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Intellectual Property and Competition

Herbert Hovenkamp¹

I. Introduction: The Political Economy of Intellectual Property Law

A legal system that relies on private property rights to promote economic development and progress must consider that profits can come from two different sources. First, both competition under constant technology and innovation promote economic growth by granting some returns to the successful developer and some to society. An effective innovation policy will ensure developer returns adequate to compensate for its investment and risk. Competition and innovation both increase output. Second, however, profits can also come from practices that reduce output, in some cases by reducing quantity, or in others by reducing innovation.

IP rights (IPRs) and competition policy were once regarded as being in conflict. IPRs create monopoly, which was thought to be inimical to competition. By contrast, competition policy favors free entry and asset mobility, which IPRs limit in order to create incentives. Today our view of this relationship is more complex. First, most IPRs are insufficient to produce durable monopoly, although they do facilitate product differentiation. Second, we tend to see IP rules as creating a property rights system in which competition exists for the property rights themselves. Firms compete by innovating and appropriating whatever payoffs they can capture, including IPRs. Third, and most importantly, we define competition in terms of output or welfare rather than simple rivalry. A market structure or practice that increases output is more "competitive" than a lower output alternative, even though the amount of immediate rivalry among firms is less. For example, output in the cellular phone market is much higher because hardware, software, and telecommunications links are all networked by cooperative agreements and standard setting.

Under conventional neoclassical assumptions, both innovation and competition increase output, whether measured by the number of units or their quality. At the same time, however, excessive IP protection limits competition by reducing asset mobility further than necessary to facilitate innovation. The policy trick is to find the "sweet spot" where the aggregate effects of IP competition and exclusion are optimized.

It is firmly established that innovation contributes significantly more to economic growth than does competition under constant technology. (Solow, 1957; Bohannon and Hovenkamp, 2012; Grossman and Helpman, 1994; Aghion and Howitt, 1998). While the theoretical and empirical literature employ different and sometimes inconsistent models, all agree on this basic conclusion (Helpman, 2004; Schumpeter, 1943; Solow, 1956; Romer, 1990; Aghion and Howitt, 2007). In addition, the "debate" between Joseph Schumpeter's (1943) position that monopoly is more favorable to innovation and Kenneth Arrow's (1962) position that competition is more favorable is somewhat settled, mainly in Arrow's favor. A broad consensus today is that the market structure/innovation curve is a lopsided, inverted "U." (Scott and Scott, 2014; Arai, 2013; Aghion, et al., 2005). Neither monopoly nor atomistic competition is especially conducive to innovation. Rather, most innovation occurs in moderately competitive, product differentiated

¹James G. Dinan University Professor, Penn Law and Wharton Business, University of Pennsylvania. Thanks to Peter S. Menell and Erik Hovenkamp for comments..

markets. Some more recent literature tilts the inverted U more to the competitive side, concluding that on balance more competition yields more innovation (Hashmi, 2011; Schmitz and Holmes, 2010; see Menell and Scotchmer, 2007, pp., 1526-1530).

Although the relationship between innovation and economic growth is clear, the relationship between innovation rates and particular IPR systems is not. One problem is that while IP systems may encourage innovation, they also act as impediments to the diffusion or cumulation of ideas through the economy (Menell & Scotchmer, 2007; Moser, 2013). The literature on the relationship between the strength of patent systems and the rate of economic growth is at best inconclusive, with most of it suggesting little or no correlation. (Gould & Gruben, 1996; Park & Ginarte, 1997; Belleflamme, 2006).² Relatively little literature exists that correlates innovation or growth rates with the existence or strength of any specific patent doctrine, although there is a robust "meta" empirical literature on the behavior of courts or judges with respect to certain doctrines (Rantanen, 2013 (nonobviousness); Mojibi, 2010 (nonobviousness); Anderson & Menell, 2013 (claim construction); Seaman, 2012 (willful infringement); Crouch, 2010 (written description)).

Further, the innovation effect of IPRs is market specific, just as is true of other market characteristics such as economies of scale, product differentiation, ease of entry, or nature of information flow. The competitive impact of IPRs also varies with differences in industry structure and the market position of the rights owners. For example, for a dominant firm additional IP protection may serve to entrench or prolong its monopoly position, while the same right held by a small rival might serve to destabilize the dominant firm and make the industry more competitive. Therefore, who gets a particular IPR can be important for competition policy.

That IPR performance varies from one market to another seems beyond dispute. For example, chemical and pharmaceutical innovations tend to benefit from a robust patent system with protection of fairly long duration. By contrast, in some markets for information technologies the patent system is much less valuable and may even produce greater harms than benefits. The same thing is true of copyright. For example, many books have long economic lives and can benefit from a lengthy term of protection, while more journalistic writing and software does not. The optimal term may also vary with the degree of market competitiveness, with greater competition conducive to shorter terms (Debrock, 1985). Further, a tradeoff exists between duration and breadth: a patent with a shorter life but broader protection may provide the same incentives as one with longer life but narrower protection. (Gilbert & Shapiro, 1990; Merces & Nelson, 1990; Khoury, 2010).

² One study finds a correlation between the existence of a patent system and total factor production (TFP) growth, but also concludes that there is an *inverse* correlation between the strength of patent rights and TFP growth. (Chang, 2014). The authors conclude that while patent rights lead to more patents, "our findings also suggest that patent rights slow the diffusion of new innovations throughout the economy, as we find that the effect of patents on TFP growth is weaker in countries with stronger patent rights. Our results suggest that finding the optimum level of patent protections requires the consideration of these two offsetting effects." *See also* Falvey, 2006 (at least in middle income countries, IPRs cause more harm by restricting the dissemination of technology than they contribute to economic growth). For an experimental test, see Torrance and Tomlinson, 2011, which find an inverse relationship between innovation and patenting.

Unfortunately, our knowledge about market diversity has had little impact on the creation or application of intellectual property law, which is not particularly sensitive to issues of market structure, information transmittal, ease of copying, and other barriers to market entry or mobility. This is in very sharp contrast to antitrust law, which is acutely sensitive to market differences, perhaps overly so. For example, questions concerning the legality of a merger or allegedly monopolistic practice can be answered only after a detailed expert inquiry into the markets at issue and the rationally expected results of certain practices. By contrast, questions of patent validity, scope and infringement are largely indifferent to the markets in which these queries occur. Likewise, the legislated term of IPR protections is largely invariant to the particular market in which the protected product is sold.

Because our information about the relationship between innovation and specific IP rules is so inadequate, opinions often go to extremes. Some believe that the patent or other IP systems are worthless or even harmful because they hinder rather than promote innovation (e.g., Boldrin & Levine, 2008), while others defend IPRs enthusiastically (e.g., Epstein, 2010; Mossoff, 2013). Even within the United States Supreme Court these views have gyrated from periods when the Court was extremely tolerant of patenting and patent practices, to periods in which it struck down nearly every patent it encountered and held exaggerated views about the anticompetitive effects of patent practices (Hovenkamp, 2015d).

Further, IPRs are hardly the only inducement to innovation, and their relative importance varies from one market to another. When firm managers are questioned, a plurality believe that the biggest inducement is first mover advantages, while patent protection is at best secondary. (Bohannon and Hovenkamp, 2012, pp. 100–102).³ In some markets, such as digital content, copying is so cheap and quick that little innovation would occur but for IP protection. Innovations in processes that are not readily observable or reverse engineered might be better protected by simple first mover advantages or trade secrets. Patent protection is secondary and may even be counterproductive to the extent that patenting requires disclosure. Some markets exhibit high rates of innovation without any intellectual property protection at all (Raustiala & Sprigman, 2012).

The lack of empirical validation for specific IP rules is troublesome, because some rules may be far from optimal. A good example is the way that patent law's requirement of nonobvious subject matter (35 U.S.C. §103) is administered. Because patent infringement does not require copying or even knowledge of another's patent, it is crucial that the nonobviousness requirement be interpreted strictly, keeping patent issuance within proper bounds: we do not want to give patents on things that independent entrepreneurs would develop on their own. An empirically-based inquiry into nonobviousness would consider the extent to which new technology results from copying rather than independent invention, a forward looking inquiry. Whether one can infer nonobviousness from commercial success is debatable, but doubtful (Merges, 1988). But in any event that is not how nonobviousness subject matter is actually determined. Patent examiners or courts deciding infringement cases assess nonobviousness, or "inventive step," by looking backward through prior art. By contrast, entrepreneurs think forward, considering new things to try from their current position. The likely result is that far too many patents are granted on things that other businesses develop on their own in the ordinary course of

³ On the use of alternative funding mechanisms, such as prizes or direct government finance of research, see Menell and Scotchmer, 2007, at 1530-1534.

competition. The recent experience with non-practicing patent holders in information technology markets suggests as much. Most of the defendants in those cases are independent developers rather than copyists.

The statutory systems of competition law and IPRs differ significantly from one another. Most of the United States antitrust laws are highly general and do not reflect specific "deals" between legislators and particular special interests. The Sherman and Clayton Acts simply condemn practices that "restrain trade," "monopolize," or have effects that "may be substantially to lessen competition."⁴ As a result, assessment of specific practices is left largely to judges. In addition, after more than thirty years of redefinition and retrenchment, antitrust policy in the United States has become much more focused on promoting consumer welfare, which it does by facilitating structures or practices that maximize output, measured by quantity or quality (Bohannon & Hovenkamp, 2012).

