Antitrust Analysis Involving
Intellectual Property and Standards:
Implications from Economics
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Jorge Padilla, Douglas H. Ginsburg, & Koren W. Wong-Ervin[1]

ABSTRACT

There is a significant industrial organization ("IO") economics literature on the economics of innovation and intellectual property ("IP") protection. As some courts and antitrust agencies have recognized, the IO economics toolkit for business arrangements (e.g., vertical restraints, tying and bundling, etc.) involving IP rights is sufficiently flexible to be applied in high-technology areas involving antitrust and IP. In this Article, the authors explain the economics of innovation and IP protection, licensing, and compulsory licensing, with specific applications to standards development and to standard-essential patents. The authors then propose first-best approaches based on the implications of the economics that courts and antitrust agencies can apply at each stage of an antitrust inquiry, from market definition and market power to the assessment of particular business practices. The authors conclude by providing a summary of the approach applied in each major antitrust jurisdiction—China, the European Union, India, Japan, Korea, and the United States.

INTRODUCTION

In recent years there has been significant scrutiny of what the holder of a standard-essential patent ("SEP") who has made a commitment to license on fair, reasonable, and nondiscriminatory ("FRAND") terms may do when seeking to license it. Antitrust authorities have undertaken numerous investigations, and several have issued new guidelines. In an effort to promote an exchange of views and to better understand the proper antitrust analysis of these topics, the Organization for Economic Co-Operation and Development ("OECD") is expected to hold a roundtable discussion on antitrust analysis of intellectual property rights ("IPRs"), including SEPs, in 2019. Given that antitrust analysis is fundamentally economic analysis, any

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[1] Jorge Padilla is Senior Managing Director at Compass Lexecon, Research Fellow at CEMFI (Madrid), and teaches competition economics at the Barcelona Graduate School of Economics (BGSE). Douglas H. Ginsburg is a Judge on the United States Court of Appeals for the District of Columbia Circuit, Professor of Law and Chairman of the International Board of Advisors to the Global Antitrust Institute at Antonin Scalia Law School, and a former Assistant Attorney General in charge of the Antitrust Division of the U.S. Department of Justice. Koren W. Wong-Ervin is the Director of IP & Competition Policy at Qualcomm Incorporated, a Senior Expert and Researcher at China's University of International Business & Economics, and former Counsel for Intellectual Property and International Antitrust at the U.S. Federal Trade Commission. The opinions in this paper are the authors' sole responsibility. The authors thank Tim Snyder for his research and writing assistance and Jane Antonio for her careful cite check. They also thank Anne Layne-Farrar, Samir Gandhi, Professor Hwang Lee, Rahul Rai, and Xin (Roger) Zhang for their insightful comments, particularly on the chart in Section IV, which summarizes the approaches taken around the world.

discussion of these issues should be grounded in empirical and other economic learning regarding innovation, intellectual property ("IP") protection, and related business arrangements.

This Article addresses the proper analysis for antitrust matters involving SEPs in three parts. Section I summarizes the relevant economic literature, namely the economics of innovation and IP protection, licensing, and compulsory licensing, with specific applications to standards development and to standard-essential patents. Drawing upon these economic principles, Section II then provides a blueprint that antitrust agencies and courts may apply when evaluating market definition; monopoly power (or market dominance, depending on the jurisdiction); and particular business practices, such as refusals to license, tying and bundling, grantbacks and cross-licenses, and excessive pricing and injunctive relief. Section III concludes by surveying major jurisdictions to understand how closely each one follows these economic principles and our proposed blueprint.

I. THE ECONOMICS OF INNOVATION AND IP PROTECTION

Firms innovate to reduce their costs (*process innovation*) or to launch new products and services (*product innovation*). Product innovation may lead to better products (*vertical product innovation*) or products that are different from the existing ones without being superior (*horizontal product innovation*).[2] It may also lead to entirely new products or ways of doing things (often referred to as *drastic* or *leapfrog innovation*). Process and product innovations are extremely valuable to social welfare. While consumers gain from increases in static efficiency in the short run, economics teaches us that dynamic efficiency, including societal gains from innovation, are an even greater driver of consumer welfare.[3] Process innovation allows firms to produce the same output while using fewer inputs and, hence, to economize on scarce resources. Product innovation expands choice and allows consumers to obtain better products or products that better fit their needs or preferences.

Modern economic research shows that new products, including even small changes in product design, can result in remarkable increases in social welfare, including significant consumer benefits.[4] A seminal study by Professor Jerry Hausman of the Massachusetts Institute

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[2] OECD & Eurostat, OSLO MANUAL: GUIDELINES FOR COLLECTING AND INTERPRETING INNOVATION DATA (3d ed.), *available at* www.oecd.org/sti/inno/oslomanualguidelinesforcollectingandinterpretinginnovationdata3rdedition.htm.

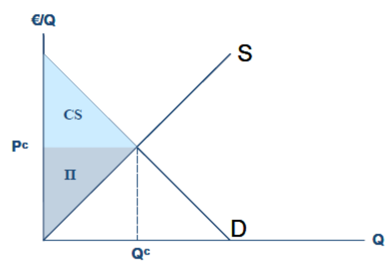
[3] Robert Solow won the Nobel Prize in economics for demonstrating that gains in wealth are due primarily to innovation—not to marginal improvements in the efficiency of what already exists. *See* Press Release (Oct. 21, 1987), *available at* http://www.nobelprize.org/nobel_prizes/economic- sciences/laureates/1987/press.html.

[4] NAT'L BUREAU OF ECON. RESEARCH STUDIES IN INCOME & WEALTH, THE ECONOMICS OF NEW GOODS (Timothy F. Bersnahan & Robert J. Gordon eds., Univ. of Chicago Press 1996).

of Technology, for example, calculated that value in a concrete example. He found that a new cereal—one made by adding apple and cinnamon to an existing cereal—created $78.1 million per year of added value to the U.S. economy.[5] The creation of a new drug is a more intuitive example. The value of saving or improving lives dwarfs the very high costs of some drugs.[6] Likewise, technical change (due to product and process innovations) has resulted in rapid increases in productivity and improved standards of living around the world.[7]

The conventional economic diagram of supply and demand helps to understand these results (see Figure 1 below). When a new product is introduced, the value created is the area between the demand curve (D) and the cost or supply curve (S). That is, each unit of output has a social value that is the difference between the value shown by the demand curve and the cost of producing it. The overall social value of a product innovation is the sum of those differences, *viz.*, the area CS + Π.

Figure 1: Social Value of New Product



The competitive equilibrium is at (Pc,Qc) and it is located at the intersection of the supply curve, S, which is given by the incremental costs of production, and the demand curve D. Social value equals the sun of consumer surplus, CS, and producer surplus, Π.

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5 Jerry A. Hausman, *Valuation of New Goods under Perfect and Imperfect Competition*, *in* NAT'L BUREAU OF ECON. RESEARCH STUDIES IN INCOME & WEALTH, THE ECONOMICS OF NEW GOODS 207-248 (Timothy F. Bersnahan & Robert J. Gordon eds., Univ. of Chicago Press 1996). *See also generally* Ernst R. Berndt, Iain M. Cockburn & Karen A. Grépin, *The Impact of Incremental Innovation in Biopharmaceuticals: Drug Utilisation in Original and Supplemental Indications*, 24(2) PHARMACOECONOMICS 69-86 (2006) (studying data on drug utilization by diagnosis for the period 1999-2004 combined with data on the approval histories of three important classes of drugs, and finding that: (1) incremental innovation to existing pharmaceutical products in the form of new dosages, formulations, and indications account for a substantial share of drug utilization and associated economic and medical benefits; and (2) all three drug classes studied have been approved for numerous new indications, some targeting markedly distinct populations from that of the original indication, significantly increasing the economic and medical benefits of these drugs).

6 The estimated social value of increases in life expectancy due to advances in medical research from 1970 to 1990, was estimated to amount to $2.8 trillion per year. Kevin M. Murphy& Robert H. Topel, *The Economic Value of Medical Research*, *in* THE GAINS FROM MEDICAL RESEARCH: AN ECONOMIC APPROACH (Kevin M. Murphy& Robert H. Topel eds., Univ. of Chicago Press 2003). *See also* David M. Cutler & Mark McClellan, *Is Technological Change In Medicine Worth It?*, 20:5 HEALTH AFFAIRS (Sept./Oct. 2001), *available at* www.healthaffairs.org/doi/pdf/10.1377/hlthaff.20.5.11.

7 Joel Mokyr, *Chapter 17 – Long-Term Economic Growth and the History of Technology*, *in* HANDBOOK OF ECONOMIC GROWTH, VOLUME 1B (Philippe Aghion & Steven Durlauf eds., 2005).

Policies and laws that encourage investment and innovation are welfare increasing and thus optimal, while interventions that risk thwarting incentives to innovate are not appropriate public policies.[8] This is why understanding what drives innovation incentives has focused the attention of the economics profession for a long time.

A. Innovation Incentives

Though some individuals and firms may invest resources in innovation projects for philanthropic reasons, there is a wide consensus in economics that profits are the key driver of innovation. Firms and investors are generally willing to incur the large costs needed to obtain meaningful innovations only because they expect to obtain a significant return on those investments.[9] Investors in innovation may expect to open new markets and thus appropriate part of the value generated for consumers. They may try to reduce their costs or improve their offerings in order to obtain a competitive advantage *vis-à-vis* their rivals, increasing both their market share and their profits. Innovation is also used to mitigate the rigors of head-to-head competition; but unlike other ways of softening competition, such as collusion, innovation enhances social welfare. It allows society to produce the same quantity of goods at lower costs and increases the gains from trade by bringing new products and services to meet the needs of consumers.

The social value of process and product innovation is very large.[10] The problem is that the social value of innovation typically exceeds the private value of innovation. This is mainly due to the so-called "appropriability problem."[11] Consider, for example, the case of a product innovation: innovators will not be able to fully appropriate the value generated by their inventions unless they are able to engage in first-degree price discrimination, that is, unless they are able to charge a different price, a targeted price, to each and every consumer equal to that consumer's willingness to pay for the new product. There are many reasons, even in the Internet Age, why first-degree price discrimination is merely a theoretical possibility. Firms often cannot identify

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8 OECD, INNOVATION AND GROWTH RATIONALE FOR AN INNOVATION (2007), *available at* www.oecd.org/sti/inno/39374789.pdf. *See also* Susan A. Creighton, *2010 Horizontal Merger Guidelines: The View from the Technology Industry,* THE ANTITRUST SOURCE (Oct. 2010) (noting consensus that "the new commodity, the new technology, the new source of supply" is "crucial to long-term gains to consumer welfare.").

9 SUZANNE SCOTCHMER, INNOVATION AND INCENTIVES (2006).

10 OECD, THE INNOVATION IMPERATIVE: CONTRIBUTING TO PRODUCTIVITY, GROWTH AND WELL-BEING (2015), *available at* www.oecd.org/sti/the-innovation-imperative-9789264239814-en.htm.

11 Nicholas Bloom, Mark Schankerman & John Van Reenen, *Identifying Technology Spillovers and Product Market Rivalry*, 81(4) ECONOMETRICA 1347-1393 (2013) [hereinafter Bloom et al.]. *See also* Vincenzo Denicolò, *Do Patents Over-Compensate Innovators?*, 22(52) ECON. POL'Y 679-729 (2007).

their customers and, even when they can, are unable to ascertain precisely their willingness to pay for the new product.

The appropriability problem opens a wedge between the private and social returns to innovation and leads to underinvestment. It plays a role even when successful inventors enjoy full monopoly power over their inventions. But it becomes even more problematic when that is not the case.[12] Inventions can often be imitated. When that is the case, the firm that sunk considerable resources to develop the new product will face competition after its new product is launched, which forces it to reduce prices.[13] Some of the returns to its investment will therefore be appropriated by competitors and a significant fraction will go to consumers.

So, while competition at the innovation stage (ex ante competition) encourages investment since firms try to acquire a competitive advantage over their rivals by differentiating their products and/or reducing their costs, competition after the innovation has been developed and proven successful (ex post competition) aggravates the appropriability problem and therefore is bound to have a negative effect on investment. Because imitation results in fiercer ex post competition, its anticipation discourages innovation by reducing the returns a successful innovator can expect. Furthermore, it encourages free riding: Better to wait and see whether others develop new products and then hit them with me-too copycats.

Not surprisingly, economists who have investigated the rational basis for granting and protecting intellectual property rights ("IPRs") conclude that it lies in the need to control the risk of imitation and limit the strength of ex post competition.[14] IPRs exist to stimulate innovation by increasing the return on costly investments in research and development ("R&D").

An IPR, like any other property right, gives its holder the ability to exclude others from using that property and thereby enables the holder to appropriate some of the value of the property. Whether that right is exercised in practice is typically inconsequential from a social viewpoint because most IPRs are worthless.[15] Some IPRs, however, are immensely valuable for the patent holder because the right to exclude can result in large monopoly profits. In fact, as

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12 Bloom et al., *supra* note 11.

13 *See generally* Michael Salinger, *Net Innovation Pressure in Merger Analysis* (Working Paper, March 2016) (describing methodology for estimating the negative impact of rivals' appropriation on "net innovation pressure" for any given market participant), *available at* https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3051249.

14 *See* DENNIS W. CARLTON & JEFFREY M. PERLOFF, MODERN INDUSTRIAL ORGANIZATION, Ch. 16 (4th ed., 2005).

15 According to data from the U.S. Patent and Trademark Office, from 1999-2003 more than one-sixth of the patents up for renewal were left to expire. In that period, over 260,000 patents expired because of non-renewal. *See* U.S. PATENT & TRADEMARK OFFICE, FY 2003 PERFORMANCE AND ACCOUNTABILITY REPORT 106, *available at* www.uspto.gov/sites/default/files/about/stratplan/ar/USPTOFY2003PAR.pdf.

explained above, the value to society of the products and services covered by those IPRs is bound to exceed the value to the holder of the IPRs because even monopolists are typically unable to extract all the consumer surplus generated by the products and services they commercialize.

Society generally allows successful innovators to enjoy some market power because they must receive a reward for their risky and costly investments or they will not invest. The reward must be higher for innovations that require larger investments. Getting a new drug to market, launching a new Hollywood film, developing a new application for a smartphone or a new algorithm for an ecommerce platform are all costly endeavors. Investors can recover the significant sunk costs incurred at the R&D stage only if they can charge prices that exceed the incremental costs of production when the innovation is ready to be marketed. The right to exclude can ensure that ex post competition does not unduly limit the profits investors can earn when their projects succeed. It is for this reason that the right to exclude conferred by an IPR has a direct, positive effect on the incentive to innovate.

Another reason the rewards obtained for successful projects must be large is that most innovation efforts fail. In other words, the promise of potentially earning monopoly profits is the prize for a game in which most people lose.[16] Many of the failures are invisible. But the failures we do see remind us how fleeting success is. For example, most new drugs fail to reach the commercialization stage.[17] In fact, many films, including those produced by the so-called Hollywood majors and directed by top professionals, fail to turn a profit.[18] Therefore, inventors and investors, even those that are relatively risk-loving, will invest and commit resources, time, and effort only if they expect that the rewards for the few successes they may achieve will compensate them for the many failures.

The right to exclude has yet another important effect on the incentive for innovation. Without it, people would tend to wait for others to incur the costs and risks of innovation and then free ride on the resulting creations.[19] In the extreme case, everyone waits for others to invest and, as a result, investment and innovation cease and the economy stagnates.

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16 *See* U.S. Small Business Administration, *Frequently Asked Questions* 1 (Aug. 2017) (estimating that in the United States "[a]bout half of all establishments survive five years or longer"), https://www.sba.gov/sites/default/files/advocacy/SB-FAQ-2017-WEB.pdf; Bureau of Labor Statistics, Entrepreneurship and the U.S. Economy (last modified April 28,2016), https://www.bls.gov/bdm/entrepreneurship/bdm_chart3.htm (publishing the survival rates of U.S. firms from 1994-2015 validating the estimate that ~50% of firms fail after five years).

17 Henry Grabowski, *Patents, Innovation and Access to New Pharmaceuticals*, 5(4) J. INT'L ECON. L. 849–860 (2002).

18 *A fine Romance*, THE ECONOMIST (Mar. 29, 2001) *available at* www.economist.com/node/554490.

19 Richard J. Gilbert& Carl Shapiro, *An Economic Analysis of Unilateral Refusals to License Intellectual Property*, 93 PROC. NATL. ACAD. SCI 12749-12755 (1996), *available at* www.pnas.org/content/pnas/93/23/12749.full.pdf.

B. Licensing

After an IPR has been created, it is often most efficient to make it widely available—ex post, full dissemination and disclosure of an innovation is socially optimal. But if dissemination or disclosure are made mandatory, then the IPR may not be created in the first place; ex ante, the ability to exclude and limit dissemination and disclosure is optimal for the creation of IP. In other words, the core right to exclude is often critical to incentivize innovators to invest in costly and risky research and development. There are some circumstances, however, in which this ex post / ex ante tradeoff does not operate: namely, when the IP holder finds it privately profitable to license its IPR to one or more implementers.

In these circumstances, the innovator chooses not to exclude all actual or potential competitors but rather to enable some or all of them to produce the products or services that are made available as a result of its innovation. An inventor may choose to license because it prefers to specialize itself in product design and outsource the manufacturing to others, who may have better access to capital markets or may already possess the needed production facilities and enjoy considerable economies of scale and scope.

