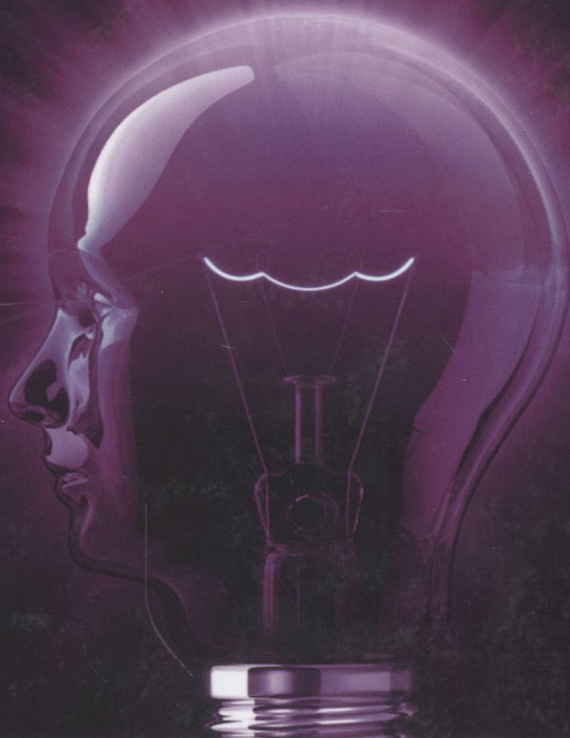


# INTELLECTUAL PROPERTY AND COMPETITION

Edited by **MICHAEL A. CARRIER**



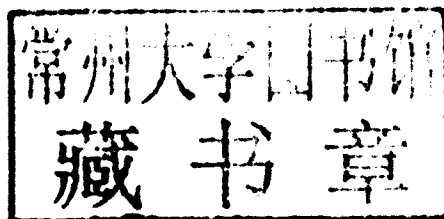
# Intellectual Property and Competition

*Edited by*

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CRITICAL CONCEPTS IN INTELLECTUAL PROPERTY LAW

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# Introduction

*Michael A. Carrier*

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For the past century, the intersection of the competition and intellectual property (IP) laws has presented difficult issues for courts and commentators. Although the two systems attempt to increase total societal welfare, they pursue this goal through different paths. The foundation of the IP system—the patent and copyright laws in particular—is the right to exclude. Such a right is designed to allow innovators to charge prices high enough to recover their investment costs and gain profits, thereby encouraging future innovation.

The exclusion at the core of IP may nonetheless be punished under the competition (or, as they are referred to in the US, antitrust) laws. These laws scrutinize activity that restricts competition, because such conduct could lead to higher prices, lower output, and (often) less innovation. Monopolists, for example, typically lack the constraints provided by competitive markets.

Similarly, by their very nature, agreements between IP holders and licensees restrict competition. IP holders may impose limitations on licensees such as (1) quantity restrictions, which limit the number of products that can be sold, (2) royalty payments, which determine the royalties that can be received, (3) grantbacks, by which licensees extend rights to use improvements to licensors, and (4) territorial restrictions, which confine licensees to certain areas.

On a larger scale, owners could combine their IP. Patentees could jointly set royalties for multiple patents in a patent pool. Copyright holders could offer blanket licenses that provide access to numerous (even millions of) copyrighted works. And IP owners could enter into joint ventures and mergers.

This broad range of activity may make perfect sense from the standpoint of dispersing or exploiting the protected innovation. Cross-licensing and patent pools avoid bottlenecks. Blanket licenses reduce transaction costs. Licensing allows owners to maximize the use of their creations. However, the greater need for cooperation from the perspective of IP law could trigger the suspicion of the competition laws.

Over the course of the past century, US courts have been left to reconcile these two systems without any compass to guide them. As a result, their analysis of IP and competition issues has shifted dramatically. In the period immediately following the enactment of the Sherman Act in 1890, courts treated IP as paramount. By the middle of the 20th century, they had adopted an approach hostile to IP. By the 1980s, the pendulum had swung back, with courts deferring once again to IP.

From our vantage point in the early 21st century, much of competition law's deference to IP is beneficial and—most important—has reduced the saliency of the IP-antitrust conflict. However, as the history of the intersection in the 20th century reveals, this has been a rocky road.