By contrast, most IPR systems are detailed codes that reflect considerable producer involvement but relatively little input from consumers. The 1976 Copyright Act currently in force, together with the Copyright Term Extension Act, are examples (Bohannon, 2006; Patry, 1996), but the patent laws are not far behind (Merges, 2000). For example, over history Congress has repeatedly granted retroactive term extensions to both patents and copyrights (Ochoa, 2001; Hovenkamp, 2016c). Retroactive extensions do not facilitate innovation to the extent that the inventions to which they apply have already been created. They are pure rent seeking, prolonging exclusive rights and reducing output. Such extensions have come to the Supreme Court twice, 150 years apart. In *Bloomer v. McQuewan*, 1852, the Supreme Court held that retroactive patent extensions could not be applied to patented articles that had already been sold, thus creating the foundation for the modern patent "exhaustion" doctrine. (Hovenkamp, 2016b, 2016c). In *Eldred v. Ashcroft*, 2003, the Supreme Court upheld a retroactive extension of the copyright term.

This history is unsettling because consumer welfare should be the ultimate goal of innovation policy just as it is of traditional competition policy. Consumers profit from lower prices and higher innovation rates, giving them the correct set of incentives to determine optimal IP rules. By contrast, producer incentives are more mixed. While producers profit from lower costs and increased innovation, they also profit from increased protection for their own IPRs or reduced protection for the innovations of rivals, whether or not these protection levels are optimal (Hovenkamp, 2014).

II. The Relationship Between the IP Policy and Antitrust Policy

A. Approaches to Market Diversity

While the antitrust laws do not explicitly require different analysis for different markets, the sparse, highly general statutes have been interpreted that way at least since the Supreme Court's *Chicago Board of Trade* decision in 1918. That decision approved an agreement that literally fixed prices for after hours trading occurring after the open market had closed. Such

⁴ 15 U.S.C. §§ 1, 2, 14, 18. One exception is the Robinson-Patman Act, which was in fact the product of a deal between retailers and Congress during the Great Depression. See 15 U.S.C. § 13. See Hovenkamp, 2015d, 225-232.

price fixing was unique to that market and, in the Court's view, promoted rather than restricted competition. The antitrust merger provision contained in the Clayton Act, 15 U.S.C. §18, condemns acquisitions whose “effect may be substantially to lessen competition or tend to create a monopoly”—a requirement that has always been held to require highly specific market analysis. For well over a half century the law of monopolization under Sherman Act § 2, 15 U.S.C. §2, has required detailed inquiries into market structure, producing different outcomes in different industries. See, e.g., *United States v. Aluminum Co. of America* 1945; *United States v. E.I. du Pont de Nemours and Co.*, 1956; *Brooke Group Ltd. v. Brown and Williamson Tobacco Corp.*, 1993.

By contrast, IP law largely disregards market differences. (For some qualifiers, see Burk and Lemley, 2003; Menell and Scotchmer, 2007). Terms of protection are largely invariant to the industry, even though rates of technological turnover vary widely. If protected technology or expression routinely becomes obsolete in the market before IPRs expire, then the Constitution's provision authorizing Congress to create patents or copyrights only for “limited times” (U.S. Const., art. I, §8, cl. 8), is largely meaningless. The premise of that provision is that the protection period should be sufficient to induce innovation, but after expiration the protected good goes into the public domain. Even requirements such as nonobvious subject matter for patents generally avoid market specific questions about how information is disseminated in a particular market.

An ideal IP policy truly concerned with innovation would need to develop more empirically driven, market specific rules, reflecting how innovation works in different situations, what amount and nature of inducement is required, and the extent of harm caused by the resulting exclusion. Offsetting this, of course, would be the higher transaction and enforcement costs involved in enforcing a system that contemplates greater market diversity.

B. *Changing Attitudes Toward Antitrust and IP*

Competition policy and IP policy should be regarded as complements. They share economic welfare as a goal, and an optimal policy includes elements of both. Public policy has been erratic, however, and the two legal systems have not always accommodated each other in socially beneficial ways. Prior to 1917 the Supreme Court approved nearly every patent practice that had been alleged to restrict competition, including toleration of product price fixing in a patent pool (*E. Bement and Sons v. Nat'l Harrow Co.*, 1902); granting a dominant firm an injunction against infringement of an externally acquired but unpracticed patent (*Cont'l Paper Bag Co. v. E. Paper Bag Co.*, 1908); and permitting tying of patented and unpatented goods (*Henry v. A.B. Dick Co.*, 1912). One important exception was *Standard Sanitary Mfg. Co. v. United States*, 1912, which condemned a product price fix covering the entire bathroom fixture industry. The price stipulation was included in a patent license for an enameling process that represented a minor component of the finished product.

A single mention of patents in the 1914 Clayton Act, 15 U.S.C. §14, provoked a dramatic change. Beginning in the 1917 *Motion Picture Patents* case, which overruled *Henry*, the Supreme Court embarked on a war against patent practices thought to be anticompetitive, in the process developing an expansive, judge made doctrine of patent “misuse,” of which more later.

Beginning in the late 1930s the Supreme Court applied increasingly harsh standards for patent issuance, eliciting Justice Robert H. Jackson's famous complaint that "the only patent that is valid is one which this Court has not been able to get its hands on." *Jungersen v. Ostby and Barton Co.*, 1949 (Jackson, J. dissenting).

Three dispersed events gradually turned the tide again. First was the 1952 Patent Act, a significant revision, which restated the patentability requirement as "nonobvious" subject matter and also limited the reach of patent misuse law (Duffy, 2007; Hovenkamp, 2015d). The second was the establishment of the Federal Circuit Court of Appeals in 1982, with a mandate to unify and strengthen patent law (Dreyfuss, 1989; Dreyfuss, 2008). The third development, which occurred more gradually and within antitrust and patent misuse law, was a doctrinal reformulation that required much more explicit proof of anticompetitive effects (Bohannon & Hovenkamp, 2012). The high point of antitrust hostility toward perceived patent abuses was 1970, when the U.S. Antitrust Division issued its "nine no nos" of patenting that were almost certain to provoke an antitrust challenge (Wilson, 1970; Hovenkamp, 2015d). Today nearly all of the "nine no nos," including such things as mandatory packaging licensing, grantback clauses, reach through royalties, and resale price maintenance, are widely regarded as competitively benign in most situations (Hovenkamp, 2015a). Antitrust courts and scholars increasingly came to believe that many post-issuance patent practices that had been condemned as "misuse" were in fact competitively harmless. This was particularly true of tying arrangements, the most frequent generator of misuse findings, as well as vertical price and nonprice restraints, package licensing, provisions that tied royalty payments to unpatented goods, and most unilateral refusals to license. (Bowman, 1973; Hovenkamp, 2018a).

One important result of significant antitrust revision is that overreaching is less likely to occur today than it was thirty years ago. By contrast, patent law has continued on an expansion course in both issuance and doctrine that until recently seemed unstoppable. Today antitrust law is in a much better position to accommodate concerns about innovation than patent law is to accommodate concerns for competition. Antitrust law's sensitivity to innovation manifests itself in several ways. One is a very broad rule that innovation itself can almost never be an antitrust violation, no matter how exclusionary, as several courts have held. See, e.g., *Allied Orthopedic Appliances, Inc. v. Tyco Health Care Grp. LP*, 2010; *In re Apple iPod iTunes Antitrust Litig.*, 2014. See also Areeda and Hovenkamp, 2009-2015, ¶776. One limited exception is situations where the cost of product changes is very small in relation to competitive harm and the changes are readily reversible. This is true mainly of software, where a minor change in code can serve to make rivals' products incompatible (Newman, 2012). Another area is the deferential treatment that the courts have afforded to settlements of IP lawsuits. For example, in *Clorox Co. v. Sterling Winthrop, Inc.*, 1997, the court approved a market division agreement settling a trademark dispute. See Hovenkamp (2015a). A third area is increasingly strict limitations on the use of antitrust to challenge anticompetitive IP infringement actions, as created by the Supreme Court in *Walker Process Equip., Inc. v. Food Mach. and Chem. Corp.*, 1965, but limited by *Dippin' Dots, Inc. v. Mosey*, 2007. (See Bohannon and Hovenkamp, 2012, pp., 290-324). Yet another is deferential treatment of technology sharing agreements under antitrust law, which rarely condemns them unless they involve explicit restraints in the product market (Hovenkamp, 2015a).

By contrast, patent case law sometimes operates as if competition were the affirmative evil to be resisted. One example is the Federal Circuit's 2014 decision in *Trebro Mfr., Inc. v. Firefly Equip., LLC* 2014. See Hovenkamp and Cotter, 2015. The court permitted a dominant firm in a concentrated market to enjoin patent infringement on unpracticed patents. The dominant firm had purchased two patents from a third party that covered an alternative technology to that in its own product. After the acquisition, it continued to use its older technology and brought an infringement suit against the defendant, a recent entrant whose technology very likely infringed the acquired patents. The Federal Circuit distinguished a line of lower court decisions which had refused injunctions to non-practicing entities, following the Supreme Court's decision in *eBay Inc. v. MercExchange, L.L.C.*, 2006 (Sichelman, 2014). In this case the patentee was actually competing in the market, even though it was not practicing the patent whose infringement was claimed. No one apparently raised an antitrust issue. Nevertheless, the court's lack of foresight did considerable harm to competition by giving dominant firms an excuse to buy up competing technologies in order to keep them out of production, thus limiting the avenues through which new entry can occur.