Of course, the innovator will license its IPR only if it expects to obtain an appropriate return in the relevant technology market; in other words, only if the expected net present value of the royalty payments received from licensees exceeds the expected value the IPR holder could obtain by exercising its right to exclude actual and potential competitors. Whether the technology market functions efficiently, allowing IP owners to license their innovations profitably, depends upon whether they are able to enforce their IPRs against an infringer, i.e. against someone that uses the innovation without paying for it.

The existence of technology markets in which IP owners can license their innovations efficiently and at attractive terms is likely to have a positive effect on their incentives to invest in innovation. Since licensing will take place only when licensing revenues exceed the profits the IP owner could obtain by excluding rivals, the option to license ex post unambiguously increases the incentive to invest ex ante. Therefore, licensing contracts will generally be procompetitive, fostering both competition ex post and innovation ex ante.[20] The exception to this general proposition involves licensing agreements made between competitors seeking to reduce competition ex post. An example, would be a hypothetical cooperative R&D agreement that de

[20] U.S. DEP'T OF JUSTICE & FED. TRADE COMM'N, ANTITRUST GUIDELINES FOR THE LICENSING OF INTELLECTUAL PROPERTY § 2.3 (Jan. 12, 2017), *available at* www.justice.gov/atr/IPguidelines/download [hereinafter DOJ/FTC IP GUIDELINES].

facto reduces the number of competing innovators and through which price coordination can be achieved.[21]

In many circumstances, however, the IP owner may find it privately profitable not to license its product. For example, the IP owner may consider that it is best placed to commercialize the innovation itself. Or it may be that the whole purpose of the new innovation was to escape head-to-head competition and thereby increase profitability. Alternatively, the IP owner may be unable to obtain an appropriate return on its investment by licensing because its bargaining power *vis-à-vis* potential licensees is weak. This may be because there are few potential licensees, each of which has considerable monopsony power, or because the institutional framework makes it difficult to monitor and enforce a licensing agreement. For one reason or another, therefore, the IPR holder's decision not to license cannot be presumed anticompetitive. Innovators should be entitled to exercise the right to exclude if that is the option that makes them better off.

C. Compulsory Licensing

An IPR is meaningful only if its holder can raise the price of the product embodying the IPR above the competitive level by restricting output below the competitive level. While this supra-competitive price is justified ex ante because of its positive effect on the incentive to innovate, it distorts the efficient allocation of resources ex post. Diagrammatically, it generates a "monopoly-loss triangle" (or deadweight loss), given by the value that consumers do not get from the output the monopolist does not produce (see area L in Figure 2 below).

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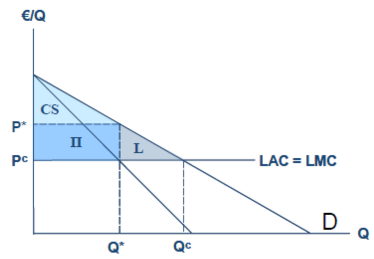
21 *Id*., § 3.

Figure 2: Monopoly-loss Triangle



The competitive equilibrium is at (Pc,Qc). The monopoly outcome results in a higher price and lower quantity given by (P*,Q*). The result is a deadweight loss of welfare to society given by L, commonly known as the monopoly-loss triangle. Π is the monopoly profit and CS is consumer surplus. The negative impact of monopoly power on consumer's welfare is equal to the sum of the supra-competitive profits Π and the deadweight loss L.

In a concrete example, one can imagine the value that society loses when pharmaceutical companies charge prices for pills that far exceed the cost of manufacturing those pills. But, as explained further below, this example examines only the static view of monopoly pricing, and ignores the dynamic view. Under a dynamic view, the supra-competitive profits (area II) represents not only producer surplus, but return on investment. The dynamic view also recognizes that the innovation at issue created an entirely new demand curve. While consumers gain from increases in static efficiency in the short run, dynamic efficiency, including societal gains from innovation, are an even greater driver of consumer welfare. As such, policymakers must decide whether the societal gains from stimulating investment in innovation outweigh the losses from allowing monopoly pricing.

Industrial societies have balanced these considerations and reached a consensus. A society can rely upon a number of policy instruments to stimulate intellectual creativity, including prizes, honors, social prestige, and government funding, but those are unlikely to substitute for granting and enforcing IPRs. Copyrights, patents, and trade secrets fill out the arsenal in promoting economic progress because strong IPRs are needed to stimulate and protect innovation and investment.[22] Governments have made complex economic policy judgments regarding IPRs. They have chosen to enforce those rights through laws and institutions. As we have already explained, the logic behind this choice is that innovations—and the new and improved products and processes they enable—are extraordinarily valuable. While some may bemoan the high cost

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[22] *See, e.g.*, Maureen K. Ohlhausen, *Patent Rights in a Climate of Intellectual Property Rights Skepticism*, Harvard J. of Law & Techn. Vol. 30, No. 1 (Fall 2016) (surveying the empirical and theoretical literature on the relationship between patents and innovation, concluding that, while "[i]t is true that it is not always possible to identify when patents are a but-for cause of innovation . . . there is ample evidence that patents serve a materially valuable role in promoting innovation in at least some settings").

of pharmaceuticals, for instance, the fact is that in the absence of patent protection, few of these drugs would have been produced, put through clinical trials, and made available to consumers.

Governments also have defined limits to the protection afforded by IP laws. This is most obvious in the case of a patent, which expires after 20 years so others can then make use of the knowledge free of charge. Similarly, once a copyright expires, anyone may reproduce and distribute the material without charge. Furthermore, there is a vast category of "intellectual stuff," such as mathematical methods and theorems, for which it is not possible to obtain a property right. Some creations of the mind may be so valuable from a social standpoint that we do not want to restrict their use even for a limited time. One must be careful not to assign property rights unnecessarily. For example, if the discovery of a "law of nature" could be patented, more scientific progress would be blocked than stimulated. For this reason, in the United States and elsewhere, ideas are not appropriable and obviousness is a ground for denying a patent even for a matter that is patentable subject matter.

In short, governments and societies have struck a balance between the incentives for innovation (*dynamic efficiency*) and the inefficiencies stemming from the exercise of market power (*static efficiency*).[23] The pragmatic resolution of this trade-off is precisely the subject and content of IP law. In fact, the decision to grant IPRs for only a limited period already reflects a balancing of the interest in free competition with that of providing incentives for research and development and more generally, creativity. In order to ensure consistency with the balancing decision struck by IP law, there should in principle be no obligation to license IPRs during that limited period of exclusivity granted by the law.

This raises an obvious question: when is compulsory licensing likely to increase long-run consumer welfare? To answer this question, consider a dominant firm in an upstream technology market that refuses to license its IP to a third party with which it competes in a downstream market. Compulsory licensing would have two main and opposing effects on welfare.

First, compulsory licensing reduces the incentives to innovate both in the first place and in creating competing alternative technologies. Indeed, those advocating forced sharing often

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[23] This is not to say that all governmental agencies around the world have taken the same view. In particular, the European Commission and China have at times been more receptive than the United States to compulsory licensing, drawing criticism from U.S. enforcers and academics. *See, e.g.*, Makan Delrahim, *Forcing Firms to Share the Sandbox: Compulsory Licensing of Intellectual Property Rights and Antitrust,* Address to the British Institute of International and Comparative Law (May 10, 2004) (discussing the European Court of Justice's decision in *IMS Health* and expressing concern that "an improperly-designed compulsory license can stifle innovation").

underestimate the determined ability of rivals to create work arounds or other competing products. As Professor Massimo Motta, former Chief Economist at the EU Competition Directorate, states, "[i]f antitrust agencies tried to eliminate or reduce market power whenever it appeared, this would have the detrimental effect of eliminating firms' incentives to innovate."[24] The effect on social welfare of reduced incentives for innovation is potentially very large and equal to the reduction in total surplus (area Π + CS in Figure 2) that results from a lower number of product and process innovations. A lower rate of innovation means smaller profits (a smaller area Π) and lower consumer satisfaction (a smaller area CS). This negative effect will be largest when competitors with a compulsory license to use the innovator's IP make products that are close substitutes for those of the IP innovator.

Working in the other direction, compulsory licensing may increase competition in the short-term, thus contributing to increased consumer welfare by: (1) eliminating the deadweight loss of market power (so consumer surplus increases by area L in Figure 2); and (2) forcing firms to price at marginal costs (i.e. consumers appropriate area Π in Figure 2). This effect will be largest when the degree of market power derived from the exercise of the IPR is greatest. That is, when the right to exclude embodied in the IPR leads to the exclusion of all competition in the downstream market, possibly because access to that IP is indispensable to carry on business on that market. Compulsory licensing may also have a positive effect on consumer welfare in the long run if it facilitates the development of new products for which there is potential demand.

In practice, it is close to impossible to accurately balance the welfare-increasing and welfare-decreasing effects of compulsory licensing. As a first approximation, this involves comparing areas CS + Π (the welfare cost of compulsory licensing) and Π + L (the welfare benefit of compulsory licensing) or, after simplification, comparing areas CS and L, which is a complex and inherently somewhat speculative exercise in the real world.

In general, however, compulsory licensing is likely to have an overall negative effect on welfare because area CS is likely to be large than area L. This is true for two reasons. First, the available evidence indicates that innovators do not generally appropriate the entire social value of their innovations, and that most of the value of the new products and processes are sooner or later passed on to consumers. Using data from the U.S. non-farm business sector, Professor William Nordhaus of Yale University, one of the classical authors on the economics of innovation, finds that innovators are able to capture only about 2.2 percent of the total surplus created by their

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[24] MASSIMO MOTTA, COMPETITION POLICY: THEORY AND PRACTICE 64 (2004).

innovation.[25] This result implies that the private incentives to innovate are likely to be lower than socially optimal and also that the degree of market power *de facto* enjoyed by innovators is rather limited. Consequently, compulsory licensing is likely to depress innovation from levels that are already inefficiently low, without providing any significant procompetitive effect in the short-term. In terms of Figure 2, this suggests that area CS is likely to be large and area L small.

Second, area L may also be small because compulsory licensing reduces welfare not only in the long-term but also in the short-term. Compulsory licensing may: (1) facilitate entry of inefficient producers in the downstream market; (2) promote licensing arrangements that discourage potential entrants from developing products that are significantly different from that of the IP holder, thus reducing product variety below what it otherwise would be; and (3) encourage licensing arrangements that help companies coordinate their respective commercial policies, leading to higher prices. In this last respect, as Professor Frank Easterbrook of the University of Chicago has pointed out,[26] there is a contradiction between the primary antitrust goal of protecting and promoting aggressive competition on the merits and a policy that imposes an obligation to deal with competitors in order to achieve a "level playing field" irrespective of differences in business acumen, skill, or foresight.

It follows that compulsory licensing is likely to increase long-run consumer welfare only in *exceptional circumstances*, because only in exceptional circumstances would the benefits of mandatory licensing exceed its costs. In order to determine which exceptional circumstances would justify interfering with the rights conferred by IP law, we should consider first the circumstances under which the positive effects of compulsory licensing would be greatest and then the circumstances under which its costs would be lowest.

The benefits of compulsory licensing will be greatest when: (1) the IP is indispensable to compete; and (2) the refusal to license (a) causes the exclusion of all competition from the downstream market, and (b) prevents the emergence of markets for new products for which there is substantial demand.[27] Conditions (1) and (2)(a) ensure that the short-term welfare loss resulting from a refusal to license is maximal (area L is large). Sharing a monopoly between a licensor and a licensee does not increase competition unless it leads to improvements in price and output; i.e.,

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[25] William D. Nordhaus, *Schumpeterian Profits in the American Economy: Theory and Measurement*, 4, n.6 (Cowles Found. Discussion Paper No. 1457, 2004), *available at* https://papers.ssrn.com/sol3/papers.cfm?abstract_id=537242.

[26] Frank H. Easterbrook, *On Identifying Exclusionary Conduct*, 61 NOTRE DAME L. REV. 972-980 (1986).

[27] This was clearly the case in *Magill*, in which the European Commission found that the refusal to license RTE's and BBC's copyrights prevented Magill from commercializing a product (a TV listing magazine) that was very popular among Irish TV viewers, and for which there were no substitutes in the market.

nothing has been achieved in terms of enhancing consumer welfare unless compulsory licensing has a first-order effect on downstream competition. Condition (2)(b) implies that the refusal to license has a long-run cost as well as a short-term cost.

The costs of compulsory licensing will be smallest when (3) the products to be developed by the licensees are significantly differentiated from those of the IPR holder, e.g., because they satisfy needs that the existing products failed to address; or (4) when the investments needed to obtain the IP were funded by the state or through non-market resources (e.g. prizes).

When conditions (3) and (4) fail to hold, the obligation to license is bound to have both a profoundly negative effect on the incentives for sequential innovation and no social benefit in the short-term. However, one would not expect to observe a unilateral refusal to license when these two conditions do hold because in those circumstances the IP holder is likely to be better off licensing its IP, thus reaping some of the rents generated by the new products at no cost to its own existing business. In other words, when (3) and (4) hold, there is likely to be a mutually acceptable license since total industry profits with licensing exceed total industry profits without licensing.

Not surprisingly, most economists are wary of compulsory licensing.[28] This skepticism is enhanced once one takes into account that compulsory licensing may provide incentives for free riding and, hence, reduce the scope for competition in innovation. And it remains even after taking into account the possibility of fine tuning the obligation to deal by allowing positive, reasonable, and non-discriminatory royalty rates. No doubt, the welfare consequences of a compulsory licensing obligation depend, among other things, upon the form of the licensing arrangement (e.g., fixed licensing fees vs. two-part tariffs) and the level of the royalty rates, if any is prescribed. A zero-royalty rate will promote the entry of inefficient competitors and have a large negative effect on investment. If the royalty rate is high, however, the compulsory license may not provide meaningful access. To repeat, sharing a monopoly among several competitors does not in itself increase competition unless it leads to improvements in price and output, otherwise nothing has been achieved in terms of enhancing consumer welfare. Competition would be improved only if the terms upon which access is offered allow the licensing parties to compete effectively with the dominant firm on the relevant downstream market. Imposition of such conditions would, however, require courts and antitrust enforcers to act as central planners,

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[28] Gilbert & Shapiro, *supra*, note 19.

identifying the proper price, quantity, and other terms of dealing. As the U.S. Supreme Court has recognized, this is a "role for which they [courts and agencies] are ill suited."[29]

D. Standards Development and Standard Essential Patents

The consensus view supporting a cautious approach to compulsory licensing has been questioned with respect to the licensure of SEPs.[30] The claim is that SEPs confer market power because the standardization process leads to the exclusion of alternative technologies; as a result, it is said, SEP owners have the ability and incentive to charge excessively high royalty rates (and/or apply other onerous terms and conditions) in their licensing agreements or even constructively refuse to license their IP at all.

This view seems to be based upon the assumption that standardization is an exceptional circumstance warranting compulsory licensing. It follows from this view that SEP owners should be required to license their patents at quasi-regulated (i.e. low) rates and be prohibited from seeking an injunction against infringement if licensing negotiations break down.[31] Proponents of this view disregard as impractical or ineffective the commitments most standard-development organizations ("SDOs") require of their members, that they make reasonable efforts to identify and disclose any IP that might be relevant to a standard under development and, once disclosed, agree to license their relevant patents on FRAND terms.[32] Proponents also seem to ignore the fact that FRAND commitments are voluntary commitments made by SEP holders under the specific IPR Policies of various SDOs. "While policy and academic discussions often refer to 'the FRAND commitment' as if it were a monolithic promise, there are in fact subtle, but important, differences across SDOs in regards to their IPR policies."[33] As such, whether a specific IPR policy requires compulsory licensing (including at all levels of the distribution chain) is a fact-specific, policy-by-policy issue.

The lessons of economics are to the contrary: standardization should not be treated as an "exceptional circumstance" justifying compulsory licensing and price regulation. A patented

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[29] Verizon Communications Inc. v. Law Offices of Curtis V. Trinko, LLP, 540 U.S. 398, 408 (2004).

[30] *See, e.g.*, Mark Lemley & Carl Shapiro, *A Simple Approach to Setting Reasonable Royalties for Standard-Essential Patents*, 28 BERKELEY TECH. L. J. 1135-1166 (2013).

[31] *Id*.

[32] Jorge L. Contreras, *Rethinking RAND: SDO-Based Approaches to Patent Licensing Commitments* 8 (Patent Roundtable, Oct. 10, 2012), *available at* http://ssrn.com/abstract=2159749.

[33] Anne Layne-Farrar & Koren W. Wong-Ervin, *Methodologies for Calculating FRAND Damages: An Economic and Comparative Analysis of the Case Law from China, the European Union, India and the United States*, 8:2 JINDAL GLOBAL L. REV. 127, 26-27(2017) (citing Joanna Tsai & Joshua D. Wright, Standard Setting, Intellectual Property Rights, and the Role of Antitrust in Regulating Incomplete Contracts, 80 ANTITRUST L.J. 1 (2015)).

technology is usually included in a standard because, when the standard was established, it was the best technology available. Under these circumstances, inclusion in the standard confers no additional market power upon the patent owner. Any market power that the SEP owner may enjoy would be due to the quality of its technology and not due to the standardization process.[34]

Even when there might have been a competition between two or more technologies at the standardization stage, the selected technology may still be chosen due to superior performance, functionality, and/or lower implementation costs by a consensus among the industry engineers who participate in the decision making.[35] Insofar as inclusion in the standard might nonetheless confer some market power, the potential for exploiting it would be foreclosed by the required FRAND obligation and the need of the innovator to continue to "win" such competitions in the future.