This volume collects 14 of the most important articles and book chapters written about the intersection. The first entry offers a history of courts' treatment of competition-IP issues. The

second category covers the application of competition law to ‘new economy’ issues. Third are four comprehensive frameworks that scholars have offered to resolve issues presented by the intersection. The fourth section analyzes specific types of business activity, including refusals to license, licensing, patent pools, standard setting, innovation markets (markets for research and development (R&D)), and patent settlements between brand-name and generic firms in the pharmaceutical industry.

## Part I History

In a chapter from his book *The Antitrust Enterprise*, Herbert Hovenkamp offered one of the most exhaustive treatments of the history of IP and antitrust.<sup>1</sup> The chapter traces the shifting framework that US courts have followed.

Professor Hovenkamp explains that ‘[o]ver the years, the courts have claimed to find many conflicts between the competition-furthering policies of the antitrust laws and the protection of exclusive rights that the IP laws afford’. But he asserts that ‘many of these conflicts were imagined’ since some courts ‘condemned an IP practice ... without asking whether the practice threatened competition in any important way’ while other courts ‘exonerated an anticompetitive practice without a clear indication that the practice was necessary ... to protect a legitimate IP right’.

In the period from 1890 to 1912 courts refused to impose antitrust liability for patent-based activity. They treated IP as owners’ private property and licensing arrangements as activity lying within the owners’ discretion. For example, in *E. Bement & Sons v. National Harrow Co.*, the Supreme Court upheld price fixing among competitors, explaining that ‘[t]he very object of the [patent] laws is monopoly’ and that ‘any conditions which are not in their very nature illegal ... will be upheld by the courts’.<sup>2</sup> Hovenkamp also introduces *A.B. Dick v. Henry*, in which the Court upheld a tying arrangement that required those who wished to license a patented machine to use certain unpatented supplies, concluding that ‘[a]rguments based on suggestions of public policy not recognized in the patent law are not relevant’.<sup>3</sup>

Congress responded to the Court’s decision in *A.B. Dick* by enacting the Clayton Act, which prohibited the tying of patented and unpatented products. At around the same time, courts began to limit the power of patentees. In *Motion Picture Patents Co. v. Universal Film Manufacturing Co.*, for example, the Court struck down a tying arrangement, explaining that the tie sought to expand the patent monopoly beyond the scope of the patented item and that patentees’ rights flowed not from patent law but from the ‘general law [of] the ownership of ... property’.<sup>4</sup>

Professor Hovenkamp explains how courts initially relied on the doctrine of patent misuse in imposing limits on patentees.<sup>5</sup> In *Carbice Corp. of America v. American Patents Development Corp.*, the Court denied a contributory infringement claim brought by a patentee that had required users seeking patented products to buy unpatented products on the grounds that a patent could not be utilized to ‘secure a limited monopoly of unpatented material used in applying the invention’.<sup>6</sup> The court explicitly relied on antitrust principles in *Mercoide Corp. v. Minneapolis-Honeywell Regulator Co.*, stating that ‘[t]he legality of any attempt to bring unpatented goods within the protection of the patent is measured by the antitrust laws’ and that ‘the effort ... made to control competition in [an] unpatented device plainly violates the anti-trust laws’.<sup>7</sup>

In the mid-20th century, the Supreme Court adopted an even more aggressive stance toward IP. Three examples reveal its hostile treatment of patent ties, cross-licensing agreements, territorial restraints, and other arrangements. In *International Salt Co. v. United States*, the Court found a tying arrangement to be per se illegal, and refused to analyze the issue of market power since ‘the tendency of the arrangement to accomplishment of monopoly seems obvious’.<sup>8</sup> In *United States v. Loew’s*, the Court struck down ‘block booking’, by which a party conditions the license or sale of desired movies on the buyer’s acceptance of a package containing unwanted films, explaining—in a presumption it would follow for more than 40 years—that ‘[t]he requisite economic power is presumed when the tying product is patented or copyrighted’.<sup>9</sup> Finally, in *United States v. Line Material Co.*, the Court attacked cross-licensing arrangements as price fixing even though the public could ‘obtain the full benefit of the efficiency and economy of the inventions’ only by using both products.<sup>10</sup>

Aligned with the Court’s increasingly hostile approach to tying and cross-licensing arrangements were the ‘Nine No-No’s’, announced by the Department of Justice Antitrust Division in 1970 and followed for approximately a decade. The Nine No-No’s encompassed IP licensing activities that the agency regarded as suspect under the antitrust laws. The list included nine activities—including tying, grantbacks, and mandatory package licensing—that often did not harm competition.