C. Assessing Anticompetitive Restraints: "Scope-of-the-patent" Test

Historically, competition policy presumed that an IP practice that increased the profitability of an IP right would also increase the incentive to innovate. Competition law enforcers should stand aside if the practice fell "within the scope of the patent." (Hovenkamp, 2015e). This formulation originated in the nineteenth century as a rationale for the exhaustion, or "first sale," doctrine, which held that "when the machine passes to the hands of the purchaser, it is no longer within the limits of the monopoly." *Bloomer v. McQuewan*, 1852. For example, even if a patent license limited the geographic range over which a good could be used, once the good was sold that right could no longer be enforced against the purchaser by means of a patent infringement suit. *Adams v. Burke*, 1873. Later on the Supreme Court used the "beyond the scope" formulation to describe overly broad patent claim constructions, as in *Coupe v. Royer*, 1895; or overly broad interpretations of the patent doctrine of equivalents, which extended patent coverage to things that did not literally fall within the patent's claims. See *Johnson and Johnston Assocs., Inc. v. R.E. Svce. Co., Inc.*, 2002, which concluded that a broad infringement claim under doctrine of equivalents was an attempt to extend patent beyond its rightful scope. (See also Sarnoff, 2005.) Beginning in the 1930s, the formulation was also employed in patent "misuse" cases, particularly those involving the tying of unpatented goods. The tie was said to extend the patent's power beyond its proper scope by bringing the unpatented tied product within the patent monopoly. For example, in *Carbice Corp. of Am. v. Am. Patents Dev. Corp.*, 1931, the Supreme Court held that a patentee's tie of unpatentable dry ice to its patented ice box was an attempt to control "unpatented material" and thus "beyond the scope of the patentee's monopoly."

The scope-of-the-patent formulation was also used defensively, however, to exonerate practices challenged as anticompetitive but that were found to be within the patent's scope. For example, in 1926 the Supreme Court upheld product price fixing contained in patent licenses on the theory that setting the product price was the patentee's right, and the licensee agreement did no more than retain that right, while transferring the right to produce to the licensee. (*United States v. General Electric Co.*, 1926). In the 1970s Ward Bowman's important book on patent and antitrust law envisioned the patent as a walled garden protecting everything within its scope, but not necessarily activities that spilled outside. (Bowman, 1973). In its decision in *United*

States v. Line Material Co., 1948, however, the majority condemned a product price fix in a cross-license, over the dissent of three Justices who objected that the price fix was within the scope of the patent. The dissenters in the Supreme Court's 2013 *Actavis* decision would have exonerated a settlement agreement in which a patentee paid an accused infringer a large sum to delay its entry into production, *provided* that the permitted entry date was prior to the expiry of the patent. In that case, the settlement agreement would be no more exclusionary than a judicial determination of validity and infringement; thus the agreement fell within the scope of the patent. *FTC v. Actavis, Inc., 2013*. See Edlin, et al, 2015.

Pay-for-delay settlements came into existence with the passage of the Hatch-Waxman Act, which rewards a generic firm for being the first to challenge a pioneer's patent or entering upon that patent's expiry. Under the Act, no subsequent generic can enter the market until 180 days after the first generic to file an Abbreviated New Drug Application (ANDA) actually starts producing. Prior to generic production the patent is virtually immune from challenge by other potential competitors, because they have no right to produce in any event. The situation gives the patentee and the generic infringement defendant a strong incentive to share the patent monopoly, thus largely eliminating adversity between them. Under the "scope-of-the-patent" test the equilibrium duration of such an agreement is the remaining term of the patent, assuming that the antitrust laws permit such an agreement (Edlin, et al., 2014; Hovenkamp, 2015e). That is, the joint-maximizing agreement for the settling parties would share the returns permitted by the patent for its full period.

But the *Actavis* majority rejected a scope-of-the-patent approach, perhaps heralding an important change in antitrust analysis of patent practices. If patent rights are presumed to be valid, valuable, and clearly defined, then the scope-of-the-patent formulation functions much like similar scope formulations might do for, say, real property. But if patents are of questionable validity, dubious value, or ambiguous scope, then the scope-of-the-patent formulation can permit significant anticompetitive overreaching. This issue was highlighted in *Actavis* because the legislative framework largely immunized suspiciously weak patents from challenge while the pay-for-delay agreement was pending. Further, because the owner of a robust patent would not pay much more than avoided litigation costs in order to enforce its rights, the high pay-for-delay payment (often several hundred million dollars) is a strong signal that the patent is invalid or, in a few cases, not infringed (Edlin, et al., 2013; Edlin, et al., 2014). For example, a landowner attempting to exclude a trespasser would not pay the trespasser a large sum of money to stay off her land unless she had serious doubts about the validity of her legal claim. If her title were good she could exclude the trespasser by paying nothing more than litigation costs.

In other cases, the scope-of-the-patent formulation fails, not because the patents in question are invalid, but because their value is very low in relation to the restraints in question. Licenses that include product price fixing are a good illustration. Even for relatively sound patents, license fees range from .5 to 6 percent of sales, with rates below 3 percent being the norm. The rates on individual patents can be much lower in patent intensive technologies such as computers and telecommunications. Further, these rates are for licensed patents, and only a small percentage of patents are ever licensed. By contrast, the markups of successful cartels often run in the range of 10 to 50 percent (Connor, 2014). If the firms in an industry cross license their patents and also fix the product price, the agreement as measured by a scope-of-the-patent test attributes the value of the entire cartel markup to the patents.

Justice Breyer's majority opinion in *Actavis* held that courts evaluating such settlements need not address questions of patent validity or infringement. That proposition is consistent with long-standing reluctance by federal judges to review the IP merits when considering competition-based challenges to settlements, except for obvious cases of patents that are almost certainly invalid or not infringed. Most of those cases go on to uphold the settlement, however, while the *Actavis* decision did not.

More importantly, as *Actavis* recognized, antitrust's economic approach is designed to create appropriate incentives at the point of decision. The relevant question is not the *ex post* one whether the patent was valid and infringed, but rather the *ex ante* question of what the parties' expectations were at the time the settlement was entered. By settling, the parties have already implicitly agreed that getting a judicial determination of patent validity and infringement is not worth the cost and attendant risk of a judicial determination. As a result, it makes little sense to insist on that same query before passing judgment on the settlement (Edlin, et al., 2015).

Of course, most settlements raise no competition issues because the settlements themselves tend to increase rather than decrease output. The most common settlement of an IP infringement dispute is a production license under which the defendant pays the plaintiff for the right to produce. Such a license is likely to increase rather than decrease output, but in any event production licenses are explicitly authorized by §261 of the Patent Act. They are legal whether or not they are in settlement of litigation. The more problematic settlements are those that fix product prices, divide product markets (as in *Actavis*), or in some cases that involve an agreement among the settlors not to license to or otherwise deal with third parties, such as the Supreme Court condemned in *United States v. Singer Mfg. Co.*, 1963.

Finally, one thing that makes an *Actavis* style pay-for-delay settlement unusual is that it does not involve a license at all, but at most an agreement to license at some future date. That is why Justice Breyer's opinion for the Court observed that, while the Patent Act explicitly permits licensing, the agreement providing for delayed entry was not authorized by the Patent Act. Indeed, an equilibrium agreement under the scope-of-the-patent test advocated by the dissenters would *never* be a license: for the entire remaining duration of the patent the generic would not produce. Once the patent expires the generic is free to produce without a license. Until actual production under a license occurs, the settlement is nothing more than a naked market division agreement. Even so, *Actavis* held that the agreement in question should be addressed under antitrust's rule of reason, which requires proof of market power and anticompetitive effects. It also held, however, that both power and harmful effects could be inferred from the large payment itself.⁵

III. IP and Antitrust: Specific Issues and Applications

Prior to patent issuance the patent process operates under intensive government supervision and control. To be sure, improper conduct in patent prosecution is not rare, but the patent system itself has tools for policing it. Further, riding herd on the procedures and rules of other federal agencies is not antitrust's purpose. Even if we believe that the existing system

⁵ Reverse payments in the context of adjudication before the Patent Trial and Appeal Board (PTAB) can raise analogous issues. See Hovenkamp and Lemus, 2016).

issues too many patents, that too many of these are worthless, or that the process has other flaws, these are virtually never antitrust problems. This position is mandated by the ordinary antitrust rules of implied immunity, which limit or remove antitrust involvement from activities that are actively regulated by other federal agencies (Areeda & Hovenkamp, 2009-2015).

Once a patent is issued, however, the situation is much different. Patents are largely treated as property rights requiring little government supervision, other than the USPTO's power to re-examine, collect renewal fees, and a few other housekeeping matters (Hovenkamp, 2015c). Because issued patents are largely subject to private control, antitrust policy becomes relevant. One important factor is whether the practice in question is expressly authorized by the Patent Act. Under the rules of express immunity, a practice that is compelled or authorized by a federal statute cannot be an antitrust violation, provided that the practice stays within the expressly authorized boundaries.