Thousands of license negotiations involving FRAND-committed SEPs have been successfully resolved.[36] Arbitrators, courts, and competition authorities should realize that when royalties for a FRAND-encumbered patent are being negotiated, the threat of adjudication or review by a third party will foreclose the exercise of market power and, hence, the exploitation of licensees. Sophisticated customers have the ability and incentive to bring SEP holders to court if they consider that the rates or other terms being offered are not truly FRAND. All other customers, whether large or small, will then be protected by the 'non-discriminatory' part of the FRAND obligation.

There is therefore no reason as a matter of economics to adopt a more restrictive regulatory approach toward the unilateral actions of SEP owners when any market power an SEP owner may enjoy is conferred by patent protection, as a reward for successful innovation, and not by the patent's inclusion in a standard. We note that patent owners are subject to the same risk/reward trade off when there are standards as when there are not. A firm invests hoping to develop a technology or component that can contribute to the standard and therefore receive a

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34 *See, e.g.*, Anne Layne-Farrar & Jorge Padilla, *Assessing the Link Between Standards and Patents* 19, 25-27, INTN'L J. IT STANDARDS & STANDARDIZATION RES. (July-Dec. 2011) [hereinafter Layne-Farrar & Padilla].

35 As Dr. Kirti Gupta has explained based on her decade-long experience as a wireless systems engineer who participated in standards meetings for 3G and 4G technologies: "The formation of technology standards is not about selecting between equally suitable existing technical alternatives but about firms cooperatively creating new technical solutions where none existed prior to the articulation of the new problem (or requirement) to solve the problem." Kirti Gupta, *How SSOs Work: Unpacking the Mobile Industry's 3GPP Standards*, in THE CAMBRIDGE HANDBOOK OF TECHNICAL STANDARDIZATION LAW: COMPETITION, ANTITRUST, AND PATENTS, 29, 33-34 (Jorge Contreras ed., 2017). Of significance, "the active participants in these [standards-development] meetings are engineers and discussions are of a purely technical nature. Objective metrics for technical merit are relied upon to select between alternative proposed solutions, usually related to performance, efficiency, or a combination of the two." *Id.* at 39..

36 *See generally* Jeffrey I.D. Lewis, *What is "FRAND" All About? The Licensing of Patents Essential to an Accepted Standard* (June 11, 2014), *available at* https://cardozo.yu.edu/what-%E2%80%9Cfrand%E2%80%9D-all-about-licensing-patents-essential-accepted-standard, for a discussion on license negotiations involving FRAND-committed SEPs, and the inference that thousands have been successfully resolved.

return on its investment. Being part of a standard may increase opportunities to earn and collect a royalty, but that upside is offset ex ante by the risk that the firm's technology will not be included in the standard, and another technology is selected instead. In other words, the significant risk of not being included in a standard (and thus having likely created technology that has no alternative use) counterbalances the potential benefits from widespread marketplace adoption. Ex post regulation of license fees would cap the firm's incentives to invest in the hope of becoming part of that standard.[37] Prospects of inclusion in the standard are part of the calculus that determines whether to invest in creating a superior technology. Restricting or limiting the returns the patent owner receives if its technology is included in the standard alters this calculus, which may result in firms not expecting to cover their long-run costs and therefore deciding not to invest in innovation.

In conclusion, we see no justification for adopting a regulatory approach to the licensing of SEPs.[38] There is no reason to regulate SEP royalties and no valid argument for restricting the right of SEP owners to seek an injunction when licensees are infringing or refusing to negotiate in good faith. The availability of injunctions is essential for the appropriate functioning of the IP system, since compensatory damages are generally insufficient to deter willful behavior. As explained by Denicolò *et al*., the availability of injunctive relief in case of patent infringement leads to more innovation and more consumer welfare.[39] The threat of injunctive relief induces implementers of patented technology to negotiate reasonable terms and conditions without undue delay. This ensures that innovators are appropriately compensated for their efforts, which in turn ensures that firms have incentives to invest in further innovations.

Significantly, Denicolò *et al.* find that the optimality of injunctive relief holds true both when implementers face no cost of switching technologies and when switching technologies would be costly. In both circumstances, denying the availability of injunctive relief will under-reward innovation, to the ultimate detriment of consumers.

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[37] Anne Layne-Farrar, Gerard Llobet, & Jorge Padilla (2014), *Payments and Participation: The Incentives to Join Cooperative Standard Setting Efforts*, *Journal of Economics and Management Strategy*, Volume 23, Number 1, Spring 2014, 24-49.

[38] This holds for alleged refusals by vertically integrated SEP holders to license at the component level (i.e., no foreclosure of the component level) so long as (1) the vertically integrated SEP holder does not assert its patents at the component level, and (2) it licenses its SEP portfolio to downstream (finished device) manufacturers on FRAND terms, irrespective of whether they source components from its own subsidiary or from the nonintegrated rival. Jorge Padilla & Koren Wong-Ervin, *Portfolio Licensing to Makers of Downstream End-User Devices: Analyzing Refusals to License FRAND-Assured Standard-Essential Patents at the Component Level*, THE ANTITRUST BULLETIN, Vol. 62(3) 494, 505 (2017) [hereinafter Padilla & Wong-Ervin].

[39] Vincenzo Denicolò, Damien Geradin, Anne Layne-Farrar, & Jorge Padilla, *Revisiting Injunctive Relief: Interpreting eBay in High-Tech Industries with Non-Practicing Patent Holders*, 4 J COMPETITION L. & ECON. 571-608 (2008).

E. IO Toolkit for Vertical Restraints

Licensing agreements are vertical contracts linking a firm operating in an upstream technology market (the licensor) and a firm operating in a downstream market (the licensee). In some cases, the licensor may also be active in the downstream market. In those cases, the licensing agreement may also have horizontal implications.

Economists have concluded that most vertical agreements are procompetitive or benign.[40] As the U.S. Federal Trade Commission's ("FTC's") former Director of the Bureau of Economics Francine Lafontaine explained when summarizing the body of economic evidence analyzing vertical restraints, "it appears that when manufacturers choose to impose [vertical] restraints, not only do they make themselves better off but they also typically allow consumers to benefit from higher quality products and better service provision."[41]

Some vertical restraints are imposed in order to limit double marginalization,[42] while many others are used simply to encourage downstream firms to expand output.[43] Of course, some vertical agreements may be abused to induce or conceal anticompetitive effects by, for example, facilitating coordination in downstream markets or restricting competition in upstream markets. Examples of the former include some (but far from all) resale price maintenance contracts[44] as well as some (but not all) most-favored-nation agreements.[45] Examples of the latter may be some (but far from all) exclusivity and single branding[46] agreements as well as some (but not all) agreements involving tying or bundling.[47]

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[40] *See, e.g.*, James C. Cooper, Luke M. Froeb, Dan O'Brien & Michael G. Vita, *Vertical Antitrust Policy as a Problem of Inference*, 23 INT'L J. INDUS. ORG. 639, 642, 658 (2005) (surveying the empirical literature, concluding that although "some studies find evidence consistent with both pro- and anticompetitive effects . . . virtually no studies can claim to have identified instances where vertical practices were likely to have harmed competition," and, "[i]n most of the empirical studies reviewed, vertical practices are found to have significant procompetitive effects"); Benjamin Klein, *Competitive Resale Price Maintenance in the Absence of Free-Riding*, 76 ANTITRUST L.J. 431 (2009); Bruce H. Kobayashi, *Does Economics Provide a Reliable Guide to Regulating Commodity Bundling by Firms? A Survey of the Economic Literature*, 1 J. COMP. L. & ECON. 707 (2005); Daniel P. O'Brien, *The Antitrust Treatment of Vertical Restraints: Beyond the Possibility Theorems*, *in* THE PROS AND CONS OF VERTICAL RESTRAINTS 40, 76 (2008) ("With few exceptions, the literature does not support the view that [vertical restraints] are used for anticompetitive reasons" and "[vertical restraints] are unlikely to be anti-competitive in most cases.").

[41] Francine Lafontaine & Margaret Slade, *Exclusive Contracts and Vertical Restraints: Empirical Evidence and Public Policy*, *in* HANDBOOK OF ANTITRUST ECONOMICS 391-414 (Paolo Buccirossi ed., 2008).

[42] Patrick Rey & Thibaud Vergé, *The Economics of Vertical Restraints*, *in* HANDBOOK OF ANTITRUST ECONOMICS 353-390 (Paolo Buccirossi ed., 2008).

[43] *Id*.

[44] Benjamin Klein, *The Evolving Law and Economics of Resale Price Maintenance*, 57 *J. L. & Econ.* S161-S179 (2014).

[45] Amelia Fletcher and Morten Hviid), *Broad Retail Price MFN Clauses: Are they RPM "at its Worst"?*, 81 ANTITRUST L.J. 61-98 (2017).

[46] Rey & Vergé, *supra* note 38.

[47] Erik Hovenkamp & Herbert Hovenkamp, *Tying Arrangements and Antitrust Harm*, 52 ARIZ. L.REV. 925 (2010).

As a matter of economics, the competitive implications of vertical agreements should be assessed using a structured rule-of-reason (or effects-based) approach.[48] Under this approach, a vertical agreement is considered lawful unless it fails one or more tests aimed at establishing that it is like to have an anticompetitive effect, in which case the antitrust authority will balance the anticompetitive and procompetitive effects to determine whether the overall effect of the agreement is anticompetitive.[49]

What is true for a generic vertical agreement, such as one involving a supplier of car parts and a car manufacturer, is also true for licensing agreements. Licensing agreements are generally procompetitive and, as such, should be presumed lawful unless there is evidence that they distort competition to the ultimate detriment of consumers.[50] Determining their compatibility with antitrust laws cannot be based exclusively upon formalistic criteria but requires a detailed economic analysis to identify first whether they are capable of foreclosing competition and, if so, whether the potential anticompetitive effects outweigh any procompetitive benefits.[51]

II. POLICY IMPLICATIONS FROM ECONOMICS

This Section provides a roadmap, based upon the economic principles discussed in Section I, for market definition; analysis of monopoly power or market dominance; refusals to license; tying and bundling; grantbacks and cross-licenses; excessive pricing prohibitions, and the seeking or enforcing of injunctive relief against infringement of FRAND-assured SEPs.

A. General Principles

General Principles Roadmap:

(1) Conduct involving IP, including FRAND-assured SEPs, will be analyzed under the same antitrust analysis applied to conduct involving other forms of property, taking into consideration the special characteristics of IPRs, such as ease of misappropriation;

(2) With the exception of naked restraints such as price fixing, IP licensing is generally procompetitive and therefore will be analyzed under an effects-based approach so that licensing restraints will be condemned only if the anticompetitive effects, if any, are not outweighed by procompetitive effects;

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48 Matthew Bennett & Jorge Padilla, *Article 81 EC Revisited: Deciphering European Commission Antitrust Goals and Rules, in* COMPETITION POLICY IN THE EU: FIFTY YEARS ON FROM THE TREATY OF ROME (Xavier Vives ed., 2009).

49 *Id.*

50 DOJ/FTC IP GUIDELINES, *supra* note 20.

51 DOJ/FTC IP GUIDELINES, *supra* note 20, at 3.3-4.

(3) In order to protect an IPR holder's core right to exclude, when considering whether specific conduct has anticompetitive effects, the analysis will include a determination of what would have happened in the absence of a license (the "but for world"); and

(4) In analyzing whether conduct has anticompetitive effects, the key inquiry is whether it foreclosed a rival from competing for minimum efficient scale.

The first principle derives from, among other things, the literature (discussed in Section I) developed in the 1960 s through the 1980s on the economics of vertical contractual restraints, as applied to intellectual property. Modern experience with antitrust analysis of IP indicates the IO economics toolkit is sufficiently flexible to deal with IPRs.[52]

The second principle also recognizes the procompetitive benefits of licensing, as explained in Section I.

The third principle honors an IPR holder's core right to exclude and protects the innovation incentives discussed in Section I. Under this principle, when considering the effects of a licensing restraint (such as tying or bundling), the decisionmaker compares actual effects to what would have happened had the IP holder decided to exercise its core right not to license in the first place. This is critically important given that economic analysis and evidence shows that IPRs—the central feature of which is the right to exclude[53]—stimulate innovation.[54] Like other property rights, IPRs also facilitate economic exchange.[55] In particular, they facilitate the sale and licensing of IP by defining the scope of property right protection, lowering transaction costs, and producing incentives to develop alternative technologies, improvements, and other derivative uses.

The fourth principle recognizes that there can be no anticompetitive effect unless the IPR holder "foreclose[s] a sufficient share of distribution so that a manufacturer's rivals are forced to operate at a significant cost disadvantage for a significant period of time."[56] Absent foreclosure

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52 *See e.g.*, Remarks of Timothy J. Muris, Former Chairman, Fed. Trade Comm'n, Competition and Intellectual Policy: The Way Ahead, Address Before the Antitrust Section Fall Forum (Nov. 15, 2001), *available at* www.ftc.gov/public-statements/2001/11/competition-and-intellectual-property-policy-way-ahead.

53 *See, e.g.*, U.S. CONST. art. I, § 8, cl. 8 (empowers the Congress "[t]o promote the Progress of Science and useful Arts, by securing for limited Times to . . . Inventors the *exclusive* Right to their . . . Discoveries" (emphasis added)).

54 *See, e.g.*, WILLIAM M. LANDES & RICHARD A. POSNER, THE ECONOMIC STRUCTURE OF INTELLECTUAL PROPERTY LAW (2003).

55 *See e.g.*, Henry E. Smith, *Intellectual Property as Property: Delineating Entitlements in Information*, 116 YALE L.J. 1742 (2007) (discussing the economic rationale behind intellectual property's close relationship with other property).

56 Benjamin Klein, *Exclusive Dealing as Competition for Distribution "On the Merits"*, 12 GEO. MASON L. REV. 119, 122 (2003).

sufficient to deprive a rival of the opportunity to compete for minimum efficient scale, licensing conduct cannot create or maintain market power.[57] Measuring foreclosure of the critical input requires an understanding of the minimum efficient scale of production.

B. Market Definition and Monopoly Power or Market Dominance

Market Definition and Monopoly Power or Market Dominance Roadmap:

(1) Monopoly power is a necessary but not a sufficient condition for monopolization or abuse of dominance, but analysis should be focused on competitive effects. Therefore, it is not necessary to determine a relevant market and conduct an analysis of monopoly power if there is not sufficient evidence of net anticompetitive effects.

(2) There is no presumption that IP confers monopoly power or market dominance. Instead, an analysis must be conducted on a case-by-case basis to determine whether a specific IP holder has the ability to control market prices and output for a significant period of time.

(3) Market definition is defined to capture as accurately as possible the competitive constraints a firm faces. Those constraints often take the form of demand or supply-side substitutes but, with respect to SEPs, the constraints may consist of the FRAND assurance and/or complementarities; SEPs are perfect complements, which creates an interdependence among patent holders such that an SEP cannot be licensed in isolation.

Economics counsels a shift away from the focus on market definition and market power and towards a focus on competitive effects. This is particularly important in IP matters where it is often more difficult to determine monopoly power because IP holders must necessarily charge more than marginal costs in order to recoup their investment, and there are substantial risks involved in seeking to create and commercialize IP. Relatedly, in high-tech markets involving IPRs, the lines between markets may be not be clearly delineated. The risk here is in inferring monopoly power from shares of a defined market, an approach that is fraught with error, particularly in high-tech business models involving IP.

Market power and monopoly power are related but not the same. Market power is the ability to raise prices above what would be charged in a competitive market, i.e., the power of a

[57] Joshua D. Wright, *Moving Beyond Naïve Foreclosure Analysis*, 19 GEO. MASON L. REV. 1163, 1166 (2012) (collecting sources). *See also* Derek W. Moore & Joshua D. Wright, *Conditional Discounts and the Law of Exclusive Dealing*, 22 GEO. MASON L. REV. 1205 (2015).

firm to exert some control over the price it charges.[58] Some degree of market power is nearly universal. Few firms are pure price takers facing perfectly elastic demand. For example, the unique location of a dry cleaner may confer slight market power because some customers are willing to pay a little more rather than go an extra block or two to the next-closest dry cleaner. Virtually all products that are differentiated from one another, if only because consumer tastes, seller reputation, or location confer upon their sellers at least some degree of market power. This slight degree of market power is unavoidable and is understood not to warrant antitrust intervention.

"Monopoly power" is conventionally understood to mean substantial market power, or the power to control market-wide prices or to exclude competition.[59] In other words, market power may be defined as power over one's own price, while monopoly power is defined as power over market prices. Monopoly power may also be defined as the ability to exclude competitors from the market since such power characteristically allows the firm to control market-wide prices. Finally, monopoly power must be more than fleeting; it must be durable.[60]

IP may well guarantee a firm a downward sloping demand curve for its own product or services. However, a firm with a downward sloping demand curve has market power only in the technical economic sense that it can sustain a price greater than its marginal cost (i.e., the cost of producing one more unit); this is true of nearly every firm in the modern economy.[61] Indeed, in

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58 *See, e.g.*, Bruce H. Kobayashi, *Spilled Ink or Economic Progress? The Supreme Court's Decision in Illinois Tool Works v. Independent Ink*, 53 THE ANTITRUST BULL. 5-33 (2008); *see also* Ohio v. Am. Express Co., 2018 U.S. LEXIS 3845, at *27 (U.S. 2018) ("'Market power is the ability to raise price profitably by *restricting output*.'" (quoting PHILLIP E. AREEDA & HERBERT HOVENKAMP, FUNDAMENTALS OF ANTITRUST LAW § 5.01 (4th ed. 2017)) (emphasis added).