In the 1970s courts began to follow a more economics-based approach, analyzing the competitive effects of arrangements. Scholars affiliated with the Chicago School of Economics played a pivotal role in the transformation.

One of the crucial cases of this period was *Continental T.V., Inc. v. GTE Sylvania, Inc.*<sup>11</sup> In this case, the Supreme Court examined whether a territorial restraint—by which a manufacturer limits a franchisee to a particular area—violated Section 1 of the Sherman Act. The Court discarded a formalistic approach that had depended on whether title to the object had been transferred, and focused instead on the market effect of the restrictions—in particular, their ability to stimulate interbrand competition between different manufacturers. This holding had a significant effect on IP licensing arrangements, which often take the form of nonprice vertical restraints and which are nearly always upheld today.

Another case strengthening IP’s position was *BMI Music, Inc. v. Columbia Broadcasting, Inc.*,<sup>12</sup> in which the Court analyzed blanket licenses that allowed licensees to perform any of millions of copyrighted musical works in a package. Although there was an element of price fixing in the arrangement, the Court held that Rule-of-Reason analysis applied given the license’s benefits in creating a product that would not otherwise have been available.

In addition to these two cases, courts consistently upheld parties’ activities in introducing new products. In *Berkey Photo, Inc. v. Eastman Kodak Co.*, for example, the court refused to punish Kodak’s failure to ‘predisclose’ its products to competitors. It explained that ‘withholding ... advance knowledge of one’s new products ... ordinarily constitutes valid competitive conduct’. The court recognized that a contrary rule that compelled a firm to share the benefits of ‘risky and expensive R&D’ would ‘vitiate[]’ innovation incentives.<sup>13</sup> Courts also refused to punish firms that introduced new products that had the effect of injuring competitors. They found, for example, that IBM could redesign its products ‘to make them more attractive to buyers’ rather than ‘constrict[ing] its product development so as to facilitate sales of rival products’.<sup>14</sup>

Legislation also contributed to IP deference. The Federal Courts Improvement Act of 1982 created the Federal Circuit—the sole appellate court to decide patent cases—which brought

about a more predictable and uniform patent law than the ‘expensive, time-consuming and unseemly forum-shopping’ that had characterized patent litigation.<sup>15</sup> The National Cooperative Research Act of 1984 required antitrust courts to consider joint ventures engaging in R&D under the Rule of Reason, thus encouraging collaborations.<sup>16</sup> Also, as Hovenkamp explains, the Patent Misuse Reform Act of 1988 made clear that a refusal to license a patented item and the tying of a patented good to a second product where the inventor lacked market power in the tying product did not constitute misuse.<sup>17</sup>

The transition to an increasingly dominant IP was crystallized in 1995 when the antitrust agencies issued the *Antitrust Guidelines for the Licensing of Intellectual Property*. The Guidelines embodied three principles: (1) IP is ‘essentially comparable’ to any other form of property, (2) IP does not automatically create market power in the antitrust context, and (3) IP licensing is generally procompetitive.<sup>18</sup>

These three principles slammed the door on a half-century of hostility to IP. First, they made clear that IP should not be treated more harshly than real property, concluding that IP is not ‘particularly suspect’ under the antitrust laws. Second, the Guidelines confirmed that even though the IP right ‘confers the power to exclude with respect to the *specific* product, process, or work in question, there will often be sufficient actual or potential close substitutes for such product, process, or work to prevent the exercise of market power’. Third, they explained that licensing ‘can lead to more efficient exploitation’ of IP, benefiting consumers by reducing costs, promoting R&D investment, and introducing new products.<sup>19</sup>

## Part II New Economy

In the 21st century, one hotly debated issue has been whether US competition law can apply to the new economy. Can the Sherman Act, enacted in 1890 to address the steel and oil industries, still be relevant in today’s faster, information-based world?