After considering how market power should be assessed in IP-intensive markets, this section briefly addresses specific intellectual property practices that might also be challenged as antitrust violations. All are post-issuance practices and most of them are either not authorized by the Patent Act itself, or else they fall outside the scope of the authorization. As a result, antitrust analysis is appropriate. Of course, this does not mean that they are unlawful. Nor does it entail that the presence of an IP right or license is irrelevant (Cotter, 2015).

A. *Assessing Market Power in IP Intensive Markets*

No anticompetitive practice can succeed unless its participants have significant market power, which is the power profitably to raise prices above cost by reducing output. This requirement applies both to anticompetitive exclusion and anticompetitive collusion. To be sure, certain practices such as price-fixing are said to be unlawful "per se," which means that proof of illegality does not require a showing of market power. This is not because market power is irrelevant, however. To the contrary, naked practices such as price fixing, which produce no efficiency gains to the participants, are profitable only on the premise that power exists. As a result, proper identification of the practice eliminates the need to assess market power separately (Areeda & Hovenkamp, 2009-2015).

In 2006 the Supreme Court overruled a half-century old presumption that a patent conferred sufficient market power on its owner to make certain anticompetitive practices such as tying unlawful. *Illinois Tool Works, Inc. v. Independent Ink, Inc.*, 2006, overruling *International Salt Co. v. United States*, 1947. In *United States v. Loew's, Inc.*, 1962, the Supreme Court had also extended the presumption to copyrights, and a few lower courts had applied it to trademarks. E.g., *Siegel v. Chicken Delight, Inc.*, 1971. Most courts limited the presumption to tying cases, but where it applied the challenger needed to show only that the challenged restraint involved an IPR-protected product, and the requisite market power would then be presumed. All these decisions are now overruled.

The end of the power presumption hardly means that IPRs are irrelevant to inquiries about market power. Today, they are properly regarded as an important factor in establishing power (Areeda & Hovenkamp, 2009-2015). A few very powerful patents and some software copyrights may have so much exclusionary power that they give their owners dominant market positions. One likely historical example is Microsoft's Windows operating system, which is

protected from duplication by copyright and some patents. *United States v. Microsoft Corp., 1999 and 2001*. Other good historical examples are the patents that protected Polaroid's self-developing camera and film system, which Kodak tried in vain to invent around (Fierstein, 2015), and the array of patents that Xerox acquired from outside inventors that led to its long-held dominance of plain paper copying technology. *SCM Corp. v. Xerox Corp., 1981*.

Some aggregations of patents can become so essential to operation that they give significant market power to their owners, at least when the aggregation is owned by a single firm. Of course, aggregations of essential patents are often owned by pools in which a large number of firms have nonexclusive rights. Good examples are MPEG-LA, a patent pool and standards association whose members control standards for digital video technology; and 3GPP, whose members control the technology for 3G and 4G wireless telecommunications. Once a particular patent in such a pool is declared "standards essential," it may be necessary for any firm wishing to compete in that technology to purchase a license. That obligation can confer significant market power, limited by the fact that standards-essential patents, or SEPS, are also typically subject to FRAND ("fair, reasonable, and non-discriminatory") licensing obligations, which are generally interpreted to require licensing to willing participants at fair and nondiscriminatory rates (Contreras, 2015).

So far there have been few antitrust cases challenging the creation and enforcement of SEPs or FRAND obligations, and these have been largely unsuccessful. For example, *Golden Bridge Technology, Inc. v. Motorola, Inc., 2008*, rejected the antitrust claim of an inventor whose technology was rejected by a standard setting organization (SSO) in favor of alternative technologies. Legal control of SEPs lies largely with patent law, contract law or the court's general equity powers. In *Apple, Inc. v. Motorola, Inc., 2014*, the court held that the owner of a SEP could not obtain an injunction against a user; and in *Qualcomm, Inc. v. Broadcom Corp., 2008*, the court applied the judge made doctrine of estoppel against one who reneged on its promise to subject its patents to a FRAND commitment. At this writing Qualcomm is facing separate lawsuits brought by the Federal Trade Commission and Apple, claiming that Qualcomm is tying SEPs to devices that it sells, or licensing only on the condition that its patents be used exclusively with Qualcomm devices. (See E. Hovenkamp, 2018).

IPRs of all forms can limit asset mobility and facilitate product differentiation. In such markets prices will be higher than short run marginal cost, even though the market has several competing firms. The impact of IPRs in these situations depends heavily on the number of firms in a market and the strength of the IPRs in question. Suffice it to say that many products from automobiles to computers to kitchen appliances contain numerous patents but are yet sold in moderately competitive, product differentiated markets.

One technical difficulty for assessing power is that IP development often requires high fixed costs invested at the front end, and fairly low marginal costs. Whether acquisition costs are fixed or variable depends heavily on whether the IPRs in question are developed internally or licensed from outside inventors. For example, internal research often is very costly at the front end and these costs, once invested, do not vary with output. By contrast, licensing in the same technology by per unit or per dollar royalties becomes a variable cost to the licensee. Most of the technical tools used for market power measurement examine the relationship between price and marginal cost. The result can be false positives, depending on the prevalence of IPRs and the extent of fixed costs. For example, an unpatented living room chair with a patented recliner

button may sell at a small markup over cost, reflecting licensing of the button patent. At the other extreme, purely digital products such as streamed e-books, songs, or software may have distribution costs very close to zero, meaning that the licensor's entire price is markup. In that case, any measure of market power based on the relationship between price and short run marginal cost will exaggerate the seller's power.

Because digital content is so easily duplicated, the ability to sell at a substantial markup over short run cost is largely a result of IP protection. For example, one can obtain an e-book version of *Moby Dick* at a price of zero, even though it is very famous and widely read. *Moby Dick* is in the public domain, which means that no one is earning a royalty on its sales and copying is free. By contrast, the e-book version of a mediocre but recent novel will be much higher because royalties must be paid and it cannot be copied without a license from the publisher or author. For antitrust purposes, the main takeaway from these situations is that assessment of price-cost margins is rarely a useful way of assessing market power in markets for purely digital goods. Theoretically, one could address the problem by querying whether the returns to a product are significantly positive over its entire life. For example, the fact that a digital computer program sells at a high ratio of price to short run cost tells us nothing if the product becomes obsolete or loses its commercial viability before recouping development costs. As a practical matter, these measurements can be very difficult to make, particularly when the IP right in question is a copyright with an effective duration of a century (Hovenkamp, 2016a).

With some exceptions, non-patent IPRs make even smaller contributions to power than do patents. Copyrights and trademarks are easier to obtain than patents are. A few highly popular publications or computer programs are counterexamples, but generally one cannot infer significant power merely from the existence of an IPR of any kind (Areeda & Hovenkamp, 2009-2015).

B. *Horizontal Restraints: Price Fixing and Market Division*

A restraint is "horizontal" if the participants are competitors or would be competitors but for the restraint. Identification of firms as "competitors" is usually a reference to the product or service markets in which the firms operate, although it may also refer to the technologies that they develop or license. In any event, it is always important to distinguish restraints in the patent and licensing market from restraints in the product market.

An example is price-fixing. Setting a price is inherent in licensing and rarely anticompetitive. If firms cross-license, they must necessarily agree on the price that each will charge to the others, even if the price is zero. Price fixing in the product market is another matter and is highly suspicious. For example, firms with worthless patents or other IPRs might use licenses or cross-licenses as a cover for price fixing, as Judge Posner observed in his opinion in *Asahi Glass v. Pentech Pharm., Inc.*, 2003.

As noted previously, the competition problem with product price fixing actually reaches far beyond invalid patents. Even if a patent is valid and essential, it may contribute only a small amount to a product's value. As a result, the market price of the license can be far less than the cartel markup on the product. For this reason, *product* price fixes in IP licenses should be regarded as competitively harmful whether or not the IPRs in question are valid. The corollary is

that product price fixes in patent licenses can be condemned without inquiry into patent validity or infringement.

Market division agreements operate economically much like price fixing. By dividing up the market (by territory, customer, or product) a group of firms can create individual monopolies for themselves. As a cartel device, market division can be superior to price fixing if the firms have differing costs or, for other reasons, disagree about the price that a cartel should charge. One important difference between price fixing and market division is that the Patent Act expressly authorizes patentees to grant exclusive licenses to "any part" of the United States (35 U.S.C. §261), thus making most domestic territorial division agreements lawful. While the Patent Act says nothing about licenses restricted to specific customers or products, these "field of use" restrictions are treated leniently, mainly because they are viewed as organizers of production enabling the patentee to take advantage of the unique characteristics of different producers. For example, in *General Talking Pictures v. Western Elec. Co., 1938*, the Supreme Court upheld an arrangement in which the patentee reserved to itself the market for commercial use of its patented sound amplifier, while other licensees were authorized to make the amplifiers only for residential customers. The Federal Circuit Court of Appeals has held that field of use restrictions must be evaluated under antitrust's rule of reason. *B. Braun Med. v. Abbott Labs, 1997*. Field of use restrictions become more suspect, however, if they take the form of product market division among competing manufacturers. It is also worth noting that while §261 of the Patent Act authorizes an exclusive territory agreement between a patent owner and a licensee, it does not authorize agreements among the licensees themselves.