59 *See, e.g.*, United States v. E.I. du Pont de Nemours & Co., 351 U.S. 377, 391 (1956) ("Monopoly power is the power to control prices or exclude competition"); Am. Council of Certified Podiatric Physicians & Surgeons v. Am. Bd. of Podiatric Surgery, Inc., 323 F.3d 366, 372 (6th Cir. 2003) ("Monopoly power is the power to exclude competition or control prices."); United States v. Microsoft Corp., 253 F.3d 34, 51 (D.C. Cir. 2001) ("a firm is a monopolist if it can profitably raise prices substantially above the competitive level").

60 *See, e.g.*, Colo. Interstate Gas Co. v. Nat. Gas Pipeline Co. of Am., 885 F.2d 683, 695–96 (10th Cir. 1989) ("If the evidence demonstrates that a firm's ability to charge monopoly prices will necessarily be temporary, the firm will not possess the degree of market power required for the monopolization offense."); *see also* U.S. DEP'T OF JUSTICE & FED. TRADE COMM'N, ANTITRUST GUIDELINES FOR THE LICENSING OF INTELLECTUAL PROPERTY § 2.2 (Jan. 12, 2017), *available at* www.ftc.gov/system/files/documents/public_statements/1049793/ ip_guidelines_2017.pdf [hereinafter U.S. 2017 IP GUIDELINES].

61 John Shepard Wiley, Jr. & Benjamin Klein, *Competitive Price Discrimination as an Antitrust Justification for Intellectual Property Refusals to Deal*, 70 ANTITRUST L.J. 599, 624–26 (2003) [hereinafter Wiley & Klein].

IP-intensive industries (where marginal costs are generally close to or at zero) it is well understood that prices equal to marginal cost would be insufficient to support investment in innovation.[62] The power to sustain a price greater than marginal cost is not the antitrust-relevant power to control market prices and output.[63] Thus, from an antitrust perspective, IP is neither necessary nor sufficient to confer market power.

The question of market power requires a case-by-case, fact-specific analysis of what constitutes a well-defined relevant market, whether there are potential substitutes and, with respect to SEPs, the degree to which any market power is mitigated by the FRAND assurance and/or complementarities.[64]

With respect to SEPs, it is also important to remember that SEPs are self-declared to SDOs—often through blanket declarations—yet no SDO evaluates essentiality, which may change over time as the standard continues through development.[65] Thus, until an independent review (legal and technical) establishes that a particular declared SEP is in fact essential, there can be no presumption of monopoly power.[66]

With respect to market definition, as the OECD has explained, the relevant market should be defined so that the competitive constraints a firm faces are captured as accurately as possible. While competitive constraints are often demand- and/or supply-side substitutes, that is not always the case. With respect to SEPs, the FRAND assurance mitigates monopoly power by limiting a FRAND-assured SEP holder to a "reasonable" royalty. It is also important to remember that SEPs are perfect complements (i.e., like nuts and bolts), which creates a connection among the patents and patent holders such that SEPs licensing terms cannot be set unilaterally by patent holders. Indeed, FRAND royalty rates are tied to the value the patented technologies contribute to the

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62 *See, e.g.*, William J. Baumol & Daniel G. Swanson, *The New Economy and Ubiquitous* Competitive *Price Discrimination: Identifying Defensible Criteria of Market Power*, 70 ANTITRUST L.J. 661, 665–68 (2003).

63 *See, e.g.*, Wiley, Jr. & Klein, *supra* note 52, at 628-29; *see also* United States v. E. I. du Pont de Nemours & Co., 351 U.S. 377, 389 (1956) ("[A] party has monopoly power if it has, over 'any part of the trade or commerce among the several states,' a power of controlling prices or unreasonably restricting competition.") (quoting Standard Oil Co. v. United States, 221 U.S. 1, 85 (1911)); DOJ/FTC IP GUIDELINES, *supra* note 20, § 2.3; U.S. DEP'T OF JUSTICE & FED. TRADE COMM'N, HORIZONTAL MERGER GUIDELINES §§ 2.1, 5.3 (2010), *available at* www.justice.gov/atr/public/guidelines/hmg-2010.pdf.

64 *See generally* ChriMar Sys. v. Cisco Sys., 72 F. Supp. 3d 1012 (N.D. Cal. 2014).

65 Many SDO's require patent holders to disclose whether they have patents (or pending patent applications) on any technology submitted for possible inclusion in a standard. Such disclosures are generally in the form of declarations from patent holders.

66 Anne Layne-Farrar & Koren Wong-Ervin, *Standard-Essential Patents and Market Power*, 2–3 (Geo. Mason L. & Econ. Research Paper No. 16-47, 2016), *available at* https://ssrn.com/abstract=2872172; *see also* ChriMar Sys. v. Cisco Sys., 72 F. Supp. 3d 1012, 1019 (N.D. Cal. 2014) ("In order to allege market power, the *Samsung* court required the plaintiff to allege that 'there was an alternative technology that the SSO was considering during the standard setting process and that the SSO would have adopted an alternative standard had it known of the patent holder's intellectual property rights.'" (quoting Apple Inc. v. Samsung Elecs. Co., Case No. 11–CV–01846–LHK, 2011 WL 4948567, at *5 (N.D. Cal. Oct. 18, 2011))).

standard. Therefore, in contrast to monopolists, who can set prices without consideration of other firms, SEP holders must take into account the value of other SEPs when setting their royalty rates. In this way, complementarity acts as a competitive constraint.[67] (This is, however, not to say that all SEPs are of identical value. Empirical analysis shows that the value of patents is highly skewed.[68])

In addition, because licensees know they must license various SEPs to be compliant with a given standard, they push back in negotiations if they think a SEP holder is asking for more than its proportionate share. This, too, limits any market power that might be conferred by essentiality. As such, the relevant market may well comprise all truly essential patents in a specific standard as opposed to any single SEP.

There is evidence for this conclusion. For example, the distribution of SEPs for 3G and 4G is a long-tail with two-thirds of contributions (and 80% of declared SEPs) coming from the top nine contributing firms out of the more than 500 firms that participated in the development of those standards.[69] Moreover, as the U.S. Court of Appeals for the Federal Circuit has recognized, not all SEP holders assert their patents. In fact, many SEP holders do not. The expected return to licensing their SEPs is likely to be insufficient to cover the costs of launching an active licensing program.

In terms of bargaining power—which is defined by the strength of each party's outside options—the implementer likely enjoys significant bargaining power. The value of the SEP holder's outside options is often zero, since walking away from standard compliant negotiation yields no revenues. In contrast, the value of the implementer's outside options can be high since walking away enables it to postpone payment. Indeed, given the time value of money and the fact that the worst penalty an SEP infringer is likely to face after adjudication around the world (and then only on a patent-by-patent basis) is merely paying the FRAND royalty that it should have

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67 Layne-Farrar & Wong-Ervin, *supra* note 57, at 2.

68 *See, e.g.*, Jonathan D. Putnam, *Value Shares of Technologically Complex Products* (April 16, 2014) (concluding that the top 10% of patents account for almost 65% of the total value of a patent portfolio, whereas the bottom 50% of patents capture only 5% of the portfolio value), https://ssrn.com/abstract=2461533 [hereinafter Putnam]. Mark Schankerman, *How Valuable is Patent Protection? Estimates by Technology Field*, RAND J. ECON. 29(1): 77-107 (1998), http://www.nber.org/papers/w3780.pdf.

69 Kirti Gupta, *How SSOs Work: Unpacking the Mobile Industry's 3GPP Standards* Figure 5 (Nov. 2017), *available at* https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3063360. Specifically, based on data from the 3GPP contributions database, over one-third of the approximately 500 unique member entities that participated in the 3G and 4G standard setting process did not make a single contribution during the period 2005-2013. Among the firms that did contribute, the distribution of intensity of contributions is highly skewed, with a handful of firms making the majority of the technical contributions. Out of the approximately 500 member entities that participated in the 3G and 4G standard setting process in 3GPP from 2005-2013, 161 members made zero contributions, 95 members made 1-5 contributions, 63 members made 6-25 contributions, 49 firms made 26-100 contributions, 81 firms made 100-300 contributions, and 32 firms made 300-1000 contributions. The top nine contributing firms each made over 10,000 contributions and are responsible for a total of approximately 80% of the contributions that form these standards. *Id.*

agreed to pay when first asked, it is easy to understand why holdout can be an attractive strategy for an implementer.

Lastly, empirical research suggests there are limited cases in which a standard makes a patent a "winner" (i.e., confers market power) in the marketplace. Instead, more important technologies are natural candidates for inclusion in standards and therefore SDOs tend to "crown winners" that already have some market power, as opposed to creating market power including a technology in a standard.[70] For example, a study analyzing a database of patents declared essential to a range of standards, including telecommunications technology (e.g., W-CDMA) and imaging standards (e.g., MPEG2 and MPEG4), found that inclusion in a standard has no or negligible effect on the value or importance of a patent, measured by forward citations, suggesting that the inclusion in a standard in itself does not create market power.[71]

C. *Refusals to License*

Refusals to License Roadmap:

(1) Unilateral, unconditional refusals to license are generally per se lawful. An exception may be permitted in unusual circumstances, such as when a vertically integrated company (one both licensing IP in the upstream market and selling complementary products in the downstream market) has monopoly power in a particular indispensable technology and refuses to license competitors in the downstream market, resulting in substantial foreclosure in the downstream product market. Claims based on alleged "essential facilities" are not actionable.

This approach recognizes that potential inventors are less likely to undertake the R&D that leads to an invention if the inventor's reward for its efforts is reduced by having to share its patent. Conversely, if businesses know they can easily gain access to the patents of other firms, then they have less incentive to innovate and more incentive instead to free-ride on the risky and expensive research of others. Requiring businesses to grant licenses to competitors wishing to use a patented invention is likely to result in less innovation, which will harm consumers in the long run.

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70 *See, e.g.*, Layne-Farrar & Padilla, *supra* note 32. *See also generally* Browyn H. Hall, Adam Jaffe & Manuel Trajtenberg, *Market Value and Patent Citations*, 36 RAND J. OF ECON. 16-38 (2005) (establishing the usefulness of patent citations as a measure of the importance of a firm's patents; finding that citation-weighted patent stocks are more highly correlated with market value than patent stocks themselves and that this fact is due mainly to the high valuation placed on firms that hold very highly cited patents).

71 Layne-Farrar & Padilla, *supra* note 32, at 40-43.

Although a firm's competitors may desire to use a particular technology in their own products, there are few situations in which access to a particular IPR is necessary to compete in a market. Indeed, those who advocate forced sharing of an "essential" facility often have underestimated the ability of a determined rival to compete around the facility, with resulting benefits to consumers.[72] This is particularly true with respect to fast moving technologies, where technological and market developments can present multiple opportunities to work around a competitor's IP. And it is significantly easier to work around an IPR than it is to work around other property, such as a physical structure.

D. Tying and Bundling

Tying and Bundling Roadmap:

(1) Tying and bundling are ubiquitous and widely used in a variety of industries and for a variety of reasons. The potential to harm competition and generate anticompetitive effects arises only when tying or bundling is practiced by a firm with monopoly power in either the tying good or one of the goods included in a bundle. The fact that a licensee or purchaser is forced to license IP or buy a product it otherwise would not have bought even from another seller does not imply an adverse effect on competition. Instead, for tying or bundling to harm competition, there needs to be an exclusionary effect on another seller because tying or bundling thwarts the buyers' desire to purchase substitutes for one or more of the goods in the bundle from another sellers to an extent that harms competition in the markets for these products.

Tying with respect to IPRs is an arrangement under which a licensor agrees to license IPRs (or specific IPRs) on the condition that the licensee also licenses or purchases a different (or tied) IPR or product. Examples include tying SEPs to non-SEPs or tying the license of IPRs to the purchase of a product, such as a chipset.[73] With respect to bundling, it is important to distinguish between "pure" and "mixed" bundling. Pure bundling means the firm offers only the package and not the stand-alone goods. This is distinguishable from tying in that pure bundling occurs when there are no alternative sellers of the component goods so only the bundle is available. Mixed bundling means both the bundle (e.g., SEPs and non-SEPs) and the unbundled patents are

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[72] *See generally* U.S. DEP'T OF JUSTICE, 7 COMPETITION AND MONOPOLY: SINGLE-FIRM CONDUCT UNDER SECTION 2 OF THE SHERMAN ACT, 124 (2008).

[73] *See generally* FEDERAL TRADE COMMISSION, TYING THE SALE OF TWO PRODUCTS (last visited Aug. 27, 2018), available at https://www.ftc.gov/tips-advice/competition-guidance/guide-antitrust-laws/single-firm-conduct/tying-sale-two-products, *but see Federal Trade Commission v. Qualcomm Inc.*, No. 5:17-cv-00220, 2017 WL 2774406 (N.D. Cal. June 26, 2017) where the FTC accused Qualcomm of illegally maintaining its monopoly on baseband processors, through the way it licensed its standard-essential patents. Some have described Qualcomm's behavior as tying. *See, e.g.*, Melissa Lipman, *5 Key Takeaways From The FTC's Qualcomm Patent Suit*, LAW 360, Jan. 18, 2017, available at https://www.law360.com/articles/882234/print?section=california.

available from the bundling firm. Thus, if a patent holder offers its SEPs separately from its non-SEPs, then the conduct at issue constitutes mixed bundling as opposed to tying, i.e., there is no coercion.

Both tying and bundling are ubiquitous and are used by a variety of firms and for a variety of reasons.[74] In the vast majority of cases, package sales are "easily explained by economies of scope in production or by reductions in transactions and information costs, with an obvious benefit to the seller, the buyer or both."[75] Those benefits can include lower prices for consumers, facilitating entry into new markets, reducing conflicting incentives between manufacturers and their distributors, and mitigating retailer free-riding and other types of agency problems.[76]

In 2015, the International Competition Network (ICN) published a workbook chapter on tying and bundling, identifying anticompetitive foreclosure as the "main anticompetitive concern with tying."[77] The workbook chapter focuses on the "leveraging theory," which relates to the possibility of extending a monopoly from one market into a related second market—a theory that "has great importance for the assessment of tying in many jurisdictions."[78]

The workbook reflects the general understanding among economists that a monopolist will not successfully be able to leverage monopoly power in one market into another through tying and bundling due to the "one-monopoly profit theory," which shows that "under certain circumstances there is no gain to the tying firm from leveraging its dominance into the tied

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74 *See, e.g.*, Kobayashi, *supra* note 36, at 708; *see also* THOMAS T. NAGLE & REED K. HOLDEN, THE STRATEGY AND TACTICS OF PRICING: A GUIDE TO PROFITABLE DECISION MAKING (Prentice Hall 3d ed. 2002); David S. Evans & Michael Salinger, *Why Do Firms Bundle and Tie? Evidence from Competitive Markets and Implications for Tying Law*, 22 YALE. J. ON REG. 37 (2005); Stefan Stremersch & Gerard J. Tellis, *Strategic Bundling of Products and Prices: A New Synthesis for Marketing*, 66 J. MKT'G 55 (2002).

75 Kobayashi, *supra* note 36, at 708; *see also* Stremersch & Tellis, *supra* note 74, at 70; David S. Evans & A. Jorge Padilla, *Designing Antitrust Rules for Assessing Unilateral Practice: A Neo Chicago Approach*, 72 U. CHI. L. REV. 73 (2005).

76 Kobayashi, *supra* note 36, at 708; *see also* Bruce H. Kobayashi, *Two Tales of Bundling: Implications for the Application of Antitrust Law to Bundled Discounts*, (Geo. Mason L. & Econ. Research Paper No 05-27, 2005), *available at* https://ssrn.com/abstract=796432.

77 INT'L COMPETITION NETWORK, UNILATERAL CONDUCT WORKBOOK, CH. 6: TYING AND BUNDLING ¶ 7 (Apr. 2015), *available at* www.internationalcompetitionnetwork.org/uploads/2014-15/icn%20unilateral%20conduct%20workbook%20-%20chapter%206%20tying%20and%20bundling.pdf [hereinafter ICN UCWG WORKBOOK] (This chapter was prepared by the ICN's Unilateral Conduct Working Group. The drafters were competition enforcers (both attorneys and economists) from around the world, including from the U.S. antitrust agencies.).

78 *Id.*, ¶ 6. *See also* Koren Wong-Ervin, Evan Hicks & Ariel Slonim, *Tying and Bundling Involving Standard-Essential Patents*, 24:5 GEO. MASON L. REV. (forthcoming 2018), *available at* https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2956359.

product market. Tying in such instances is expected to be competitively neutral or, for instance if the tie lowers costs, even procompetitive."[79]

Indeed, as Drs. Anne Layne-Farrar and Michael Salinger explain, the leveraging theory "rests on the implicit assumption that the seller can attach B to A and charge a price increment above the marginal cost of B without lowering demand," an assumption that in general, "is not warranted," particularly when B is available elsewhere in a competitive market.[80]

> To illustrate with a numerical example, suppose the profit-maximizing price for A is $10/unit and B is available in a competitive market for $5/unit. Since perfect competition drives price down to marginal cost, $5 is also the marginal cost of B. For tying to be profitable, the firm must be able to charge more than $15 for the A-B bundle. However, because consumers can already buy A and B for a combined price of $15 (the monopoly price of $10 for A and the competitive price of $5 for B), a price of $16 for the A-B bundle is a price increase and will generally lower demand. Moreover, the $10 price for A was chosen by the monopoly seller of A, presumably to maximize its profits. It had the option of charging $11 for stand-alone A sales, but decided not to do so. Yet, given the availability of B on the market for $5, selling the bundle of A and B for $16 is in effect charging $11 for A. To the extent that selling A on a stand-alone basis for $11 yields lower profits than selling it for $10, then we should expect the $16 price for the bundle (which entails an implicit price of $11 for A) also to result in lower profits. Indeed, this is the case even if everyone who would purchase A would also want to buy B. If some people who want A would not purchase B for $5, then the bundling strategy would be even less profitable.[81]

In other words, when the same consumers are buying both products in fixed proportions, the total price determines consumer sales, and thereby the monopolist's optimal (profit-maximizing) price; when a monopolist has already set a profit-maximizing price, obtaining the second monopoly will not allow the monopolist to raise prices further to obtain higher profits.[82] If the monopolist attempted to increase the total price further, consumers would decrease their purchases, and the monopolist's total profit would fall, prompting the monopolist to decrease prices back to the previous level in order to obtain higher profits. "As such, the principal motives for the tie would not be exclusionary conduct aimed at monopolizing the market for the tied product in order to raise its price. Rather, the firm could be using the tie for some other purpose, such as price discrimination or reducing costs."[83]

Subsequent economic work, including a seminal paper in this area by Dr. Michael Whinston, has demonstrated that the one-monopoly profit theorem relies on some restrictive assumptions, namely "that the same consumers are buying both products in fixed proportions, and

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79 ICN UCWG WORKBOOK, *supra* note 66, ¶ 6.