Most commentators have reasonably answered this question in the affirmative. US antitrust law employs a flexible analysis that is able to consider the characteristics of various industries. In the past three decades, antitrust courts have embraced more economics-based analyses that can incorporate new-economy characteristics. They have also replaced per se rules that automatically invalidated certain activities with a Rule-of-Reason framework that allows consideration of market-specific conditions. In addition, the antitrust agencies have offered nuanced analyses in issuing, for example, the *IP Guidelines* and (as discussed below) business review letters analyzing patent pools. The unique issues presented by the new economy nonetheless call for caution and some adjustments.

By ‘new economy’, Judge Richard Posner and Professor (then-Federal Trade Commission Chairman) Robert Pitofsky refer to computer software, Internet-based businesses, communications, and (in the case of Pitofsky) biotechnology. In the ‘New Economy’ chapter of his book *Antitrust Law*, Judge Posner sketches the characteristics of the new economy: falling average costs, modest capital requirements, high rates of innovation, quick and frequent entry and exit, and network effects. In *Antitrust and Intellectual Property: Unresolved Issues at the Heart of the New Economy*, Professor Pitofsky highlights the near-inevitable monopoly that arises from the combination of IP and network effects, though he recognizes that such power is less durable in high-technology industries.



Judge Posner believes that antitrust doctrine is ‘sufficiently supple’ to cope with the new economy, but contends that the ‘troublesome’ issue lies in institutional enforcement. In a later chapter, Posner thus advocates the use of neutral competent experts, including a ‘technical committee composed of two party-nominated and one neutral technical expert’ that would assist a judge in administering a consent or litigated decree.<sup>20</sup> He addresses timeliness issues by proposing an ‘agreed-upon narrative of the relevant facts’ jointly prepared by the parties, with trials limited to disputed issues.<sup>21</sup>

Professor Pitofsky is more optimistic, finding that enforcement ‘has generally evolved in recent years in a way that pays heed to the distinctive characteristics of the New Economy’. In supporting this proposition, he points to Federal Trade Commission (FTC) actions in the 1990s that involved patent settlements, refusals to license, standard setting, and mergers. Pitofsky also applauds the speed with which the government agencies review nearly all mergers, though he recognizes the desirability of improvement in the non-merger area.

### Part III Global Approaches

The relationship between IP and competition law has elicited a vast amount of commentary. The third section of this volume covers four of the most prominent attempts by US scholars to resolve the intersection. The fourth section applies to specific business activity.

In *Legal Restrictions on Exploitation of the Patent Monopoly: An Economic Analysis*, Professor William Baxter offers the first comprehensive approach. Baxter proposes a test that ‘a patentee is entitled to extract monopoly income by restricting utilization of his invention’ as long as the restriction is confined ‘as narrowly and specifically as the technology of his situation and the practicalities of administration permit’. He applies this test to royalties, tying arrangements, package licensing, price and output limits on licensees, and field and territorial restrictions.

Interwoven throughout the article are insights that eventually became far more accepted than they were at the time: the difference between legal and economic monopoly, the difficulties of determining reasonable royalties and ascertaining forbidden price discrimination, and the inapplicability (given the minimal marginal cost of patented inventions) of the differential between price and marginal cost at the heart of price discrimination analysis.<sup>22</sup>

Professor Ward Bowman presents the second approach. In his book, *Patent and Antitrust Law: A Legal and Economic Appraisal*, he assesses various forms of patent licensing. The chapter I have selected for inclusion in this volume is the most cited section of the book, typically recognized for the assertion that the antitrust and patent laws do not conflict.

Professor Bowman locates a ‘common central economic goal’ for the two regimes: ‘to maximize wealth by producing what consumers want at the lowest cost’. Elaborating on this concept, he explains that the goal of both laws is ‘to maximize allocative efficiency (making what consumers want) and productive efficiency (making these goods with the fewest scarce resources)’ while minimizing output restriction.

In the remainder of the book, Bowman evaluates the patent system, concluding that it ‘deserves continued support’ given the inferiority of potential alternatives. He also proposes a framework for evaluating patent licenses, upholding them if the reward the patentee receives measures ‘the patented product’s competitive superiority over substitutes’. Finally, he analyzes horizontal and vertical agreements and explores courts’ treatment of each.