As is true of price fixing, the tolerance for market division agreements applies to the IP right, not to products that might include it. For example, suppose that Ford patents a desirable windshield wiper blade and licenses Chrysler to sell cars with the patented blade in any state except California. That would be a territorially restricted license expressly authorized by the Patent Act. Ford could very likely also authorize Chrysler to put the blade only on its pickup trucks, but not its cars. That would be a field-of-use restriction and would ordinarily be lawful under antitrust law's rule of reason. What Ford could not do, however, is agree that Chrysler would not sell any pickup trucks in California, whether or not they contain the patented blade. That would be a restraint on the product market rather than on use of the patent. Unless other factors suggesting joint development were present, that agreement would be unlawful per se under the antitrust laws.

C. Vertical Restraints involving IPRs

A restraint is purely vertical when the parties stand in a buyer-seller relationship but are not actual or potential competitors in either the product market or the licensing market. Because every licensee agreement has a buyer and seller, they are all vertical as to the IPR license itself. The more important question is the relationship of the parties in the underlying product (or service) market. Today the antitrust attitude toward vertical restraints is benign, although it was not always so (Hovenkamp, 2015d). Resale price maintenance (RPM), vertical nonprice restraints, and tying were all once unlawful per se.

Vertical restraints come in two classes, generally called "intra-brand" and "inter-brand," even though at least some of the products and services that they control are not branded at all. A restraint is said to be intra-brand if it controls distribution only of the supplier's own product. It is

interbrand if it places limits on the products of rivals. The principal intrabrand price restraint is RPM, or seller dictation of the price at which its own product can be resold. As a general rule, the fact that the price restraints are included in an IP license is irrelevant, and when the per se rule against RPM was in place it applied to patented and copyrighted goods, as well as those protected by trade secrets (Areeda & Hovenkamp, 2009-2015). Since 2007, RPM has been assessed under the rule of reason. *Leegin Creative Leather Prods., Inc. v. PSKS, Inc.*, 2007, overruling *Dr. Miles Medical Co. v. John D. Park and Sons*, 1911. Today, few instances are found to be unlawful.

Vertical nonprice restraints restrict a dealer's or retailer's sale of the supplier's own product in some way other than by setting price. The most common ones are territorial restrictions, customer restrictions, and product restrictions. There are also numerous others, such as restrictions regulating the hours that a firm is open for business, fast food franchise restrictions dictating menu items, employee uniforms, hours of operation, and the like. Section 261 of the Patent Act expressly permits territorial restrictions in patent licenses, but in any event the Supreme Court has been applying the rule of reason to purely vertical nonprice restraints since its decision in *Continental TV, Inc. v. GTE Sylvania, Inc.*, 1977. They are rarely found to be unlawful.

The Copyright Act expressly permits many nonprice restrictions, both horizontal and vertical, by making separate statutory authorizations for the right to reproduce, to prepare derivative works, to distribute, to perform, and to display, depending on the nature of the copyrighted good (17 U.S.C. §106). However, even a purely vertical licensing restriction that is not expressly authorized by the Copyright Act would probably be legal under the antitrust laws. Restrictions that attached to a copyrighted article after it is sold might not be enforceable under copyright law's statutory first sale doctrine. See *Kirtsaeng v. John Wiley and Sons, Inc.*, 2013. These are not antitrust challenges, however.

Interbrand vertical restraints, which include tying and exclusive dealing, have historically been treated with greater suspicion than intrabrand restraints, mainly because they can reduce the opportunities of rivals. Under exclusive dealing a firm, typically a retailer or other intermediary, promises to deal exclusively in the supplier's product or service. An "output contract" does the same thing except that it places the exclusivity obligation on the seller rather than the buyer. In the IP context, the exclusive license is a form of output contract, under which the IP holder promises to license only one firm for all or a particular subset of production under the license. The Patent Act expressly authorizes domestic exclusive patent licenses in 35 U.S.C. §261. The Copyright Act also authorizes exclusive licenses, although without an express territorial limitation. 17 U.S.C. §106. By contrast, § 3 of the Clayton Act makes it unlawful to sell a good or article, "whether patented or unpatented" on the condition that the buyer not deal in the goods of a competitor, provided that the agreement's effect "may be to substantially lessen competition or tend to create a monopoly...." 15 U.S.C. §14. In addition, anticompetitive exclusionary contracts are prohibited by § 1 of the Sherman Act, as well as § 2 if the firm imposing them is a monopolist. See, e.g., *United States v. Dentsply Intern., Inc.*, 2005, which condemned exclusive dealing under §2 of the Sherman Act.

The Patent Act's explicit authorization of exclusive licenses exists in some tension with the Sherman Act's prohibition of anticompetitive contracts. The tension is partly reduced by the first sale doctrine (patent exhaustion), which exhausts the patents in any good once it is sold, thus

preventing many instances of post-sale exclusivity enforced by infringement actions. However, that solution is incomplete because it is still possible to license or lease patented goods, and the first sale doctrine does not apply unless there is a sale. The best view is that the antitrust laws qualify the Patent Act in those cases where competitive harm can be shown. This is consistent with the general rule of statutory interpretation in this area, which is that the simple statutory authority to do something is not authority to do so in violation of the antitrust laws. For example, numerous state and some federal corporation acts authorize corporations to acquire the stock or assets of other corporations, but that does not mean that they can make an anticompetitive stock or asset acquisition in violation of § 7 of the Clayton Act, which condemns anticompetitive mergers. In *FTC v. Phoebe-Putney Health Sys.*, 2013, the Supreme Court held that a hospital corporation's statutory power to acquire other hospitals did not immunize an anticompetitive acquisition. Already in the 1916 antitrust decision in *United States v. American Can* the court held that it was unlawful for the defendant to purchase exclusive rights to patented can making machinery when the effect was to deny mechanization to rivals. Because American Can made no can making machinery itself, these agreements were purely vertical. In any event, after a lengthy period of hostility the courts now accept that exclusivity provisions in sale or license contracts are only infrequently anticompetitive, depending on such factors as the market share foreclosed by the agreement, ease of entry, the duration of the contracts and frequency of rebidding, and offsetting efficiencies that might justify an exclusive deal (Areeda & Hovenkamp, 2009-2015).

A tying arrangement occurs when a firm conditions the sale of one product or service (the "tying" product) on the purchaser's taking of a second product or service (the "tied" product). The courts first confronted tying arrangements in patent law cases, long before the antitrust laws were enacted (Hovenkamp, 2018a). Most ties are contractual, which means that the tie is imposed by agreement. A few are "technological," or "tech ties," which means that tying is accomplished by a technological design or feature that makes the seller's tying product incompatible with the tied products of rivals. Well known examples are Microsoft's "commingling" of the code for the Internet Explorer browser into the Windows operating system in *United States v. Microsoft Corp.*, 2001; or Apple's technological tying of its iTunes content and devices so that they worked best only when used together, in *Apple iPod iTunes Antitrust Litigation*, 2014. Another was Kodak's introduction of the Instamatic pocket camera, which was compatible only with its own film cartridges, approved in *Berkey Photo, Inc. v. Eastman Kodak Co.*, 1979. Because product design is a unilateral act, technological ties are usually treated under antitrust's monopolization provision, § 2 of the Sherman Act. By contrast, ordinary contractual ties are addressed under § 1 of the Sherman Act or § 3 of the Clayton Act, both of which require an agreement.

Today legal and scholarly opinion has shifted dramatically from the belief expressed in the mid-1900s that tying arrangements serve "hardly any purpose beyond the suppression of competition," *Standard Oil Co. of Calif. v. United States*, 1949, to the view that most ties are competitively benign or beneficial. The Patent Act expressly addresses tying arrangements in the 1988 Patent Misuse Reform Act (35 U.S.C. §271(d)(5)), which provides that patent ties are not unlawful unless the tying firm has market power in the tying product. This provision was passed in response to serious excesses in the application of misuse doctrine, which refused to enforce patent ties in markets where there was no serious risk of competitive harm. For example, Justice Brandeis's opinion in *Carbice Corp. of America v. American Patents Dev. Corp.*, 1931,

found patent misuse when the manufacturer of a patented ice box required purchasers of the box to use its own unpatentable dry ice. The market for the unmechanized boxes was competitive and dry ice was a common commodity produced in "carbonic" plants in many places.

Proving unlawful tying under the antitrust laws requires proof of tying product market power. In *Illinois Tool Works, Inc. v. Independent Ink Inc.*, 2006, the Supreme Court held that this power may not be inferred simply from the existence of a patent covering the tying product. Beyond that, the analysis depends in part on whether the tying and tied products are used in fixed or variable proportions. The tie of Microsoft's Windows computer operating system and its Internet Explorer browser is a fixed proportion tie. A buyer purchases one copy of each, although she might use them in different proportions. The most common anticompetitive rationale for such a tie is exclusion of rivals in the tied product market, which requires that the firm employing the tie have dominance in the tying market. For example, by tying Windows and Internet Explorer (initially by contract and later by technological integration of the code), Microsoft was able to dry up the market for independent web browser Netscape. However, fixed proportion ties can also be beneficial when joint production or distribution reduces costs or makes a product work better. Many fixed proportion ties are a consequence of nothing more than technological improvement, which often proceeds by making products more integrated (Hovenkamp, 2018a). For example, IBM's desktop computers were attacked as tying arrangements to the extent that they merged processors, motherboards, controllers, storage devices, and memory into a single box. Previously these products had been sold separately and connected by cables, making it possible for one person to sell the processing box and another the disc drive, etc. But the new systems were more reliable, faster, and cheaper (Fisher, 1983). In sum, overly aggressive use of the law governing technological tying can serve to limit innovation. Thus the decision in *California Computer Prods., Inc. v. IBM Corp.*, 1979, rejected the claim that innovative product integration resulting in a technological tie was simple "design manipulation" intended to ruin competing disc drive manufacturers.