80 *See* Anne Layne-Farrar & Michael A. Salinger, *Bundling of RAND-committed Patents*, 45 RES. POL'Y 1155, 1156-57 (Feb. 2016), *available at* http://www.sciencedirect.com/science/article/pii/S0048733316300269.

81 *Id.*

82 *See, e.g.*, Alden F. Abbott & Joshua D. Wright, *Antitrust Analysis of Tying Arrangements and Exclusion Dealing* 10 (Geo. Mason Univ. L. & Econ. Research Paper No. 08-37, 2008), *available at* http://ssrn.com/abstract_id=1145529.

83 *Id.* at 10, citing RICHARD A. POSNER, ANTITRUST LAW 199-200 (2d ed. 2001); Patrick DeGraba, *Why Lever into a Zero-Profit Industry: Tying, Foreclosure, and Exclusion*, 5 J. ECON. & MGMT. STRATEGY, 433-47 (1996).

that the tied good market has a competitive, constant returns-to-scale structure."[84] "By relaxing those assumptions, some economists have identified exclusionary motives for tying, as well as strategic reasons for bundling and tying."[85]

However, as the ICN Unilateral Conduct Workbook explains:

> Even with scale economies and an oligopolistic market structure in the tied market, if the tied product is a complementary product used in fixed proportions with the tying product, and has no other uses beyond that as a complement to the tying product, the single monopoly profit result still holds. The key condition is that the dominant firm's tying product is essential for all uses of the tied product, which implies that the dominant firm always benefits from greater sales of the tied product, even if it is a rival's product.[86]

With respect to SEPs in particular, some contend that, a refusal by a vertically integrated SEP holder (i.e., one that also produces the component at issue, in competition with unintegrated component makers) to license a component manufacturer is in effect a "bundle" of the SEP holder's component with its SEP portfolio. However, as Dr. Jorge Padilla and Koren Wong-Ervin show with the help of a stylized model, this bundling strategy cannot lead to the foreclosure of the component market so long as "(1) the vertically integrated SEP holder does not assert its patents at the component level, and (2) it licenses its SEP portfolio to downstream (finished device) manufacturers on FRAND terms, irrespective of whether they source components from its own subsidiary or from the nonintegrated rival."[87]

E. *Grantbacks and Cross-Licenses*

Grantbacks and Cross-Licenses Roadmap:

(1) A grantback is an arrangement under which a licensee agrees to extend to the licensor of IP the right to use the licensee's improvements to the licensed technology. Grantbacks are often procompetitive and, as such, are analyzed under an effects-based approach. The focus is on IP holders with market power and whether a particular grantback provision is likely to reduce significantly a licensee's incentives to invest in improving the licensed technology that would affect the competitive process. If such a reduction is found, then the inquiry will focus on the extent to which the provision has offsetting procompetitive benefits. Procompetitive benefits may include (1) increasing licensors' incentives to innovate in the first place, (2) promoting dissemination of licensees' improvements to the licensed technology, (3) increasing the licensors' incentives to disseminate the licensed technology, or (4) otherwise

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84 Abbott & Wright, *supra* note 71, at 10-11, citing Ward S. Bowman, Jr., *Tying Arrangements and the Leveraging Problem*, 67 YALE L.J. 19 (1957); Michael D. Whinston, *Tying, Foreclosure, and Exclusion*, 80 AM. ECON. REV. 837, 837-38 (1990).

85 Abbott & Wright, *supra* note 71, at 11 (internal citations omitted); *see also* Whinston, *supra* note 84, at 839; Dennis W. Carlton & Michael Waldman, *Tying, Upgrades, and Switching Costs in Durable-Goods Markets* (Nat'l Bureau of Econ. Research, Working Paper No. 11407, 2005), *available at* www.nber.org/papers/w11407.pdf.

86 ICN UCWG WORKBOOK, *supra* note 65, ¶ 70.

87 Padilla & Wong-Ervin, *supra* note 34, at 505-507 and Appendix A.

increasing competition and output in a relevant technology or research and development market. Non-exclusive grantbacks are unlikely to result in harm to innovation or the competitive process.

(2) Cross-licensing agreements are often procompetitive and, as such, absent naked price-fixing or market allocation schemes, are analyzed under an effects-based approach. The focus is on IP holders with market power and whether such agreements result in harm to the competitive process. If such effects are found, then the analysis focuses on potential procompetitive benefits such as integrating complementary technologies, reducing transaction costs, clearing blocking positions, and avoiding costly infringement litigation.

Because such provisions have the potential to increase output and innovation via the dissemination and improvement of patented technologies, they are generally viewed by courts and scholars as procompetitive.[88] The potentially positive effects of grantbacks are several. First, grantbacks encourage patent holders to license (more advanced) technology by eliminating the concern that a licensee will ultimately "leapfrog" and exclude the licensor from technology based its own patent.[89] Second, grantbacks "provide a means for the licensee and the licensor to share risks and [to] reward the licensor for making possible further innovation based on or informed by the licensed technology, and both promote innovation in the first place and promote the subsequent licensing of the results of the innovation."[90]

The main theory of harm is that grantbacks may have a negative impact on the licensee's innovation (or R&D) incentives, which may affect the overall competitive process. However, as Dr. Jay Pil Choi shows, the reduced R&D incentive is not necessarily anticompetitive.[91] For example, "grantback clauses can enhance the efficacy of the licensee's R&D spending by transferring a more advanced technology. If the prohibition of the grantback clause results in the licensing of the backward technology instead of the advanced technology, grantback clauses can eliminate wasteful and inefficient research expenditures."[92] Another example arises when "unbridled R&D competition between the licensor and licensee tends to be excessive and rent-

88 *See, e.g.*, Herbert Hovenkamp, *Antitrust and the Patent System: A Reexamination*, 76:3 Ohio State L.J. 467, 537 (2015).

89 Adam Hemlock & Jennifer Wu, *U.S. Antitrust Implications of Patent Licensing*, 52 FED. LAW. 39, 42 (2005).

90 DOJ/FTC IP Guidelines, *supra* note 20, §5.6.

91 Jay Phil Choi, *A Dynamic Analysis of Licensing: The "Boomerang" Effect and Grant-Back Clauses*, CESifo Working paper Series No. 188 (Sept. 2001) (developing an incomplete contract model of the licensing relationship to analyze the dynamic effects of licensing on R&D competition in the innovation market and to examine the rationale for often observed grantback clauses), *available at* https://papers.ssrn.com/sol3/papers.cfm?abstract_id=273012.

92 *Id.* at 21.

dissipating. It is well known in the literature that the winner-takes-all payoff structure of the R&D game often implies excessive rent dissipation."[93]

With respect to cross-licenses, the main concern is that they can be used to cover up a collusive agreement, namely price-fixing or market sharing. That is possible when cross-licensing agreements involve substitute technologies.

F. Excessive Pricing Prohibitions (Including Injunctive Relief)

Excessive Pricing and Injunctive Relief for FRAND-Assured SEPs Roadmap:

(1) Excessive pricing of IPR, including SEPs, is not actionable. Instead, IP holders, including monopolists, are free unilaterally to set or privately to negotiate their prices.

(2) Seeking or enforcing injunctive relief on a FRAND-assured SEP is likewise not actionable when the theory of harm is that the injunctive relief allowed the SEP holder to charge a higher price. This is fundamentally an excessive pricing theory and not premised on exclusion or foreclosure resulting in harm to the competitive process.

Requiring by law that prices be "fair" or "reasonable," or prohibiting a firm from charging "unfairly high" prices risks punishing vigorous competition.[94] In general, competition policy should not prohibit a monopolist from charging whatever price for its products, including its IPRs, it believes will maximize its profits. It is axiomatic in economics and in antitrust law that the "charging of monopoly prices is—at least for a short period—what attracts 'business acumen' in the first place; it induces risk taking that produces innovation and economic growth."[95] This is particularly important in the case of IPRs; the very purpose for which nations create and protect IPRs is to induce investment in risky and costly research and development. To achieve a balance between innovation and the protection of competition, monopoly prices should be unlawful only if they are the result of conduct that is unlawful on other grounds.

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93 *Id.* at 22.

94 Douglas H. Ginsburg, Bruce H. Kobayashi, Koren W. Wong-Ervin & Joshua D. Wright, *"Excessive Royalty" Prohibitions and the Dangers of Punishing Vigorous Competition and Harming Incentives to Innovate*, CPI ANTITRUST CHRONICLE (Mar. 2016), *available at* www.competitionpolicyinternational.com/wp-content/uploads/2016/03/Excessive-Royalty-Prohibitions.pdf. *See also* FTC, *Investigation of Gasoline Price Manipulation and Post-Katrina Gasoline Price Increases* at 196 (2006) ("If pricing signals are not present or are distorted by legislative or regulatory command, markets may not function efficiently and consumers may be worse off. Accordingly…throughout antitrust jurisprudence, one area into which the courts have refused to tread is the question of what constitutes a "reasonable price."").

95 Verizon Commc'ns Inc. v. Law Offices of Curtis V. Trinko, LLP, 540 U.S. 398, 407 (2004); s*ee also* JOSEPH A. SCHUMPETER, CAPITALISM, SOCIALISM, AND DEMOCRACY 89-90 (George Allen & Unwin 1976).

Moreover, economics teaches that, absent information about the prices of unconstrained market transactions, it can be particularly difficult to identify a "fair" price. Indeed, it is even more difficult to assess the "fairness" of prices associated with licensing IPRs both because the fixed costs of innovation requires prices well above marginal cost in order to secure an adequate return on investments in innovation, and because IPRs themselves are highly differentiated products, which makes reliable price comparisons difficult, if not impossible. The risk of placing overly strict limitations upon IPR prices is that the return to innovative behavior is reduced, which means firms will reduce their investment in further innovations, to the detriment of consumers. Compounding the problem, with such limits in place, IPR holders will face significant uncertainty in determining whether their licensing practices violate competition laws, and legal uncertainty is the enemy of financial investment.[96]

In addition, in order to determine whether a particular price is excessive, a competition agency would need to calculate a reasonable royalty range as a baseline against which to compare the allegedly excessive price. In our experience, competition agencies do not have the requisite information to determine market prices generally, let alone royalty rates for a particular invention.[97] This is a task that is best left to negotiations in the market or, as a last resort, to the courts in those limited cases when the parties cannot reach agreement.[98]

With respect to SEPs, intervention against excessive pricing raises the very same problems that we identified for other high-tech markets. Standard price benchmarking tests, price-cost tests, and profitability tests are unlikely to deliver accurate results in SEP licensing. Skepticism regarding the practical application and relevance of conventional excessive pricing tests also applies to the so-called "ex ante" test,[99] proposed by Daniel Swanson and William Baumol,[100] and the "numerical proportionality" advocated by some industry participants and pundits,[101] to determine whether SEP royalties are FRAND. We consider the "ex ante" test a useful tool for identifying situations in which prices are not excessive. If "ex post" and "ex ante"

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[96] Ginsburg, et al, *supra* note 98.
[97] Ginsburg, et al, *supra* note 98.

[98] For a discussion of the difficulties of court-determined rate setting, *see* Anne Layne-Farrar & Koren W. Wong-Ervin, *Methodologies for Calculating FRAND Damages: An Economic and Comparative Analysis of the Case Law from China, the European Union, India and the United States*, 8:2 JINDAL GLOBAL L. REV. 127 (2017).

[99] "Ex ante" tests refer to a counterfactual that exists prior to a standard being adopted. However, at this point, innovation risk has already been taken into account. Ex ante in this sense means before the adoption of the standard rather than before the R&D expenditure.

[100] Daniel Swanson & William Baumol, *Reasonable and Nondiscriminatory (Rand) Royalties, Standards Selection, and Control of Market Power*, 73 ANTITRUST L.J. 1 (2005) [hereinafter Swanson & Baumol].

[101] Philippe Chappette, *FRAND Commitments – The Case for Antitrust Intervention*, 5:2 EUR. COMPETITION J. 319-346 (2009).

royalties are the same, then there has been no attempt to exercise market power conferred by standardization, and no basis for competition law intervention. If they are different, however, that is not necessarily indicative of exploitation; rather it indicates that further analysis of the reasons for the difference is required.

With respect to "numerical proportionality," or the equal-patent-counting approach, empirical analysis shows that the value of patents is highly skewed.[102] For example, in a recent study, Dr. Jonathan Putnam provides some simple, broadly applicable guidelines for translating the value of patent portfolio into valuations of the individual patents that cause that value.[103] Specifically, he draws on the economic literature on the distribution of patent values and adopts a very general framework for computing the share of a given patent portfolio that can reasonably be attributed to any one patent.[104] The guidelines place the focus where it should be: on using all available information (e.g., forward citations) to rank each patent against the other patents that belong to the same portfolio, and subsequently derive the relative value of each patent as compared against the "average patent" of the portfolio.[105] Among others, the author concludes that the top 10% of patents account for almost 65% of the total value of a patent portfolio, whereas the bottom 50% of patents capture only 5% of the portfolio value.[106] Because Dr. Putnam adopts a very general framework, the empirical findings are robust to various specifications and relevant to a wide variety of technologies under diverse circumstances.

As Dr. Anne Layne-Farrar and Professor Koren Wong-Ervin have explained:

> [I]t makes no economic sense to estimate an aggregate rate for a standard by assuming that all SEP holders would charge the same rate as the one being challenged in the current lawsuit. A numeric example illustrates how this estimation approach can go horribly wrong. Suppose that a standard is defined by 5 SEPs (1 – 5), with one patent each held by 5 patent holders (A- E). The value the set of 5 patents contribute to the standard (as embodied in the downstream product) is known to be 10 per product unit. Suppose that patent 1 accounts for 50% of the aggregate value of 10, patent 2 accounts for 20% of the value, while patents 3 – 5 each account for 10%. Each patent is a perfect complement (must be used together to achieve any product value); each is thus essential, but the values are not equal. FRAND would dictate that patent 1 can command a per-unit royalty of 5, patent 2 can command 2, and patents 3 – 5 can command 1 each. Suppose patent holder A is the first to seek a license and asks for 5 per unit, commensurate with its FRAND value. But under the common estimation approach, the downstream manufacturer will accuse that patent holder of holdup because the aggregate royalty estimated by multiplying the offered rate of 5 by the 5 patent holders implies a total rate of 25, two and a half times larger than the known value contributed by all 5 patents together. A judge accepting this argument would wrongly conclude that patent holder A was attempting holdup and creating or contributing to a royalty stack. Suppose instead that SEP holder E is the first to seek a license and it sets its offer at 2, twice as much as the value of its patented technology. In this case, a judge multiplying the rate by the 5 essential patents would conclude, again wrongly, that this rate was FRAND as the aggregate rate of 10 exactly equals the known value

[102] *See, e.g.*, Putnam, *supra* note 72.

[103] Putnam, *supra* note 72.
[104] Putnam, *supra* note 72.
[105] Putnam, *supra* note 72.
[106] *Id.*

> of the 5 patents—even though SEP holder E was asking for twice the value that its patent contributes to the standard.[107]

To the extent that arbitrators, courts, and/or competition authorities are going to enforce FRAND obligations, they should consider whether market outcomes are consistent with excessive pricing. First, arbitrators, courts and/or competition authorities should consider whether the inclusion of a patented technology in a standard confers any additional market power on the patent holder or whether it simply reflects a return on the investment in developing a superior technology. Economic theory unambiguously establishes that there is no reason to adopt a stricter approach when assessing the royalty rates charged for SEPs unless it can be shown that the market power enjoyed by SEP owners is conferred by standardization.[108] It follows that regulation of SEP prices is not warranted when any market power SEP owners may enjoy is conferred by patent protection more generally. Second, standardization in and of itself is not a sufficient condition to warrant price regulation.

Arbitrators, courts and/or competition authorities should realize that when prices are negotiated under the shelter of a FRAND obligation, the threat of adjudication or review by a third party will prevent the exercise of any market power and, hence, the exploitation of customers. Finally, they would need to consider the downstream markets. Markets downstream from SEP licensors, such as markets for wireless devices like phones and tablets, are vibrantly competitive, profitable for the leading downstream firms, and also reflect high rates of consumer adoption. The robustness of downstream markets undermines the view that royalty rates are too high.[109]

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[107] Anne *Layne* Farrar & Koren W. Wong-Ervin, *Methodologies for calculating FRAND damages: an economic and comparative analysis of the case law from China, the European Union, India, and the United States*, JINDAL GLOBAL L.R. Volume 8, Issue 2, 127-160 (Oct. 2017), https://link.springer.com/article/10.1007/s41020-017-0048-9?wt_mc=Internal.Event.1.SEM.ArticleAuthorAssignedToIssue. As Layne-Farrar and Wong-Ervin explain:

> ''Patent holdup'' by a patent holder refers to the potential problem that arises when a SEP holder has made an assurance to license on FRAND terms but then seeks to use standard-lock-in to obtain a supra-FRAND rate.3 On the other side of the transaction, innovators that are contributing to a standard-development organization (SDO) can also be locked-in, and hence susceptible to licensee holdup or holdout, if the contributed technologies have a market only within the standard. Thus, incentives to engage in holdup can run in both directions.4 While holdup by implementers (sometimes referred to as ''reverse holdup'') refers to the situation in which a licensee uses its leverage to obtain rates and terms below FRAND levels, holdout refers to a licensee either refusing to take a FRAND license or unreasonably delaying doing so.