In contrast to Bowman, Professor Louis Kaplow, in *The Patent-Antitrust Intersection: A Reappraisal*, explains that the conflict between patent and antitrust law is ‘even more deep-seated than is generally perceived’. One reason is that ‘it is wholly indeterminate how any individual case ... should be decided, because the question is whether the totality of the courts’ patent-antitrust decisions’ promotes an appropriate level of reward. Another reason is that the determination of patent-antitrust doctrine is linked to the calculation of the optimal patent life—the ‘length of time at which the marginal social cost of lengthening or shortening the patent life equals the marginal social benefit’—which itself presents challenging issues.

Professor Kaplow nonetheless offers the third reconciliation, a ‘ratio’ test that is the most comprehensive analysis of the intersection yet offered. The test examines the ratio between ‘the reward the patentee receives when permitted to use a particular restrictive practice’ and ‘the monopoly loss that results from such exploitation of the patent’. Kaplow applies the test to an array of activity, including patent-restricted licenses, patent combinations, price discrimination, and patentee control of unpatented end products.

In *Unraveling the Patent-Antitrust Paradox*, I propose a fourth framework. After discussing the conflict between the patent and antitrust laws in theory, I provide examples from the case law. I then explore flaws with US courts’ treatment of the intersection, in particular, analyses based on patent scope, markets affected by the activity, and monopolists’ intent. And I discuss weaknesses in the approaches offered by Baxter, Bowman, and Kaplow.

In the article, I also offer innovation as a common denominator for the laws—a means by which courts can ‘weigh’ antitrust against patent on a new scale with equivalent measures on both sides. Finally, I propose an innovation-centered rebuttable presumption for courts to apply in analyzing monopolists’ patent-based actions. The test considers, among other factors, the roles played by competition and patents in attaining innovation in particular industries.

With the benefit of hindsight, I have come to recognize the administrative difficulties inherent in such a test. I thus sought to improve on the analysis in a subsequent article by introducing a new explanation that firms could offer in defense of the challenged patent-based activity: that it is reasonably necessary to attain ‘tripartite innovation’.<sup>23</sup> Tripartite innovation denotes the three temporal stages of innovation: the creation of the product, the recovery of investment incurred in creating the product, and the circumvention of patent bottlenecks that block the path of innovation. Many of the activities employed to avoid bottlenecks are discussed in the next part of the book.

## Part IV Specific Activity

A significant array of scholarship on the IP-competition intersection, especially in recent years, has focused on specific types of business activity. The articles in this section offer nuanced analyses that can be employed in constructing appropriate 21st-century frameworks.

### *Refusals to License*

Refusals to license, which are undertaken by a single firm, most directly present the conflict between IP and competition law. A court may view a firm’s refusal to share IP-protected products as predatory conduct constituting monopolization, even if the action is lawful under

the IP laws. Courts have generally upheld refusals to license IP, though the analysis employed has varied.

Professors Herbert Hovenkamp, Mark Janis and Mark Lemley have offered the most exhaustive treatment of the activity. In *Unilateral Refusals to License*, they support courts' deference, pointing to the centrality of exclusion to IP and the challenges courts would confront in administering licensing terms. The authors also discuss the difficulties that would accompany application of the 'essential facility' doctrine—which could require monopolists to share facilities necessary to compete in a market—to IP. Such application is 'particularly problematic' given the rights provided by IP and the adverse effects on incentives from coerced sharing.

Professors Hovenkamp, Janis and Lemley also explore the three leading court decisions considering unilateral refusals to license. The Federal Circuit treated such behavior as per se legal in *In re Independent Service Organizations Antitrust Litigation (Xerox)*; the First Circuit imposed a rebuttable presumption of legality in *Data General v. Grumman Systems Support*; and the Ninth Circuit applied a presumption that could be rebutted based on pretext in *Image Technical Services, Inc. v. Eastman Kodak Co.*<sup>24</sup> The authors seek to reconcile the approaches, highlighting narrow readings of the Federal and Ninth Circuit opinions and courts' varying treatment of the tying issues involved in the cases. The authors also distinguish unilateral refusals from those that are concerted (involving multiple parties) and conditional (imposing conditions on licensees).

