wisely encourages that particular attention be given to improving estimation of the cost-reducing benefits of centralized copyright administration, the *raison d’être* of collective organizations. Finally, our understanding of general principles involving cooperative agreements for combining IP could improve with cross-fertilization between the two economic literatures on patents and copyrights, which effectively have emerged as parallel and independent streams.

A final note regards the role of antitrust policy. As presented in this paper, antitrust is complementary to IP policy in that its purpose is not to reverse protection awarded by the latter, but to ensure that the IP owners do not overextend their rights beyond the award granted. That is, the primary role of antitrust examined in this paper with respect to cooperative agreements is to ensure that these agreements are – as suggested by Shapiro – a genuine attempt at “cutting through the [IP] thicket” rather than simply facilitating socially wasteful “strong-arm tactics by dominant firms.” To the extent that competition policy is successful at screening welfare-reducing

agreements, then those collective organizations that are permitted can potentially overcome some of the social costs arising from an increasingly dense IP thicket.

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