Id. at 129-30.

[108] *See* Swanson & Baumol, *supra* note 86; Anne Layne-Farrar, Jorge Padilla & Richard Schmalensee, *Pricing Patents for Licensing in Standard Setting Organizations: Making Sense of FRAND Commitments*, 74 ANTITRUST L.J. 671 (2007).

[109] *See* Pierre Larouche, Jorge Padilla & Richard S. Taffet, *Settling Frand Disputes: Is Mandatory Arbitration a Reasonable and Non-Discriminatory Alternative?*, (Tilburg Law School Research Paper No. 023/2013 and HOOVER IP^2 Working Paper Series No. 13003, 2013) *available at* http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2346892.

In short, the high probability of error, coupled with the asymmetry of the resulting costs, strongly militates in favor of non-intervention except in exceptional circumstances. If, however, a particular jurisdiction insists on regulating the prices of IPRs, that intervention should be restricted to exceptional cases when *all* of the following conditions are met: (1) the company whose prices are reviewed holds significant market power that is not the result of prior investment or innovation, (2) barriers to entry prevent the market from adjusting, and (3) intervention is unlikely to reduce the incentive and ability of the dominant company to invest and innovate.[110] These conditions are cumulative: if just one is not met then intervention is unjustified.

Because price-cost tests, profitability tests, and price benchmarking tests are complex to implement and may produce incorrect results, competition policy authorities and courts should focus more on the mechanisms by which prices are determined and the market outcomes that result. In particular, they should consider the manner in which prices are determined, because this may prevent the exercise of market power and, hence, the exploitation of customers. For example, competition authorities should not be concerned about excessive prices when prices can be subject to a third-party review (e.g. in a court adjudication or an arbitration) at the request of a customer.[111] They should also consider market outcomes in downstream markets and measures of consumer welfare. Consider for example a dominant company setting a price for an intermediate product or technology that is used in the production of a series of end products. If the price is excessive (assuming that could be determined), then there are unlikely to be any direct customers of the dominant company earning significant profits and consumer welfare will be reduced because end products are unduly expensive and their diffusion limited. On the other hand, if downstream markets are healthy, with robust competition, high product penetration rates, and the possibility for superior downstream firms to earn high profits, then the price is surely "fair" or "reasonable".

III. SURVEY OF THE APPROACHES IN CHINA, THE EUROPEAN UNION, INDIA, JAPAN, KOREA, AND THE UNITED STATES

See Appendix A, below.

CONCLUSION

110 *See* ROBERT O'DONOGHUE & JORGE PADILLA, THE LAW AND ECONOMICS OF ARTICLE 102 TFEU 771-775 (2013).

111 This is the case, for example, in licensing SEP technology subject to a FRAND assurance.

As agencies around the world continue to search for the best antitrust approaches to matters involving IPRs, we submit that a careful study of the significant IO economics literature on innovation and IP protection and vertical restraints provides a roadmap worth following. Adherence to economic principles—and in particular application of an effects-based approach in order to determine whether specific conduct results in net harm to the competitive process and consumer welfare—tethers antitrust analysis to the methodological rigors of economics in terms of theories that can be tested and rejected. Such an approach not only serves to protect innovation and consumers, but lends credibility to decisions of courts and competition agencies around the world (as well as protects against any accusations of discriminatory or otherwise improper use of competition laws to further industrial policy goals).

APPENDIX A: SURVEY OF THE APPROACHES IN CHINA, THE EUROPEAN UNION, INDIA, JAPAN, KOREA, AND THE UNITED STATES

	China	European Union	India	Japan	South Korea	United States
General Approach	Article 55 of the Antimonopoly Law ("AML") provides that the AML does not apply to the legitimate exercise of IPRs under laws and relevant administrative regulations on IPRs; however, it does apply to the "abuse" of IPRs that "eliminate or restrict" competition.[1] The AML and IP laws share the same goals of "protecting competition and promoting innovation, enhancing economic efficiency, protecting consumers' interests and social welfare."[2]	The European Commission ("E.C.") recognizes the general IPR to exclude, yet the fact that IP laws "grant exclusive rights of exploitation, does not imply" immunity from competition law intervention; that said, "[m]ost license agreements do not restrict competition and create procompetitive efficiencies."[3] With the exception of hardcore restrictions (such as price-fixing), the E.C. analyzes licensing agreements by weighing any procompetitive effects against possible harm to competition,[4] focusing on the impact to inter-technology and intra-technology competition.[5] Restrictions "by object" (i.e., "those that by their very nature restrict competition") do not	The general prohibition on anticompetitive agreements[8] and abuse of dominance[9] under the 2002 Competition Act ("Act") applies equally to IP-related business practices as it would to non-IP related conduct. Section 3(5) of the Act creates a carve out from the provision prohibiting anticompetitive agreements to allow "reasonable and necessary" conditions for protecting IPRs.[10] There is no carve out for the provision prohibiting unilateral conduct.	The Japan Fair Trade Commission ("JFTC") recognizes the general importance of IPRs to innovation and aims to apply the Antimonopoly Act to "restrictions that deviate from the intent of the intellectual property systems."[11] Japan applies an effects test when determining if an IP practice reduces competition.[12]	South Korea purports to generally apply an effects test to matters involving IPRs,[13] yet considers substantial restrictions on competition to be "especially likely" when: (1) there is a "strong market dominating power," (2) the IP is "an essential element necessary for production," (3) a horizontal relationship exists between the parties, (4) there is an increased probability of "collaborative practices," and (5) "when the possibility for other enterprisers to enter the market is reduced."[14]	The United States ("U.S.") applies the same general antitrust approach to IP as to other forms of intangible and to tangible property. With the exception of naked restraints such as price fixing, licensing is generally deemed procompetitive and thus analyzed under the rule of reason (i.e., an effects-based approach). In determining whether conduct results in anticompetitive effects, the U.S. antitrust agencies consider what would have happened in the but-for world (i.e., in the absence of a license).[15]

	China	European Union	India	Japan	South Korea	United States
		require a demonstration of any effects on the market in light of their "high potential for negative effects on competition." Restrictions "by effect" do require a showing of actual or potential effects.[6] "The assessment of whether a license agreement restricts competition must be made within the actual context in which competition would occur in the absence of the agreement with its alleged restrictions."[7]				
Market Power or Dominance	**IP does not necessarily confer market power.** • Both the 2015 Final Rules of the State Administration for Industry and Commerce ("SAIC")[16] (one of China's three AML agencies) and the latest version (2017) of the State	**IP does not necessarily confer market power, although "lock-in" is considered for SEPs.** • Court cases and E.C. Guidelines provide that mere ownership of an IPR does not confer a dominant position. *See, e.g.*, European Court of Justice ("ECJ") *Magill*[20] and E.C. Guidelines.[21]	**IP does not necessarily confer market power.** • One factor is whether the dominant position is "acquired as a result of any statute." • In cases such as *Three D Integrated Solutions Ltd. v. Verifone Sales Pvt. Ltd.* (Case	**IP does not necessarily confer market power.** • JFTC IP Guidelines: "whether or not [a] licensor has a dominant bargaining position over licensees is examined through a comprehensive consideration of	**IP does not necessarily confer market power, but special rules exist for SEPs.** • Market Dominance "is determined by . . . considering not only existence or non-existence of IPRs but also the technologies'	**IP, including SEPs, does not necessarily confer market power.** • In 2006, the U.S. Supreme Court adopted the approach taken by the U.S. antitrust agencies in their 1995 IP Guidelines, holding that IPRs do not necessarily

	China	European Union	India	Japan	South Korea	United States
	Council's draft AML-IP Guidelines[17] state that IPRs do not necessarily confer a dominant position. • With respect to SEPs, the AML-IP Guidelines state that "the following factors may be further considered: (i) The market value, range of application, and degree of application of the standards; (ii) Whether any standards with alternative relationship are available, including the possibility of using alternative standards, and the cost for such shift; (iii) The extent of the reliance of industries on relevant standards;	• With respect to SEPs, in the 2014 *Motorola* case, the E.C. concluded that Motorola held a 100% share of the market for the licensing of GPRS not solely based on its IPRs, but on an assessment of factors, namely: (1) the widespread adoption of the GPRS standard made it indispensable for manufacturers of mobile devices to implement; and (2) mobile device operators and device manufacturers needed to base their products on the same air interface technology to enable different devices to communicate on the same network.[22] This resulted in "lock-in," which further proved	no. 13/2013), the Competition Commission of India ("CCI") examined market power associated with IP on the basis of general principles contained in Section 19(4) of the Competition Act, such as market share, technical substitutability, bargaining power, size, and the importance of competitors. • With respect to SEPs, see CCI's prima facie orders against Ericsson, defining the relevant market as the provision of SEP(s) for 2G, 3G and 4G technologies in standard "GSM compliant mobile communication devices" in India, concluding that "prima facie it is	the degree of influence of the technology," "the extent to which the licensees' business activities depend on the technology, the positions of the parties in the technology or product market, the state of the technology or product market and the disparity in the scale of business activities between the parties."[26]	influences, existence or non-existence of the alternative technologies, and competition-related situation in the relevant market." However, holders of SEPs are "highly likely to have market dominance."[27] • See KFTC's decision against Qualcomm, concluding that because "SEPs cannot be replaced by other technologies" the owner of an SEP necessarily "gains complete monopolistic power by holding even a single SEP."[28]	confer market power.[29] • With respect to SEPs, owning an SEP does not necessarily confer market power (see *ChriMar*).[30]

	China	European Union	India	Japan	South Korea	United States
	(iv) The evolution and compatibility of relevant standards; (v) The possibility of replacing relevant technologies that have been included in the standards." • With respect to SEPs and market definition, MOFCOM has taken varying approaches. *Compare* Microsoft/Nokia (2014) (concluding that each SEP is its own relevant market with 100% market share)[18] *with* Nokia/Alcatel-Lucent (2015) (defining the relevant market as the entire information and communication technology SEP market, stating	Motorola's market power.[23] *See also Rambus* (E.C. defined the relevant market as "the worldwide technology market for DRAM interface technology (whether there is a single market for the full package of DRAM interface technologies, or whether there are separate worldwide markets for individual DRAM interface subtechnologies)."[24]	apparent that Ericsson [was] dominant" because it held 400 Indian patents, was the "largest holder of SEPs for mobile communications like 2G, 3G and 4G patents used for smart phones, tablets etc.," and there was no alternate technology in the market.[25]			

	China	European Union	India	Japan	South Korea	United States
	that, even though this market could be divided into more specific markets based on demand-side analysis, it would have made no difference to the analysis in this deal).[19]					
Refusals to License	**Prohibits refusals to license by dominant firms, particularly for "essential facilities."** • The 2017 version of the State Council's draft AML-IP Guidelines states that refusals to license can be an abuse of market position when the patent holder has a dominant market position and refuses to license its IPR "without justification." This is particularly true when the IPR	**Prohibits refusals to license by dominant firms under exceptional circumstances, including indispensability.** • Under case law, IPR holders have no general duty to deal,[33] except in "exceptional circumstances."[34] *See IMS Health*[35] and *Microsoft*.[36] • Refusals to license can be found to violate Article 102 when the IP is deemed "indispensable" and the refusal to license results in anticompetitive foreclosure.[37]	**Prohibits refusal to license as an anticompetitive vertical restraint as well as by dominant firms, primarily on the basis of a rule of reason analysis.** • Key factors considered include the extent to which the refusal results in a denial of market access,[39] restricts the production of goods or services,[40] or restricts the technical or scientific development relating to goods or services.[41]	**Prohibits refusals to license by dominant firms when, judging by its effects, it would "exclude or control the business activities of other entrepreneurs."**[43] • With respect to SEPs, the JFTC IP Guidelines state that "[r]efusal to license or bringing an action for injunction against a party who is willing to take a license by a FRAND-encumbered [SEP] holder, or refusal to	**Prohibits refusals to license by dominant firms when it threatens to restrict competition.** • The 2016 KFTC IP guidelines state that refusals to license are generally not antitrust violations.[45] Exceptions include: "(1) Act of collaborating with competing enterprisers to refuse to grant a license to particular enterprisers without	**Unconditional, unilateral refusals to license are generally lawful.** • U.S. courts apply a general presumption of legality for unilateral, unconditional refusals to license.[48] • The 2017 IP Guidelines state that the antitrust laws "generally do not impose liability upon a firm for a unilateral refusal to assist its competitors, in part because doing so may undermine

	China	European Union	India	Japan	South Korea	United States
	constitutes an essential facility.[31] • With respect to SEPs, the 2015 SAIC Final Rules prohibit a company with a dominant market position from refusing to license after its IPR has become part of a standard, which it considers a violation of "FRAND principles."[32]	• The E.C.'s guidance suggests it will prioritize enforcement if three elements are present: (1) "the refusal relates to a product or service that is objectively necessary to be able to compete effectively in a downstream market"; (2) "the refusal is likely to lead to the elimination of effective competition in the downstream market; and" (3) "the refusal is likely to lead to consumer harm."[38]	• *See* CCI's *Auto Parts* decision, in which CCI viewed the car companies' refusal to license their diagnostic (software) tools and repair manuals to independent repairers and workshops as an anticompetitive "refusal to deal" due to anticompetitive foreclosure.[42]	license or bringing an action for injunction against a party who is willing to take a license by a FRAND-encumbered [SEP] holder after the withdrawal of the FRAND Declaration for that SEP may fall under the exclusion of business activities of other entrepreneurs by making it difficult to research & develop, produce, or sell the products adopting the standards."[44]	justifiable reasons"; "(2) Act of unfairly refusing to grant a license to particular enterprisers"; "(3) Act of refusing to grant a license for unjust purposes such as refusing to grant a license because the patentee's unfair terms were not accepted."[46] • *See* KFTC-Apple decision, rejecting Apple's contention that Samsung's request for injunctive relief on Apple's SEPs constituted a refusal of access to essential facilities, concluding that FRAND-encumbered SEPs do not	incentives for investment and innovation."[49] Agency officials have applied this to SEPs as well.[50] • The U.S. DOJ has recently taken the position that "a unilateral refusal to license a valid patent should be per se legal."[51] • Regarding SEPs, the DOJ has recently stated that FRAND is not "a compulsory licensing scheme."[52]

	China	European Union	India	Japan	South Korea	United States
					constitute essential facilities.[47] *But see* KFTC-Qualcomm decision referenced under market power, above.	
Excessive Pricing	**Prohibits holders of dominant market positions from charging "unfairly high" prices.** • Under the AML, firms with dominant market positions are prohibited from abusing those positions by selling commodities at "unfairly high" prices.[53] The 2017 State Council draft AML-IP Guidelines applies this prohibition to IPRs.[54] • In 2014, the Guangdong Higher People's Court in *Huawei v. InterDigital*	**Prohibits excessive pricing and has found pricing to be excessive when deception was used in the standard setting process.** • The 2011 E.C. Horizontal Cooperation Guidelines recognize charging excessive royalty fees as a possible violation of competition laws.[56] These guidelines provide guidance to assess whether fees charged in the standard setting context are unfair or unreasonable.[57] In practice, few cases have been brought under an excessive pricing theory.[58]	**Prohibits excessive pricing and views it as prima facie abuse of dominance.** • The Competition Act considers imposition of an "unfair" or discriminatory price to be an abuse of dominance.[61] • CCI considers imposition of excessive and unfair royalty rates a prima facie abuse of dominance.[62] • In a number of prima facie orders against Ericsson, CCI stated that royalties based on the end-user device "seem contrary" to	**Does not regulate price, but an excessive pricing theory may fit under prohibitions on refusals to deal.** • Japan's competition law does not include an excessive pricing provision; however, the JFTC's IP Guidelines indicate that it may treat refusal to license as functionally equivalent to excessive pricing if the royalty demanded is prohibitively expensive.[64]	**May prohibit excessive royalty rates.** • The KFTC's IP Guidelines prohibit excessive licensing by a dominant firm with "overwhelming market dominance."[65] • Within the standard setting context, the guidelines indicate that imposing unreasonable levels of royalties may violate competition laws.[66] • In practice, enforcers may	**No excessive pricing prohibitions.** • U.S. antitrust law does not regulate price. Rather, firms, including monopolists, are free unilaterally to set or privately negotiate their prices.[68] This hands-off approach applies to all IPRs, including SEPs.[69]