### *Licensing and Patent Pools*

The next set of activity involves licensing. This activity—which encompasses patent cross-licenses, blanket copyright licenses, and patent pools—has become widespread in recent years due to the evolving relationship between IP and the products in which it appears. For much of the nation's history, an invention tended to be covered by a single patent. However, in the late 20th century devices such as software, Internet, and semiconductor inventions began to more frequently incorporate numerous patented components.

Because IP holders may not be the most efficient actors to utilize their inventions, or use could be blocked by other IP owners, licensing is inevitable and often procompetitive. In recent years, courts and the US competition agencies have recognized this. In the 1995 Guidelines, for example, the agencies explained that IP 'typically is one component among many in a production process' that 'derives value from its combination with complementary factors' and that licensing can lead to efficient exploitation of IP, cost reductions, R&D investment, and new products.<sup>25</sup> In the past two decades, scholars have described three settings in which—in the absence of licensing—bottlenecks could arise: cumulative innovation, anticommons, and patent thickets.

Cumulative innovation proceeds as innovators 'build on each other's discoveries'.<sup>26</sup> The optimal breadth of patents is unclear in industries marked by such innovation since stronger patent protection benefits the initial creator but harms subsequent innovators. Cumulative innovation occurs in industries as diverse as automobiles, aircraft, semiconductors, computer hardware, and software. In these industries, bottlenecks can block the path of innovation, with the latest product generation held hostage to its predecessor. Licensing between the initial and follow-on innovator can address these problems.

The second setting is an 'anticommons', in which multiple owners of patented biotechnology research tools exercise rights to exclude. Such a framework creates obstacles to R&D by requiring downstream developers to gain 'access to multiple patented inputs to create a single useful product'.<sup>27</sup> Although the empirical evidence has not, at least yet, demonstrated the existence of significant anticommons problems, its potential effect provides another reason for antitrust deference to licensing.

Professor Carl Shapiro has most thoroughly described the third setting, patent thickets. In *Navigating the Patent Thicket: Cross Licenses, Patent Pools, and Standard Setting*, he defines a thicket as 'an overlapping set of patent rights requiring that those seeking to commercialize new technology obtain licenses from multiple patentees'. Such a thicket allows owners with patented parts in a complex product to block use by others. Shapiro highlights particular concern when products are already on the market, as manufacturers in large-scale production cannot easily redesign their products and thus can be forced to comply with patentees' demands.

Professor Shapiro discusses solutions to the thicket problem. One involves cross licenses, agreements by which two firms grant the right to use each other's patents instead of blocking each other, filing lawsuits, or ceasing production. Another is a patent pool, which involves 'a single entity ... that licenses the patents of two or more companies to third parties as a package'.

In the context of patent pools, Shapiro underscores the distinction between essential and substitute patents. Patents are essential if a product cannot be produced without infringing the patent. Essential patents do not have substitutes and typically are complementary, possessing a greater value if a licensee can use other essential patents. Substitute patents, in contrast, are not necessary for the use of a technology in the pool but present alternate ways of creating products that otherwise would compete with each other. Even if the relation between these categories is more nuanced than a rigid dichotomy would suggest, the concept is valuable in focusing analysis on the relationships among the patents.

In *Institutions for Intellectual Property Transactions: The Case of Patent Pools*, Professor Robert Merges situates patent pools in the broader framework of mechanisms that lower the costs of integrating separately held IP rights. Viewed through such a prism, pools share features with collective copyright licensing organizations that issue blanket licenses and distribute licensing fees to copyright holders.

Professor Merges explains how IP rights holders resolve transactional bottlenecks by contracting into liability rules. In particular, pools settle valuation issues by determining the rates licensees pay for access to the pool and the rules for dividing payments among pool members. Their collectively-determined prices 'operate in much the same way as a compulsory license'.

Professor Merges also traces the history of patent pools, beginning with the automobile and aircraft industries in the early 20th century and concluding with DVDs and MPEG compression technology at the end of the century. He discusses key features of the pools, such as the nuanced mechanisms employed in the MPEG pool to evaluate new technologies and determine the essentiality of relevant patents. Merges concludes by pointing to the antitrust agencies' recent appreciation of the benefits of patent pools.