Variable proportion ties can serve all of the same functions as fixed proportion ties. In addition, however, variable proportioning can operate as metering or price discrimination devices. These are usually either competitively harmless or beneficial to the extent that they increase overall output. For example, the manufacturer of a printer that uses ink cartridges might tie the printer and the cartridges, either by contract or technological design. It then drops the price of the printer, often substantially and sometimes even to zero, but charges a premium for the ink cartridges. The result of this practice is that the firm obtains a higher overall return from high intensity users who consume more ink. This is a form of second degree price discrimination which results in larger printer sales to the extent the printer price is lower, but also captures more revenue from higher intensity users. In most cases consumers as a group are better off, although high intensity consumers may be injured (Hovenkamp & Hovenkamp, 2015). While such ties may reduce welfare if the firm has an absolute monopoly in the tying product and the tie reduces output (Elhauge & Nalebuff, 2017), they clearly increase welfare in cases where the seller is not a monopolist or in collusion with the other sellers in the market. In such cases any purchaser required to pay a monopoly price will purchase from a different seller (Hovenkamp, 2018a). In virtually all litigated variable proportion tie cases the seller is not a monopolist, and often it is not even among the largest firms in the market. For example, in *Impression Products, Inc. v. Lexmark Intern., Inc.*, 2017, a variable proportion tying case that the

Supreme Court decided under the patent exhaustion doctrine, Lexmark's share of the highly competitive computer printer market was less than 5% (Hovenkamp, 2018b).

Variable proportion ties are also commonly used by franchisors, such as those in the fast food industry, where the tying product is commonly trademarked or occasionally copyrighted rather than patented. For example, the franchisor might charge a very low price or even zero for the right to a franchise, but then place an overcharge on various food products or supplies that the franchisee uses in variable proportions. As a result, the franchisor makes more money from franchisees that sell more. See, e.g., *Queen City Pizza Inc. v. Domino's Pizza Inc.*, 1998. Importantly, the profitability of these variable proportion ties does not depend on the seller's market power, but only on sufficient product differentiation or branding to make its tying product attractive. Many of the defendants in franchise tying claims have been relatively minor firms. For example, *Siegel v. Chicken Delight, Inc.*, 1971, found antitrust liability for a variable proportion franchise by a struggling, minor fast food franchisor. The market power requirement was thought to be met because the defendant's name was trademarked. As noted earlier, that legal conclusion has now been overruled.

D. Patent Pools

In a patent pool, several patent holders license their patents into a common "pool," or organization that relicenses them out to members. The pool may also license to outside manufacturers who do not own relevant patents of their own. While patent pools have existed for a long time, in recent decades their growth has been exponential, thanks largely to the rapid development of networked products sold by multiple firms. The products include telecommunications and other digital devices as well as computer and video technology.

A patent pool is a "horizontal" restraint to the extent that its participants are competitors in the product market or license competing technologies. The relationship among the parties is often more complex, however. First of all, one important value of patent pooling is to facilitate the coordinated use of complementary technologies, but firms that produce pure complements are not competitors. Another use, equally or more important in some markets, is to minimize the transaction costs of patent management. For such savings to occur the pool members can have any relationship, from competitor, to vertically related, or complementary.

Historical rationales for pooling focused on the differences between complements and substitutes (Gilbert, 2004; Santore, 2010). Pooling or cross licensing among different producers in the same industry was thought to be procompetitive if the shared patents were complements with one another, but more likely to be anticompetitive if they were substitutes (e.g., Shapiro, 2001). If a patent is a discrete unit of innovation whose validity and boundaries are easily assessed, this distinction makes sense. Complements are ordinarily used together, meaning that joining them can create social benefits. For example, if one firm owns a patent on a desirable lawn mower motor and another owns a patent on a desirable throttle, pooling will enable the two firms to produce mowers that have both improvements. By contrast, substitutes are used in the alternative rather than together. This makes price fixing a more likely explanation.

The distinction between complements and substitutes is less important, however, in a world where patents are numerous and complex, with many claims, costly to interpret, and of uncertain quality (Lerner & Tirole, 2004). In such a setting, the economics of transaction costs

and boundary enforcement dominates other explanations. That is to say, the modern patent pool in information technologies is a type of commons for which sharing with management rules is cheaper and more effective than individual appropriation and enforcement.

Patent pools for complex information technologies can contain thousands of patents. For example, the MPEG-LA pool for digital video technology controls about 5,000. See <http://www.mpegla.com/main/Pages/AboutHistory.aspx>. Subsequent to issuance, most of these patents have never been assessed for validity and scope. Even getting a legal opinion on these issues can be very costly. Many of the patents have numerous claims, often making the relationship among different patents far more complex than simple substitutes or complements. Further, the substitute/complement question often cannot be answered until one examines the device that intends to use them. For example, the licensees of the MPEG-LA pool include multiple competing makers of digital cameras and phones, but also producers of complementary products such as flash memories, video displays or projectors, film or photo editing software, and the like. Whether two patents are substitutes, complements, or simply not practiced at all can depend on the type of device that the manufacturer produces.

One illustration of these complex relationships is the *Princo* litigation in the Federal Circuit, which involved shared technology for developing rewritable digital discs. A feature that located the stylus on a rewritable disc came in both patented analog and digital versions. The two versions were substitutes in the product market, because a manufacturer would use one of them but not both. However, at least one claim of the analog version wrote on the digital patent, making the two patents legal complements as well. Regardless of their function, two patents are complements if someone cannot practice one without infringing the other. *Princo v. ITC*, 2010. See Bohannon, 2011, at 510–511. Indeed, not until after costly claim construction would we know how the patents relate to one another. Even then, claim construction reversal rates are unacceptably high. *Brief of the ABA as Amicus Curiae, Teva Pharmaceuticals USA, Inc. v. Sandoz, Inc.*, 2014.

Finally, the relationship between substitutes and complements is relevant to one additional factor: in markets where multiple technological alternatives exist, the pooling of substitutes may serve to deny access to outsiders. For example, if there are three known technological alternatives for solving a particular problem a pool that acquires the patents to all three may be in a position to exclude non-pool members from the product market.

A more robust explanation for pooling in high tech information markets comes from the theory of commons development (Bohannon & Hovenkamp, 2012). As Ronald Coase argued in *The Nature of the Firm* (Coase, 1937), the boundaries of a firm are determined by its costs of doing business. A firm makes for itself or buys from others, depending on which alternative is more profitable. When it makes something for itself its boundaries expand, and when it buys from others they contract (Hovenkamp, 2011a).

Property rights, including IPRs, provide the legal power to exclude, but they do not always make individual exclusion the best choice. The traditional property world is full of instances, ranging from shared driveways and party walls to community owned tennis courts and swimming pools, where individuals share because sharing is cheaper or more productive than exclusion. The same thing has been true for many centuries of so-called common pool resources such as fisheries, irrigation rights, or grazing rights. One hundred fishermen who own a large

lake could if they wished build fences cutting the lake into 100 pieces. But subdividing would be costly, would very likely produce many disputes, and would be devastating to the yield of a mobile species of fish (Ostrom, 1990). Patent rights in information technologies are similar. While firms are certainly entitled to own patents individually, defining and defending boundaries might be much less productive than sharing them reciprocally with others.

While patent pools created to limit boundary problems have some similarities to common pool resources, they are not identical and some differences are critical to competitive impact. Most traditional common pool resources are "rivalrous," which means that each unit taken depletes what is left. Uncontrolled sharing leads to overuse, as shown by the fate of the American Bison as well as chronic overfishing in many fishing commons. For this reason, catch or harvest limitations are essential if the commons is to operate efficiently. Indeed, a principal difficulty in commons management is making and enforcing access or harvest rules (Ostrom, 1990). By contrast, IPRs are generally nonrivalrous. An IP right such as a patent can be used many times without depleting what is left over. As a result, output restraints in the product market are more suspicious in IP commons than in traditional commons (Bohannon & Hovenkamp, 2012).

Another difference between modern information technology patent pools and traditional commons is the diversity of the participants. All those sharing rights on a common fishery or pasture are likely to be fishermen and ranchers with relatively undifferentiated businesses. By contrast, given the nature of multi-claim patents, those who practice them might be highly diverse, producing complements or unrelated technologies as much as they produce substitutes. That is clearly true of the previously described MPEG-LA pool. A complex device such as a digital video camera might practice many patents in the pool, while a simple device such as a memory chip or photo editing software employs only a few.