	China	European Union	India	Japan	South Korea	United States
	found that InterDigital violated the AML by seeking, *inter alia*, unfairly high royalty payments for its mobile SEPs (case pending appeal before China's Supreme People's Court). • In 2015, the NDRC imposed a $975 million fine against Qualcomm for allegedly charging unreasonably high royalties by refusing to provide their patent list and charging royalties for expired patents, requiring royalty-free grantbacks of relevant patents, bundling SEPs and non-SEPs, and charging "relatively high royalty rate[s] based on the wholesale net	• The E.C. adopted an excessive pricing theory in *Rambus*, finding that it abused its dominance by charging excessively high royalties for the use of its patents that it would not have been able to claim absent its deceptive conduct during the standard setting process.[59] • Royalties have also been found excessive under Article 102.[60]	FRAND terms, and that this "[c]harging of two different license fees per unit phone for use of the same technology prima facie is discriminatory and also reflects excessive pricing vis-à-vis high cost phones." CCI's rationale was that "[f]or the use of GSM chip in a phone costing Rs 100, royalty would be Rs. 1.25 but if this GSM chip is used in a phone of Rs. 1000, royalty would be Rs. 12.5."[63] • In certain matters, CCI's approach to excessive pricing of IP appears consistent with its general approach to unfair pricing, under which it has adopted a simple cost-plus		not pursue excessive pricing theories.[67]	

	China	European Union	India	Japan	South Korea	United States
	selling price of devices."[55]		approach for determining whether the price has a reasonable relation to the economic value of the product supplied.			
Injunctive Relief	**May prohibit a dominant firm that seeks injunctive relief in order to obtain unfairly high royalties.** • Under Article 26 of the State Council's 2017 draft AML-IP Guidelines, SEP holders with a dominant market position that apply for injunctive relief to obtain unfairly high license fees may be found to exclude or restrict competition.[70]	**Safe harbor from competition law for SEP holders that seek or enforce injunctive relief.** • In *Huawei v. ZTE*, the ECJ found that SEP holders have "the right to bring an action for a prohibitory injunction" and that an injunction may only be an abuse of dominance in a few exceptional circumstances.[71] • The court created a safe harbor for an SEP holder that: 1. prior to initiating an infringement action, alerts the alleged infringer of the claimed infringement and specifies the way in	**Unclear**. • In dicta, the Delhi High Court has suggested that an SEP holder may be in violation of the Competition Act by seeking injunctive relief against its implementers. However, in those cases, the court also granted interim injunctions on FRAND-assured SEPs against "unwilling licensees."[72]	**May prohibit a firm from seeking injunctive relief in order to obtain unfairly high royalties.** • JFTC IP Guidelines provide: "Refusal to license or bringing an action for injunction against a party who is willing to take a license by a FRAND-encumbered [SEP] holder, or refusal to license or bringing an action for injunction against a party who is willing to take a license	**May prohibit an SEP holder from seeking an injunction against a willing licensee.** • KFTC's IP Guidelines provide for possible antitrust liability against an SEP holder that files an injunction against a "willing licensee."[74] • *See also* KFTC-Apple decision, concluding that, because Apple failed to engage in good faith negotiations, Samsung's injunction claims on its SEPs did not constitute an	**Likely not an antitrust violation.** • No U.S. court has held that seeking an injunction on a FRAND committed SEP violates antitrust law. • Instead, U.S. courts have held that, absent sham, the *Noerr-Pennngton* doctrine generally precludes antitrust liability for seeking or enforcing injunctive relief, including on SEPs.[76] • DOJ and FTC heads have stated that such conduct is

	China	European Union	India	Japan	South Korea	United States
		which the patent has been infringed; and 2. after the alleged infringer has expressed its willingness to conclude a license agreement on FRAND terms, presents to the alleged infringer a specific, written offer for a license, specifying the royalty and calculation methodology. • The ECJ put the burden on the alleged infringer to "diligently respond" to the SEP holder's offer, "in accordance with recognized commercial practices in the field and in good faith," by promptly providing a specific written counter-offer that corresponds to FRAND terms, and by providing appropriate security		by a FRAND-encumbered [SEP] holder after the withdrawal of the FRAND Declaration for that [SEP] may fall under the exclusion of business activities of other entrepreneurs by making it difficult to research & develop, produce or sell the products adopting the standards."[73]	abuse of dominance or unfair trade practice.[75]	properly analyzed under contract (or fraud) law, and not antitrust.[77] • The FTC entered two negotiated consents (*Bosch* and *MMI/Google*) under its standalone Section 5 "unfair methods of competition" authority (and not under traditional antitrust law) that precluded the firms from seeking injunctive relief.[78]

	China	European Union	India	Japan	South Korea	United States
		(e.g., a bond or funds in escrow) from the time at which the counter-offer is rejected and prior to using the teachings of the SEP.				
Tying & Bundling	**Prohibits tying or imposing "unreasonable trading conditions" without "any justifiable cause."** • The State Council's 2017 draft AML-IP Guidelines state that tying involving IPRs are evaluated using the same factors as other types of products.[79] • *See also* NDRC-Qualcomm decision, finding an abuse of dominance for allegedly bundling SEPs and non-SEPs without justification.[80]	**Tying is generally evaluated under an effects-based approach.** • The Technology Transfer Guidelines recognize the possibility of restrictive effects as well as efficiencies of tying relationships for IPRs generally.[82]	**Prohibits tying as an anticompetitive vertical restraint as well as by abuse of dominance, primarily on the basis of a rule of reason analysis.** • When market share exceeds 30%, CCI applies an effects-based approach. • In *Auto Parts*, CCI held that the car manufacturers unlawfully leveraged their dominance in the market for supply of spare parts to the market for after sales service and maintenance. • The CCI Advocacy Booklet states that package	**Tying that results in foreclosure is generally prohibited.** • "Where Tying causes difficulty in the business activities of competitors who are unable to easily find alternative trade partners in the market of the tied product, the said conduct is regarded as Exclusionary Conduct."[84]	**Tying is generally evaluated under a rule of reason analysis; for SEPs, tying is likely to be considered "unfair behavior" if it is conditioned upon licensing unnecessary, non-SEPs.** • KFTC's IP Guidelines state that "an act of coercing a licensee to get a license to use unnecessary non-SEPs on the condition of licensing SEPs is highly likely determined as an unfair behavior."[85]	**Tying is generally evaluated using an effects-based approach.** • Tying by a monopolist is quasi per se unlawful under the Supreme Court's decision in *Jefferson Paris Hosp. Dist. No. 2 v. Hyde*.[86] However, several lower courts have essentially applied an effects-based approach, requiring proof that the tie has anticompetitive effects,[87] and showing a willingness to consider legitimate

	China	European Union	India	Japan	South Korea	United States
	• In *Huawei v. InterDigital*, the Guangdong Higher People's Court held that InterDigital violated the AML by tying SEPs and non-SEPs.[81]		licensing of IPRs may be regarded as anticompetitive.[83]			business justifications for the alleged tie.[88] • The U.S. antitrust agencies have long stated (originally in their 1995 *Antitrust Guidelines for the Licensing of Intellectual Property* and reiterated in their 2017 update) that, "[i]n the exercise of their prosecutorial discretion, the Agencies will consider both the anticompetitive effects and the efficiencies attributable to a tie-in."[89]
Grantbacks & Cross-Licenses	**Standard unclear.** • In *Huawei v. InterDigital*, the Guangdong High People's Court held that InterDigital violated the AML by seeking	**An effects-based analysis is used, although exclusive grantbacks are disfavored and a safe harbor exists for non-exclusive grantbacks.** • The E.C. Guidelines provide a safe harbor for non-	**Exclusive grantbacks are "likely to augment the market power of the licensor in an unjustified and anti-competitive manner."**[93] • CCI's Advocacy Booklet states: "A	**Grantbacks are strongly disfavored and cross-licenses are evaluated under an effects-based analysis.** • Regarding grantbacks, the JFTC's IP Guidelines	**An effects-based analysis is used.** • The KFTC's IP Guidelines recognize both the procompetitive effects of grantbacks (especially non-	**An effects-based analysis is used.** • U.S. IP Guidelines provide: "The Agencies will evaluate a grantback provision under the rule of

	China	European Union	India	Japan	South Korea	United States
	grantbacks from Huawei.[90] • In February 2015, the NDRC imposed a $975 million fine against Qualcomm concluding that the company abused its dominance by, among other things, requiring royalty-free grantbacks of relevant patents.[91]	exclusive grantbacks. Exclusive grantbacks (and termination upon challenge clauses in non-exclusive grantbacks), however, are "likely to reduce the licensee's incentive to innovate since it hinders the licensee in exploiting the improvements." If there is consideration provided for the grantback term it is "less likely that the obligation creates a disincentive for the licensee to innovate."[92]	licensee may [be require[d] to grant back to the licensor any know-how or IPR acquired and not to grant licenses to anyone else. This is likely to augment the market power of the licensor in an unjustified and anti-competitive manner."[94] • The Booklet further states that exclusive licensing that may give rise to competition concerns include cross licensing by parties collectively possessing market power.	provide: "Normally it is not thought that there is any justifiable reason for instituting such restrictions." However, it is not deemed anticompetitive "in a case in which the improved technology created by a licensee cannot be used without the licensed technology."[95] • Regarding cross-licensing, the Guidelines consider it an "unreasonable restraint of trade to set forth jointly each party's scope of the use of technology. . . if it substantially restrains competition in the field of trade relating to the	exclusive) and the anticompetitive potential.[97] • The guidelines indicate caution regarding cross-licenses, stating that "despite procompetitive effects such as promotion of technology and reduction of trade costs, a cross license shares significant similarities with a patent pool in its possibility to result in collaborative practices among enterprisers and to exclude third-party competitors, therefore restraining competition."[98]	reason…."[99] Market power is a significant factor in the analysis of the grantback provision. • Cross-licensing arrangements are typically procompetitive, yet antitrust concerns may nonetheless arise. Such as when licensing conditions "include restraints that adversely affect competition in goods markets by dividing the markets among firms that would have competed using different technologies."[100]

	China	European Union	India	Japan	South Korea	United States
				technology or product."[96]		

[1] Anti-Monopoly Law of the People's Republic of China (adopted by the Standing Comm. Nat'l People's Cong., Aug. 30, 2007), Art. 55, www.china.org.cn/government/laws/2009-02/10/content_17254169.htm (China).

[2] ANTI-MONOPOLY COMN'N OF THE STATE COUNCIL, DRAFT ANTI-MONOPOLY GUIDELINES REGARDING ABUSE OF INTELLECTUAL PROPERTY RIGHTS (DRAFT) Preamble (2017) (unofficial English translation on file with authors) [hereinafter AML-IP GUIDELINES].

[3] Guidelines on the Applicability of Article 101 of the Treaty on the Functioning of the European Union to Technology Transfer Guidelines, 2014 O.J. (C 89) 3, ¶¶ 6-7, 9 (stating that "[i]ntellectual property laws confer exclusive rights on holders of patents, copyright, design rights, trademarks and other legally protected rights") [hereinafter E.C. IP Guidelines].

[4] *Id.* at ¶ 8 ("Article 101 cannot be applied without considering such ex ante investments made by the parties and the risks relating thereto").

[5] *Id.* at ¶ 11, (stating that "[i]n making this assessment it is necessary to take account of the likely impact of the agreement on inter-technology competition (that is to say, competition between undertakings using competing technologies) and on intra-technology competition (that is to say, competition between undertakings using the same technology)").

[6] *Id.* at ¶¶ 14-15. "The assessment of whether or not an agreement has as its object a restriction of competition is based on a number of factors. These factors include, in particular, the content of the agreement and the objective aims pursued by it. It may also be necessary to consider the context in which it is (to be) applied or the actual conduct and behavior of the parties on the market. In other words, an examination of the facts underlying the agreement and the specific circumstances in which it operates may be required before it can be concluded whether a particular restriction constitutes a restriction by object of competition. The way in which an agreement is actually implemented may reveal a restriction by object even where the formal agreement does not contain an express provision to that effect. Evidence of subjective intent on the part of the parties to restrict competition is a relevant factor but not a necessary condition. An agreement may be regarded as having a restrictive object even if it does not have the restriction of competition as its sole aim but also pursues other legitimate objectives." *Id.* at ¶ 14 (internal citations omitted).

[7] *Id.* at ¶ 11.

[8] The Competition Act, 2002, No. 12 of 2003, § 3, www.cci.gov.in/sites/default/files/cci_pdf/competitionact2012.pdf (India).

[9] *Id.* at § 4.

[10] Section 3(5) of the Competition Act provides that the prohibition on enterprises from entering into agreements that cause an AAEC does not extend to the right of any person to restrain any infringement of, or to impose reasonable conditions, as may be necessary for protecting any of his rights which have been or may be conferred upon him under (1) the Copyright Act, 1957; (2) the Patents Act, 1970; (3) the Trade and Merchandise Marks Act, 1958 or the Trade Marks Act, 1999; (4) the Geographical Indications of Goods (Registration and Protection) Act, 1999; (5) the Designs Act, 2002; and (6) the Semi-conductor Integrated circuits Layout-Design Act, 2000.

[11] JAPAN FAIR TRADE COMM'N, GUIDELINES FOR THE USE OF INTELLECTUAL PROPERTY UNDER THE ANTIMONOPOLY ACT pt. 1(1), 2 (2016), www.jftc.go.jp/en/legislation_gls/imonopoly_guidelines.files/IPGL_Frand.pdf [hereinafter JFTC IP GUIDELINES].

[12] *Id.* at pt. 2(3) ("Whether or not restrictions pertaining to the use of technology reduce competition in the market is determined by fully considering the nature of the restrictions, how they are imposed, the use of the technology in the business activity […]").

[13] KOREA FAIR TRADE COMM'N, REVIEW GUIDELINES ON UNFAIR EXERCISE OF INTELLECTUAL PROPERTY RIGHTS § II.2.D (2015), www.ftc.go.kr/solution/skin/doc.html?fn=bf37a158b33c09397cfc565b7ff85a7c97be02a5ea37c2d8289c04a34d8b2e8e&rs=/fileupload/data/result/BBSMSTR_000000002411, with additional amendments in 2016 mentioned at www.ftc.go.kr/solution/skin/doc.html?fn=a2f1e5f1168d4a9935f8694c2dfbfc376d28c09626ad8f19a8f207899cf3e257&rs=/fileupload/data/result/BBSMSTR_000000002402/ ("When an exercise of IPRs increases both anti-competitiveness and effectiveness, whether the exercise violates the Act or not in principle is determined after comparing the two effects through the fair comparison of the interests.") [hereinafter KFTC IP GUIDELINES].

[14] *Id.* at § II.3.B(2).

15 U.S. DEP'T OF JUSTICE & FED. TRADE COMM'N., ANTITRUST GUIDELINES FOR THE LICENSING OF INTELLECTUAL PROPERTY § 1.0 (Jan. 12, 2017), www.justice.gov/atr/IPguidelines/download [hereinafter U.S 2017 IP GUIDELINES].

16 STATE ADMIN. FOR INDUS. & COMMERCE, RULES OF THE ADMIN. FOR INDUS. AND COMMERCE ON THE PROHIBITION OF INTELLECTUAL PROPERTY RIGHTS FOR THE PURPOSES OF ELIMINATING OR RESTRICTING COMPETITION art. 6 (2015), *available in Chinese at* www.saic.gov.cn/zwgk/zyfb/zjl/fld/201504/t20150413_155103.html (translation using Google Translate) [hereinafter SAIC IP RULES].

17 AML-IP GUIDELINES, *supra* note 2, at art. 13.

18 Press Release, People's Republic of China Ministry of Com., The Ministry of Com. Holds a Special Press Conference on Anti-Monopoly Law (Apr. 11, 2014), http://english.mofcom.gov.cn/article/newsrelease/press/201404/20140400554324.shtml.

19 Press Release, People's Republic of China Ministry of Commerce, MOFCOM Approves Nokia's Acquisition of Equity of Alcatel-Lucent Conditionally (Oct. 21, 2015), http://english.mofcom.gov.cn/article/newsrelease/significantnews/201510/20151001151049.shtml; *See* Anjie Law Firm, *MOFCOM Clears Nokia's Acquisition of Alcatel-Lucent with Behavioral Remedies*, LEXOLOGY (Dec. 17, 2015), https://www.lexology.com/library/detail.aspx?g=27e7a773-6760-43d1-b928-fcaada8fedba.

20 Joined Cases C-241/91 P & C-242/91 P, *Radio Telefis Eireann & Indep. Television Publ'ns Ltd. (RTE & ITP) v. Comm'n*, 1995 E.C.R. I-743, ¶ 46; *see* ROBERT O'DONOGHUE & JORGE PADILLA, THE LAW AND ECONOMICS OF ARTICLE 102 TFEU Ch. 10 (2d ed. 2013) (explaining that "[m]ore precisely, the Court held that an intellectual property right would not confer a dominant position as long as competitors were able to provide close substitutes") (citations omitted).

21 E.C. IP Guidelines, *supra* note 3, at ¶ 15.

22 Case AT.39985—*Motorola–Enforcement of GPRS Standard Essential Patents, Comm'n Decision*, ¶ 222 (Apr. 29, 2014), http://ec.europa.eu/competition/antitrust/cases/dec_docs/39985/39985_928_16.pdf.

23 Case AT.39985—*Motorola–Enforcement of GPRS Standard Essential Patents, Comm'n Decision*, ¶ 222 (Apr. 29, 2014), http://ec.europa.eu/competition/antitrust/cases/dec_docs/39985/39985_928_16.pdf.

24 Case COMP/38.636—*Rambus, Comm'n Decision*, ¶ 2 (Dec. 9, 2009) (summary at 2010 O.J. (C 30) 17), http://ec.europa.eu/competition/antitrust/cases/dec_docs/38636/38636_1203_1.pdf.

25 Case No. 50/2013—*In re Micromax Informatics Ltd. v. Telefonaktiebolaget LM Ericsson, Comm'n Decision*, ¶¶ 15-16 (Nov. 12, 2013), http://cci.gov.in/sites/default/files/502013_0.pdf; *see also* Case No. 76/2013—*In re Intex Techn. Ltd., v. Telfonaktiebolaget LM Ericsson Comm'n Decision*, ¶ 16 (Jan. 16, 2014), http://cci.gov.in/sites/default/files/762013_0.pdf.