## Standard Setting

Another mechanism for addressing potential bottlenecks involves standard setting. There are several types of standards. Governments often enact performance standards, which address product quality, health, and safety. De facto standard-setting occurs when one firm dominates a market. The third type, which presents some of the most challenging antitrust issues, involves standards set by private industry groups known as standard-setting organizations (SSOs).

Many SSOs have adopted interface (or interoperability) standards, which allow products to work together. These standards, which are ubiquitous in our economy, are especially needed in network effects markets, in which users benefit from an increase in the number of other users in the system. A telephone or e-mail system, for example, becomes more valuable as more users connect to it. Even though standards are vital, competition law traditionally viewed the process of setting standards with suspicion. SSOs tend to be composed of industry rivals discussing sensitive information such as price.

Despite this concern, competitors frequently have good reason to engage in such discussions. Before the selection of a standard, an SSO often can choose from an array of alternative technologies. In contrast, after a standard is chosen and the industry has invested in a particular technology, flexibility can be severely restricted. If the selected technology is patented, the owner could impose excessive licensing terms that reflect not just the value of the patent but also the significant costs of switching to a new technology. The patentee, in other words, could 'hold up' the standard's implementation.

This threat of holdup explains why SSOs have required members to provide certain information before a standard's selection. Some SSOs have mandated that participants disclose IP (typically patents and sometimes patent applications and other IP rights) that could be implicated by the standard. Others have adopted search rules that require members to search for relevant IP rights. Many have required members to agree to license their IP on reasonable and nondiscriminatory (RAND) terms. One SSO has compelled participants to specify the maximum royalties it would impose.

In *Intellectual Property Rights and Standard-Setting Organizations*, Professor Mark Lemley provides the first empirical survey of SSOs and their IP rules. He finds that most of the surveyed SSOs require disclosure and RAND licensing, with few imposing search obligations. And he notes that 'much of the diversity' in SSO IP rules cannot be justified on efficiency grounds.

Professor Lemley also observes that SSOs have developed IP policies 'in precisely those industries where the unconstrained enforcement of patents could be most damaging to innovation', namely, software, Internet, telecommunications, and semiconductors. These industries are characterized by network effects, raising the importance of interoperability. Also, patents 'create the most difficulties' in these industries, since they are more likely to block each other, interfere with cumulative innovation, and lead to holdups.

## Innovation Markets

Mergers present a more permanent solution to bottlenecks than pools or standard setting. In the 1990s the competition agencies began to challenge mergers that affected markets for R&D, known as 'innovation markets'. The theory behind innovation markets is that a merger between the only two (or two of a few) firms conducting R&D in a particular area might increase the

incentive to suppress at least one of the research paths. With no other firms ready to enter the market, the merging firms might choose not to introduce a second product that would reduce sales of the first.

In their important article, *Incorporating Dynamic Efficiency Concerns in Merger Analysis: The Use of Innovation Markets* (which was not available for inclusion in this volume), Richard Gilbert and Steven Sunshine introduce the concept. The authors suggest an innovation markets framework that focuses on the merging firms' overlapping R&D activities, alternative R&D sources, competition from downstream products, increased R&D concentration, and efficiencies.

To be sure, the concept confronts challenges. For starters, it may be difficult to identify all the firms in a particular innovation market. In addition, after a half-century of debate and innumerable studies, no clear answer has emerged to the question of which market structure is most conducive to innovation. The opposing positions of economists Joseph Schumpeter (favoring concentration) and Kenneth Arrow (favoring competition) both garner support in unending bouts of hand-wringing.

Schumpeter famously highlighted the role played by concentration in promoting innovation. He explained that perfect competition (in which firms lack market power) is always suspended 'whenever anything new is ... introduced'. In contrast, monopoly allows long-range planning and is 'the most powerful engine of [economic] progress'.<sup>28</sup> Arrow, on the other hand, contended that 'the incentive to invent is less under monopolistic than ... competitive conditions'. Unlike the monopolist, for which some of the profits from the new invention come at the expense of the old technology, the competitor receives all of the returns from a new invention.<sup>29</sup>

In *Fostering Cumulative Innovation in the Biopharmaceutical Industry: The Role of Patents and Antitrust*, Professor Arti Rai emphasizes the importance of competition for innovation in the biopharmaceutical industry. She explains how multiple research paths promote development in early-stage research. Also, she links the Schumpeterian framework to Professor Edmund Kitch's 'prospect' theory, which advocates broad patentee rights to provide incentives and coordinate development efforts. Professor Rai highlights difficulties with this approach as downstream developers in the industry typically do not deal with only one broad upstream patent holder and high transaction costs often make licenses difficult to conclude.