These differences have led to claims akin to anticompetitive tying. A firm that is required to license all of a pool's package of 5000 patents may complain that it really uses only 200 of the patents. In this case, the patents it uses are the "tying product," while the unwanted patents are the "tied product." These antitrust claims nearly always fail, for the simple reason that competition is not injured. Forcing someone to take a bigger product than he might want—such as 100 acres of land instead of a single residential lot—might present a bargaining problem. It is not anticompetitive, however, because no one is being excluded. Further, the cost of determining which of the pool's patents the complaining licensee actually practiced could be much greater than the cost of the license fee itself. As one court observed in rejecting such an antitrust claim, "[I]t is not anticompetitive for a patent pool to include numerous *potentially* blocking patents, patents which may or may not be essential but which are more efficient to license as part of the pool than to risk the expense of future litigation." *Nero AG v. MPEC LA, LLC, 2010*.

E. *Exclusionary Practices*

1. *Walker Process and Unreasonable Infringement Claims*

By their nature IPRs create a power to exclude. Asserting that right is protected by §271(d)(3) of the Patent Act as well as constitutional protections of the right of access to the courts (Areeda & Hovenkamp, 2009-2015). No protection exists, however, for "baseless" claims

having no foundation in fact or law. The Supreme Court's decision in *Walker Process Equip., Inc. v. Food Machinery and Chem. Corp.*, 1965, recognized that improper patent infringement actions could violate §2 of the Sherman Act if they excluded another firm unreasonably. As noted previously, antitrust has little or no role in policing pre-issuance patent applicant conduct. Many *Walker Process* cases, including *Walker Process* itself, involve some pre-issuance conduct. In *Walker Process* the patent applicant failed to inform the patent examiner about sales made prior to patent application that, if disclosed, would have barred the patent. See 35 U.S.C. §102(a)(1). Other cases have involved other forms of inequitable conduct before the USPTO, including failures to inform the examiner of known prior art that would have defeated patentability. *Nobelpharma AB v. Implant Innovations, Inc.*, 1997. Importantly, however, merely *obtaining* a patent improperly is not an antitrust violation. Further the patent system has numerous remedies for improper conduct before the USPTO. *Walker Process* itself involves the *post*-issuance practice of filing an infringement suit, or engaging in other enforcement activity such as a threat to sue, on a patent that the owner should reasonably have known to be invalid or unenforceable under the circumstances.

Antitrust liability for *Walker Process* violations requires not only the improper infringement action, but also a structural basis for thinking that the lawsuit either perpetuates or threatens to create a market monopoly. This makes the antitrust remedy much less readily available than the "exceptional case" remedy in §285 of the Patent Act, which authorizes a judge to award attorney's fees against a patentee who makes an improper claim or commits other litigation misconduct. The Supreme Court's decision in *Octane Fitness v. ICON Health and Fitness*, 2014, made such awards easier to obtain. At this writing it remains to be seen if this decision will have any impact on the availability of antitrust remedies. One 2014 decision did find some basis for comparison. *Tyco Healthcare Group LP v. Mutual Pharma Co., Inc.*, 2014.

As formulated, *Walker Process* reaches no more than a small portion of socially harmful infringement actions. It applies in cases where questions of validity or infringement are relatively clear and, given that, the patent holder has sued unreasonably. A far larger number of harmful infringement actions arise out of problems of "notice failure" (Menell & Scotchmer, 2007; Menell & Meurer, 2013; Hovenkamp, 2011b). Because patent infringement does not require advance notice of someone else's patents, many innocent innovators are later caught by surprise simply because the cost of searching patents or interpreting their claims is so high and the results so unreliable. These are features of the patent system itself, however, and generally cannot be remedied by the antitrust laws.

2. Acquisitions

Section 261 of the Patent Act expressly authorizes patentees to assign their patents to others, although it does not authorize anticompetitive assignments. Even monopolists should be entitled to acquire technology that they need to improve their own products or processes. Nevertheless, a few qualifications are important. First, to improve its own technology a dominant firm requires no more than a nonexclusive license. Second acquiring a patent in order to improve one's own technology necessitates practicing the patent; acquisition and nonuse does nothing to improve the acquirer's own product, but may serve to exclude rivals from access to alternative technologies. Third, under some circumstances the acquisition of exclusive rights in competing patents can be a significant threat to competition, particularly when the patents represent all of the best alternatives for operating in some market. Suppose, for example, that

patent portfolios Alpha, Beta, and Gamma represent the only three commercially feasible ways of providing a particular service. If a dominant firm acquired exclusive rights in all three it would be able to exclude competitors from the market even though it would likely be practicing only one of the three alternatives. Such acquisitions of competing portfolios should be challengeable as unlawful mergers under § 7 of the Clayton Act, which expressly applies to asset as well as stock acquisitions. The courts have repeatedly held that a patent is a qualifying “asset,” provided that anticompetitive effects are shown (Areeda & Hovenkamp, 2009-15). If market dominance results, the acquisitions could also be unlawful monopolization under §2 of the Sherman Act, at least if followed by an infringement action. For example, in *Intellectual Ventures I, LLC v. Capital One Financial Corp.*, 2015, the court held that a non-practicing entity’s acquisition of some 3,500 patents covering an entire segment of banking industry and subsequent enforcement could amount to unlawful monopolization. See Hovenkamp & Hovenkamp, 2017; 3 Areeda and Hovenkamp (2009-2015), ¶707 (2017 Supp.). If the firm has acquired only one or two patents, however, the courts have been willing to sustain infringement actions even if one or more of the patents are unused, as the Supreme Court held in the *Continental Paper Bag v. Eastern Paper Bag Co.*, 1908 and the Federal Circuit much more recently confirmed in *Trebro Mfr., Inc. v. Firefly Equip., LLC*, 2014. Neither case raised an antitrust issue. See Hovenkamp and Cotter, 2015.

3. Refusal to License

Neither United States antitrust law nor the Patent Act recognizes a general duty to license a patent or to share patented technology. Indeed, §271(d)(4) of the Patent Act provides that a refusal to license is not “misuse or illegal extension of the patent right....” This language appears to refer to unilateral refusals to deal, but some language in a Federal Circuit dissent in *Princo Corp. v. Int’l Trade Com’n*, 2010, suggested that it could reach concerted refusals to deal as well. (Bohannon & Hovenkamp, 2011). That rule, if accepted, would be unfortunate, for concerted refusals have significantly more anticompetitive potential than unilateral refusals (Areeda & Hovenkamp, 2009-15).

In its decision in *Eastman Kodak Co. v. Image Tech. Servs., Inc.*, 1997, the Ninth Circuit held that the antitrust laws did give Kodak a duty to sell patented parts to independent repair persons who wished to fix its high-speed photocopiers. The decision has been widely criticized and was expressly rejected by the Federal Circuit in the *ISO Antitrust Litigation*, 2000, a similar case involving Xerox. As of this writing the Supreme Court has not resolved the split (Areeda & Hovenkamp, 2009-15).

Currently the courts have not settled on the scope of a patentee's duty to license a patent encumbered by a FRAND commitment, or a promise made as part of a standard setting process to license on “fair reasonable, and nondiscriminatory terms.” Patentees generally make these commitments as a condition of having their patents declared “standards essential,” or part of the technology to be adopted by a network. In *Apple, Inc. v. Motorola, Inc.*, 2014, a panel of the Federal Circuit split three ways on the question. Nonetheless, it seems clear that if the owner of a FRAND-encumbered patent has executed a contractual promise to license to all on FRAND terms, then an infringement suit in conflict with that contractual obligation would be improper, as the court found in *Microsoft Corp. v. Motorola, Inc.*, 2015. It could occasion antitrust liability, although antitrust would not necessarily be the best vehicle for assessing it because the challenger must also establish market power and the creation of monopoly. The Patent Act’s

own remedial measures such as the previously discussed “exceptional case” provision, would provide a more direct route to relief, although not treble damages.

One must also distinguish between simple and conditional refusals to grant an IP license or sell a good covered by an IP right. Section 3 of the Clayton act, discussed above, expressly limits certain conditional licensing contracts that threaten competition, and expressly covers goods that are patented as well as unpatented. For example, a tying arrangement can readily be construed as a refusal to sell or license a tying product unless the buyer also takes the tied product. The legality of a conditional refusal depends on the legality of the underlying condition.

Another important distinction is between compulsory licensing as a general antitrust duty and compulsory licensing as a remedy for some other antitrust violation. In many antitrust cases the courts have determined that compulsory licensing is the best way to undo the effects of some other violation. Merger remedies often require IP licensing as a condition for approval and many structural breakups, such as the one that dismantled the nationwide AT&T telephone network, could not have succeeded unless each of the spun off companies received nonexclusive licenses to the parent's intellectual property portfolio. *United States v. AT&T, 1982*.

Finally, it is worth noting that the question of compulsory licensing duties is an important and controversial one, raising serious questions in market dominating networks, lifesaving pharmaceuticals, national defense, and other areas involving questions about patent social value. Antitrust is a poor vehicle for resolving most of these issues. It offers no useful tools for determining when such a dealing obligation is socially necessary. Nor does it have any mechanisms for setting a price, other than through ordinary damages measurement tools.

IV. IP Law's Own Internal Rules for Facilitating Competition

Intellectual property law also has internal rules for facilitating competition in the scope or use of IPRs (Cotter, 2006). Most of these rules are quite different from antitrust rules. IP law's internal competition rules do not require a market definition, proof of anticompetitive market exclusion, or even an attempt to measure the impact of a particular practice on price or output. Rather they are best seen as rules that limit IP "overreaching" of various kinds.

A. The First Sale (Exhaustion) Doctrine

Patent and copyright law's "first sale," or exhaustion rule, limits the power of a right holder to restrict the use or resale of a protected good once it has been sold. Both the patent and copyright exhaustion rules were originally judge made, but subsequently Congress enacted the copyright first sale doctrine into the statute, at 17 U.S.C. §109(a). In its simplest form the exhaustion rule states that the sale, not the license or lease, of a patented or copyrighted good exhausts the right holder's legal interest in that particular copy. The exhaustion doctrine has been used to strike down resale price restrictions, under both copyright (*Bobbs-Merrill Co. v. Straus, 1908*); and patent (*United States v. Unis Lens Co., 1942*). It has been applied to quasi-exclusive dealing restrictions in patent (*Quanta Computer, Inc. v. LG Elecs., Inc 2008*), and has also been used to strike down limitations on where purchased goods can be sold, in both copyright (*Kirtsaeng v. John Wiley and Sons, Inc., 2013*) and patent (*Adams v. Burke, 1873*). (Hovenkamp, 2011c). In 2017 the Supreme Court held that a patentee could not avoid

exhaustion by making its sale “conditional” on certain post-sale restrictions, no matter how clearly the condition was stated. *Lexmark, Inc. v. Impression Products, Inc.*, 2017. The Court located the policy rationale for this concern in the common law rules limiting restraints on alienation. (See Hovenkamp, 2017b).

Even though the first sale rule reaches many of the same practices that antitrust law reaches, such as tying, exclusive dealing, or resale price maintenance, it cannot be counted as an antitrust provision. Its application is completely indifferent to competitive effects, requiring only that there be a qualifying “sale.” Once such a sale has been found⁶ the post-sale restraint becomes unenforceable per se, without regard to competitive effects. One view of the doctrine is that it is intended to limit the reach of patent law in order to leave space for other bodies of commercial law (Duffy & Hynes, 2015; Hovenkamp, 2011c). Another view is that it is a creature of federalism, limiting the reach of federal IP supremacy in order to ensure that states retain the power to control post-sale restraints on protected goods. (Hovenkamp, 2016b).

B. “Misuse”

The misuse doctrine originated in patent law and was later expanded to copyright. It is entirely judge made, and the only references to it in the Patent Act are limitations contained in the Patent Misuse Reform Act, 35 U.S.C. §271(d), rather than recognition. Almost from the beginning misuse doctrine got off to a troublesome start. The Supreme Court’s decision in *Motion Picture Patents Co. v. Universal Film Mfg. Co.*, 1917 case, where a version of the doctrine was first recognized, almost surely involved an anticompetitive restraint. The owner of a market dominant projector sold it subject to a license restriction permitting projection only of its own films. But the Clayton Act had already been passed, and in 15 U.S.C. §14 it expressly prohibited patent ties that injured competition. To be sure, the competition issue was raised as a defense to an infringement action rather than an antitrust claim, but by this time the Supreme Court had already held in *Continental Wall Paper Co. v. Louis Voight & Sons Co.*, 1909, that illegality under the antitrust laws was a complete defense to an enforcement action, such as a breach of contract suit. Therefore, a patent-law-generated misuse doctrine was unnecessary.

In subsequent decades, misuse doctrine was applied aggressively to patent tying, exclusive dealing, royalty extensions and other licensing arrangements where injury to competition was nowhere in view. It is no wonder that during a later era of antitrust contraction both courts and commentators severely criticized “misuse” unless its application was limited to conduct that violated the antitrust laws. See, e.g., *USM corp. v. SPS Tech., Inc.*, 1982. See also Bohannon, 2011; Lim, 2013.

The courts have also recognized copyright “misuse” where the copyright infringement plaintiff had attempted to “sequester” uncopyrightable public data in a copyrighted database program. Judge Posner made clear that the violation in question was not of the antitrust laws. It was a unilateral act and there was no finding that the infringement plaintiff had sufficient market

⁶ *But see* *Bowman v. Monsanto co.*, 133 S.Ct. 1761 (2013), which held that exhaustion did not apply to self-replicating seed where the replanted seed was a subsequent generation and not the selfsame seed that the infringement defendant had purchased.

power.⁷ Rather, the concern was strictly one of copyright law, which both protects copyrighted content but also seeks to ensure that material in the public domain can be accessed.

In 2015, the Supreme Court breathed new life into one particular variation of the misuse doctrine. In *Kimble v. Marvel Entm't Co., LLC*, 2015, it adhered to the much-criticized rule adopted by the Supreme Court in *Brulotte v. Thys*, 1964, that a license agreement basing royalties on post-expiration patent use is unenforceable per se. *Kimble* did not attempt to justify the original *Brulotte* rule, but held only that reliance plus *stare decisis* required adherence. See Hovenkamp (2015b).

The overuse and subsequent undermining of "misuse" doctrine was an opportunity lost. Courts have legitimate concerns about IP overreaching as a matter of intellectual property law. The 70-year-long escapade, stretching from the 1917 *Motion Picture Patents* case to the 1988 Patent Misuse Reform Act, represented gross overreaching in tying doctrine under both misuse and antitrust, including the doctrine developed in *Morton Salt co. v. G.S. Suppiger Co.*, 1942, that someone who was misusing its patent as against one firm could not sue anyone else, even an admitted infringer. In *U.S. Gypsum vs. National Gypsum* the Supreme Court, globalized that remedy, holding that once misuse was found the patent would be unenforceable against the entire world until the misuse was "purged."

A revitalized doctrine of patent misuse should do two things. First, it should identify conduct that is socially harmful because it threatens the balance between exclusion and access created by the intellectual property laws themselves. Second, the remedy should ordinarily be limited to an injunction against the practice, or recognition that violation of the practice is not an act of infringement. (Bohannon, 2011).

C. Competition-based Limitations on "Functionality" Protection

One important limiting principle of IP law is that protection of a "function" must come by means of a utility patent, which is more difficult to obtain than other IPRs and has a shorter duration than copyrights or trademarks. For this purpose, design patents are treated more like copyrights and trademarks rather than patents.

The fundamental principle undergirding functionality limitations is that people should not be able to use IPRs to create product monopolies any more than is justified by the limitations inherent in utility patents. An important corollary is that people should not be able to turn other IPRs into quasi-patent rights in order to broaden their scope or duration. The grandparent of the doctrine is *Baker v. Selden*, 1879, which held that a copyrighted book teaching the author's method of accounting served to protect against making unauthorized copies of the book, but not against using or teaching the method itself. That decision was followed in *Bikram's Yoga College v. Evolution Yoga*, 2015, holding that a book illustrating yoga poses and movements did not prohibit someone from teaching those motions in a class. In the area of trademark or trade

⁷ *Assessment Tech. of Wisconsin, LLC v. Wiredata, Inc.*, 350 F.2d 640, 646 (7th Cir. 2003). The court also relied on the Fourth Circuit's decision in *Lasercomb Am., Inc. v. Reynolds*, 911 F.2d 970 (4th Cir. 1990), which found misuse in a restriction on a copyright licensee's development of new technology, even though that restraint did not violate the antitrust laws, *See also Omega S.A. v. Costco Wholesale Corp.*, 776 F.3d 692 (9th Cir. 2015) (concurring opinion arguing that copyright holder committed misuse by trying to leverage copyrighted design into prohibition on product sale in United States).

dress, the Supreme Court's important decision in *Traffix Devices v. Market Displays*, 2001, held that a traffic sign support that was an essential element of an expired utility patent could not be grandparented into a trademark, effectively extending the right over this functional design indefinitely.⁸ Similarly, copyright protection does not extend to purely functional names or commands in computer programs if good alternatives are lacking and the result serves to limit the ability of rival programmers to replicate that function. E.g., *Lotus Development Corp. v. Borland Intern., Inc.*, 1995; *Oracle America, Inc. v. Google, Inc.*, 2014.

Several lower courts have also held that design patents cannot be expanded so as to perform a utility function, thus excluding the products of rivals. For example, in *Chrysler Motors Corp. v. Autobody Panes of Ohio*, 1990, and *Best Lock Corp. v. Ilco Unican Corp.*, 1996, the Federal Circuit held that the owner of design patents could not use a design feature to exclude complementary products. In the first, it rejected Chrysler's attempt to enforce a design patent on an automobile bumper mount so as to exclude competing bumper makers who could not make a Chrysler-compatible bumper without infringing the design patent. In the second it prevented the owner of a design patent on a door key from enforcing a patent so as to make competitors' keys incompatible with its locks. In both cases the design patentees were attempting to create "technological ties." No determination of the patentee's market power was made, and the ties may or may not have been antitrust violations. But that is beside the point. The issue was sequestration, not monopoly. Utility patents may permit firms to keep rivals out of the product market, but design patents should not.

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⁸ Cf. the so-called "trademark use" doctrine, which in its most extreme form would make it unlawful under the Lanham Act to use the trademarked name of a competitor for purposes such as comparative advertising. See *Rosetta Stone, Ltd. v. Google, Inc.*, 676 F.3d 144 (4th Cir. 2012); *1-800-CONTACTS, Inc. v. WhenU.Com, Inc.*, 414 F.3d 400 (2d cir. 2005).

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