In *Two Puzzles Resolved: Of the Schumpeter-Arrow Stalemate and Pharmaceutical Innovation Markets*, I explain why the critiques leveled against innovation markets are less relevant in the pharmaceutical industry. I analyze the innovation market challenges brought by the FTC, and I introduce a framework for analyzing mergers in innovation markets that is based on the US Horizontal Merger Guidelines and that considers not just the number of firms in R&D, but also their respective stages of US Food and Drug Administration (FDA) review.

The realities of pharmaceutical innovation would seem to call for a recognition of the wildly varying odds of success of reaching the market. On average, compounds in preclinical development face a less than 1 in 4000 chance of reaching the market, while those in Phase III of clinical studies have a greater than 1 in 2 chance. Mergers involving compounds in late clinical studies thus are more likely to threaten the suppression of research paths.

### *Pharmaceutical Settlements*

At the end of the first decade of the 21st century, the issue in the IP-competition intersection that has caused the greatest divide among US courts, antitrust agencies, and scholars is



presented by settlement agreements in the pharmaceutical industry. Brand-name firms with patents have settled cases with generics that have challenged the patents, seeking to enter the market before the end of the patent term. Many commentators have voiced concern with these agreements, in particular with large ‘reverse payments’ from brand to generic firms. These payments, which differ from typical licensing payments that flow from challengers to patentees, may even exceed what the generic could have earned by entering the market.

If a patent is valid and infringed, the patentee could rely on the patent itself to restrict competition, and so an agreement allowing a generic to enter before the end of the patent term could increase competition. On the other hand, if a patent is invalid or not infringed, there is no legitimate justification for delaying competition, with the agreement thus serving as a cover for market allocation. A central difficulty is that the appropriate competition-law treatment of settlements depends on the validity of the patent and existence of infringement, but these issues require the analysis of complex issues such as patent claim construction and infringement analysis that courts cannot easily consider in the midst of an antitrust case.

Courts thus have resorted to other principles in recently blessing the agreements. They have explained that the agreements reduce costs and increase innovation. They have contended that the activity falls within the scope of the patent, and they have pointed to patents’ presumption of validity in demonstrating the agreements’ reasonableness.

The missing element in these assertions, however, is the Hatch-Waxman Act, enacted by Congress in 1984. In *Paying for Delay: Pharmaceutical Patent Settlement as a Regulatory Design Problem*, Professor Scott Hemphill emphasizes the importance of industry-specific regulation in antitrust analysis. He highlights the central role played by generic challenges to patents, which would appear to displace general norms favoring settlement. These challenges, however, have declined with the rise of pay-for-delay agreements, which allow brand and generic firms to share monopoly profits, which is more profitable than competing for duopoly (and, as additional generics enter, even smaller) profits.

Professor Hemphill also discusses the unique position occupied by the first generic to successfully challenge patent validity or infringement and seek entry before the end of the patent term. This generic firm receives a 180-day period of marketing exclusivity. In contrast to general patent settlements, which do not prevent other competitors from challenging the patent, the Hatch-Waxman bounty can significantly delay other patent challenges. Hemphill shows that settlements with the first generic challenger ‘remove[] from consideration the most motivated challenger, and the one closest to introducing competition’.

In conclusion, the intersection of the IP and competition laws presents an array of complex issues. The 14 articles and book chapters included in this volume provide a roadmap to guide the reader through the intersection’s history, issues, and potential solutions.

## Notes

1. Even more expansive than the chapter is Hovenkamp’s *The Intellectual Property-Antitrust Interface*, in 3 ISSUES IN COMPETITION LAW & POLICY (ABA Section of Antitrust Law 2008), which was not available for inclusion in this volume.
2. 186 U.S. 70, 91 (1902).
3. 224 U.S. 1, 19 (1912).
4. 243 U.S. 502, 513, 517–18 (1917).