26 JFTC IP GUIDELINES, *supra* note 11, at pt. 4(1)(iii)(b).

27 KFTC IP GUIDELINES, *supra* note 13, at § II.2.C.

28 Press Release, Korea Fair Trade Comm'n, Strict Sanctions on Qualcomm's Abuse of Cellular SEPs 3 (Dec. 28, 2016), *unofficial translation available at* www.qualcomm.com/documents/kftc-issued-press-release-dated-december-28-2016-unofficial-english-translation; Koren Wong-Ervin, Douglas H. Ginsburg, et. al., *A Comparative and Economic Analysis of the U.S. FTC's Complaint and the Korea FTC's Decision Against Qualcomm*, CPI ANTITRUST CHRON. at 2 (Apr. 2017), www.competitionpolicyinternational.com/wp-content/uploads/2017/04/CPI-Wong-Ginsburg-Layne-Robins-Slonim.pdf.

29 *Illinois Tool Works Inc. v. Indep. Ink, Inc.*, 547 U.S. 28, 45-46 (2006); U.S. DEP'T OF JUSTICE & FED. TRADE COMM'N, ANTITRUST GUIDELINES FOR THE LICENSING OF INTELLECTUAL PROPERTY § 2.0 (Apr. 6, 1995), www.justice.gov/sites/default/files/atr/legacy/2006/04/27/0558.pdf.

30 *ChriMar Sys. v. Cisco Sys.*, 72 F. Supp. 3d 1012, 1019 (N.D. Cal. 2014); *See* Press Release, U.S. Fed. Trade Comm'n, FTC and DOJ Issue Updated Antitrust Guidelines for the Licensing of Intellectual Property (Jan. 13, 2017), www.ftc.gov/news-events/press-releases/2017/01/ftc-doj-issue-updated-antitrust-guidelines-licensing-intellectual (reiterating that "that the flexible effects-based enforcement framework set forth in the IP Licensing Guidelines remains applicable to all IP areas"); Edith Ramirez, Former Chairwoman, Fed. Trade Comm'n, Standard-Essential Patents and Licensing: An Antitrust Enforcement Perspective, Address Before the 8th Annual Global Antitrust Enforcement Symposium (Sept. 10, 2014), www.ftc.gov/system/files/documents/public_statements/582451/140915georgetownlaw.pdf. Former FTC Chairwoman Ramirez has stated that "the same key enforcement principles [found in the 1995 IP Guidelines] also guide our analysis when standard essential patents are involved" and that "it is important to recognize that a contractual dispute over royalty terms, whether the rate or the base used, does not in itself raise antitrust concerns." *Id*. at 4, 11.

31 AML-IP GUIDELINES, *supra* note 2, at art. 15.

32 SAIC IP RULES, *supra* note 16, at art. 13 (translation using Google Translate) (emphasis added).

33 *See* O'DONOGHUE & PADILLA, *supra* note 20, at 530-37 (providing a discussion of the case law).

34 Joined Cases C-241/91 P and C-242/91 P, *Radio Telefís Éireann & Indep. Television Publ's Ltd. (RTE & ITP) v. Comm'n*, 1995 E.C.R. I-743, ¶ 50; O'DONOGHUE & PADILLA, *supra* note 20, at 531.

35 O'DONOGHUE & PADILLA, *supra* note 20, at 533.

36 Case COMP/C-3/37.792—*Microsoft, Comm'n Decision*, 2007 O.J. (L 32) 23, ¶ 20; O'DONOGHUE & PADILLA, *supra* note 20, at 534.

37 O'DONOGHUE & PADILLA, *supra* note 20.

38 Guidance on the Commission's Enforcement Priorities in Applying Article 82 of the EC Treaty to Abusive Exclusionary Conduct by Dominant Undertakings, 2009 O.J. (C 45) 7, ¶¶ 75-88 (only the essential points are reproduced, with footnotes omitted); *see* O'DONOGHUE & PADILLA, *supra* note 20.

39 The Competition Act, 2002, No. 12 of 2003, § 4(2)(c), www.cci.gov.in/sites/default/files/cci_pdf/competitionact2012.pdf (India).

40 *Id*. at § 4(2)(b)(i).

41 Since the CCI has held that for a vertical restriction to qualify as an anticompetitive vertical arrangement, market power is necessary. Vertical restrictions may equally be examined as unilateral conduct (where the entity imposing the restriction is a dominant entity).

42 Case No. 03/2011—*In re: Shri Shamsher Kataria v. Honda Siel Cars Indian Ltd. & Others Comm'n Decision*, (Aug. 25, 2014), http://www.cci.gov.in/sites/default/files/032011_0.pdf.

43 JFTC IP GUIDELINES, *supra* note 11, at pt. 3(1).

44 *Id*. at pt. 3(1)(i)(e).

45 KFTC IP GUIDELINES, *supra* note 13, at § III.3.B (stating that "the ability of the patentee within reasonable bounds to refuse to grant a license to protect its rights is generally deemed to be a fair exercise of its patent right").

46 *Id*.

47 Press Release, Korea Fair Trade Comm'n, Strict Sanctions on Qualcomm's Abuse of Cellular SEPs (Dec. 28, 2016), www.qualcomm.com/documents/kftc-issued-press-release-dated-december-28-2016-unofficial-english-translation (unofficial translation) [hereinafter KFTC Apple Samsung Press Release]; *See also* Koren W. Wong-Ervin, *Standard-Essential Patents: The International Landscape*, ABA SECTION OF ANTITRUST LAW INTELLECTUAL PROP. COMM. NEWSLETTER (Spring 2014), www.ftc.gov/system/files/attachments/key-speeches-presentations/standard-essential_patents_the_intl_landscape.pdf [hereinafter Wong-Ervin].

48 *In re Indep. Serv. Organizations Antitrust Litig.*, 203 F.3d 1322, 1327–28 (Fed. Cir. 2000) ("In the absence of any indication of illegal tying, fraud in the Patent and Trademark Office, or sham litigation, the patent holder may enforce the statutory right to exclude others from making, using, or selling the claimed invention free from liability under the antitrust laws. We therefore will not inquire into his subjective motivation for exerting his statutory rights, even though his refusal to sell or license his patented invention may have an anticompetitive effect, so long as that anticompetitive effect is not illegally extended beyond the statutory patent grant."); U.S. DEP'T OF JUSTICE & FED. TRADE COMM'N, ANTITRUST ENFORCEMENT AND INTELLECTUAL PROPERTY RIGHTS: PROMOTING INNOVATION AND COMPETITION 30 (2007), www.justice.gov/sites/default/files/atr/legacy/2007/07/11/222655.pdf [hereinafter U.S. 2007 IP REPORT) ("Taking all of the relevant factors together—including the fact that no case supported this type of antitrust liability before Kodak, and the silence of section 271(d)(4) on the issue, the Agencies conclude that liability for mere unconditional, unilateral refusals to license will not play a meaningful part in the interface between patent rights and antitrust protections."); U.S 2017 IP GUIDELINES, *supra* note 15, at 3 ("The antitrust laws generally do not impose liability upon a firm for a unilateral refusal to assist its competitors, in part because doing so may undermine incentives for investment and innovation.").

49 U.S 2017 IP GUIDELINES, *supra* note 15, at § 2.1 (citing *Verizon Commc'ns Inc. v. Law Offices of Curtis V. Trinko, LLP*, 540 U.S. 398, 407-08 (2004); *United States v. Colgate & Co.*, 250 U.S. 300, 307 (1919); U.S. 2007 IP REPORT, *supra* note 48, at 27-28.

50 Ramirez, *supra* note 29, at 4 (stating that "the same key enforcement principles [found in the 1995 IP Guidelines] also guide our analysis when standard essential patents are involved").

51 Makan Delrahim, Asst. Att'y Gen., U.S. Dep't of Justice, Antitrust Div., Take It to the Limit: Respecting Innovation Incentives in the Application of Antitrust Law, Address Before the USC Gould School of Law – Application of Competition Policy to Technology and IP Licensing 8 (Nov. 10, 2017), www.justice.gov/opa/speech/file/1010746/download.

52 *Id.* at 12 ("We should not transform commitments to license on FRAND terms into a compulsory licensing scheme").

53 Anti-Monopoly Law of the People's Republic of China, *supra* note 1, at art. 17(1).

[54] AML-IP GUIDELINES, *supra* note 2, at art. 14.

[55] *See* Koren W. Wong-Ervin, *Antitrust and IP in China: Quo Vadis?* 5-6 (Apr. 16, 2015), www.ftc.gov/system/files/attachments/key-speeches-presentations/wong-ervin_-_2015_aba_spring_meeting_4-16-15.pdf [hereinafter Wong-Ervin, *Antitrust and IP in China*]; *see also* Press Release, Qualcomm Inc., Qualcomm and China's National Development and Reform Commission Reach Resolution -NDRC Accepts Qualcomm's Rectification Plan -Qualcomm Raises Midpoints of Fiscal 2015 Revenue and Non-GAAP EPS Guidance (Feb. 9, 2015), http://files.shareholder.com/downloads/QCOM/3864235320x0x808060/382E59E5-B9AA-4D59-ABFF-BDFB9AB8F1E9/Qualcomm_and_China_NDRC_Resolution_final.pdf.

[56] Guidelines on the applicability of Article 101 of the Treaty on the Functioning of the European Union to horizontal co-operation agreements, 2011 O.J. (C 11)1, ¶ 269 (internal citations omitted) [hereinafter EC Horizontal Cooperation Guidelines].

[57] *Id.* at ¶ 289–90 (2011) (internal citations omitted).

[58] Case C-177/16—*Biedrība 'Autortiesību un komunicēšanās konsultāciju aģentūra – Latvijas Autoru apvienība' v. Konkurences padome, Opinion of Advocate General Wahl* ¶ 3 (Apr. 6, 2017), http://curia.europa.eu/juris/document/document_print.jsf?doclang=EN&text=&pageIndex=0&part=1&mode=req&docid=189662&occ=first&dir=&cid=756879 (stating that the E.C. has been "been extremely reluctant to make use of that provision against (allegedly) high prices practiced by dominant undertakings").

[59] Case COMP/38.636—*Rambus, Comm'n Decision*, ¶ 28 (Dec. 9, 2009) (summary at 2010 O.J. (C 30) 17), http://ec.europa.eu/competition/antitrust/cases/dec_docs/38636/38636_1203_1.pdf.

[60] *See, e.g.*, Joined Cases 110/88, 241/88, 242/88, *Lucazeau v SACEM* [1989] E.C.R. 2811, ¶¶ 21-33, http://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:61988CJ0110&from=EN.

[61] The Competition Act, 2002, No. 12 of 2003, § II.4.2, www.cci.gov.in/sites/default/files/cci_pdf/competitionact2012.pdf (India).

[62] Case No. 04/15—*Best IT World (India) Private Ltd. v. Telefonaktiebolaget LM Ericsson* ¶ 14 (May 12, 2015), www.cci.gov.in/sites/default/files/042015_0.pdf (stating that "The Commission observes that forcing a party to execute NDA and imposing excessive and unfair royalty rates, prima facie, amount to abuse of dominance in violation of section 4 of the Act").

[63] Case No. 50/2013—*In re: Micromax Informatics Ltd. v. Telefonaktiebolaget LM Ericsson*, Comm'n Decision, ¶ 17 (Nov. 12, 2013), http://cci.gov.in/sites/default/files/502013_0.pdf; *see also* Case No. 76/2013, *In re Intex Techn. Ltd., v. Telfonaktiebolaget LM Ericsson, Comm'n Decision*, ¶ 17 (Jan. 16, 2014), http://cci.gov.in/sites/default/files/762013_0.pdf.

[64] JFTC IP GUIDELINES, *supra* note 11, at pt. 3(1)(i).

[65] KFTC IP GUIDELINES, *supra* note 13, at § II.2.B.

[66] *Id*. at § III(5)(A). Note that the KFTC has stated that the phrase "likely to impede fair trade" found in its English version of its Guidelines should be translated as "may harm competition".

[67] Glob. Antitrust Inst., Geo. Mason Univ. Sch. of Law, A Conversation with Former Federal Trade Commissioner Joshua D. Wright & Korea Fair Trade Commission Vice-Chairman Kim Hack-hyun 9 (Apr 8, 2016), http://masonlec.org/site/rte_uploads/files/GAI%20Interview%20Final%28VC%20Kim%29%282%29.pdf ("[T]here are very few cases where we actually enforced this provision. As far as I remember, the last case that this provision was applied to was the case in 1992, the early stage of the competition law enforcement. It was a very rare case where the output was drastically reduced with prices unchanged.").

[68] *See, e.g.*, *Verizon Commc'ns Inc. v. Law Offices of Curtis V. Trinko, LLP*, 540 U.S. 398, 407 (2004).

[69] *See, e.g.*, Bill Baer, Former Assistant Att'y Gen., U.S. Dep't of Justice, Antitrust Div., Reflections on the Role of Competition Agencies When Patents Become Essential, Address Before the 19th Annual International Bar Association Competition Conference 10 (Sept. 11, 2015), www.justice.gov/opa/file/782356/download ("We don't use antitrust enforcement to regulate royalties. That notion of price controls interferes with free market competition and blunts incentives to innovate. For this reason, U.S. antitrust law does not bar 'excessive pricing' in and of itself. Rather, lawful monopolists are perfectly free to charge monopoly prices if they choose to do so. This approach promotes innovation from rivals or new entrants drawn by the lure of large rewards."); Ramirez, *supra* note 29, at 8 ("In contrast to the FTC's and EC's approach, media reports indicate that China's antitrust authorities may be willing to impose liability solely on the royalty terms that a patent owner demands for a license to its FRAND-encumbered SEPs, as well as royalty demands for licenses for other patents that may not be subject to a voluntary FRAND commitment."); Keith N. Hylton, *Antitrust Snoops on the Loose*, WALL ST. J., Apr. 3, 2015, at A9, *reprinted in* CPI ANTITRUST CHRON. (June 2015) *available at* www.competitionpolicyinternational.com/file/view/7396.

[70] AML-IP GUIDELINES, *supra* note 2, at art. 26.

[71] Case C-170/13, *Huawei Techs. Co. Ltd. v. ZTE Corp.*, EU:C:2015:477, ¶¶ 65–67 (July 16, 2015), http://curia.europa.eu/juris/liste.jsf?num=C-170/13.

[72] Case No. 50/2013—*In re Micromax Informatics Ltd. v. Telefonaktiebolaget LM Ericsson*, Comm'n Decision, ¶ 199 (Nov. 12, 2013), http://cci.gov.in/sites/default/files/502013_0.pdf; Case No W.P.(C) 464/2014 & CM Nos.911/2014 & 915/2014, *Telefonaktiebolaget LM Ericsson v. Competition Comm'n of India*, (Mar. 30, 2016), http://cis-india.org/a2k/blogs/telefonaktiebolaget-lm-Ericsson-publ-v-competition-commission-of-india-and-anr (High Ct. of Delhi).

[73] JFTC IP GUIDELINES, *supra* note 11, at pts. 3(1)(i)(e) & 4(2)(iv).

[74] KFTC IP GUIDELINES, *supra* note 13, at § III(5)(B).

[75] KFTC Apple Samsung Press Release, *supra* note 47; *see* Wong-Ervin, *supra* note 46.

[76] *Apple, Inc. v. Motorola Mobility, Inc.*, 886 F. Supp. 2d 1061 (W.D. Wis. 2012) (the court dismissed Apple's Sherman Act Section 2 claims on Noerr-Pennington grounds). The Noerr-Pennington doctrine precludes antitrust liability for the act of petitioning the government and conduct incidental to it. The doctrine states that petitioning is protected by the First Amendment. Sham exception holds that using the petitioning process simply as an anticompetitive tool without legitimately seeking a positive outcome to the petitioning destroys immunity.

[77] *See e.g.*, Delrahim, *supra* note 51, at 12; Maureen Ohlhausen, *The Elusive Role of Competition in the Standard-Setting Antitrust Debate*, 20 STAN. TECH. L. REV. 93 (2017).

[78] For a discussion of these consent agreements, *see* Koren W. Wong-Ervin & Joshua D. Wright, *Intellectual Property and Standard Setting*, 17 FEDERALIST SOC'Y REV. 523 (Oct. 2016).

[79] AML-IP GUIDELINES, *supra* note 2, at art. 16.

[80] Nat'l Dev. & Reform Comm'n, Administrative Penalty Decision No. [2015] (Feb. 9, 2015) *available in Chinese at* www.ndrc.gov.cn/gzdt/201503/t20150302_666209.html (unofficial English translation of decision on file with author).

[81] InterDigital, Inc., Quarterly Report 12 (Form 10-Q), at 12 (Sept. 30, 2013), www.sec.gov/Archives/edgar/data/1405495/000140549513000040/idcc-20139302013.htm.; *see* Anne Layne-Farrar & Koren W. Wong-Ervin, *Methodologies for Calculating FRAND Damages: An Economic and Comparative Analysis of the Case Law from China, the European Union, India and the United States*, 8:2 JINDAL GLOBAL L. REV. 127 (2017).

[82] E.C. IP Guidelines, *supra* note 3, at ¶¶ 221–25.

[83] COMPETITION COMM'N OF INDIA, INTELLECTUAL PROPERTY RIGHTS UNDER THE COMPETITION ACT 6–7 (2002), www.competition-commission-india.nic.in/advocacy/Intellectual_property_rights.PDF [hereinafter CCI IP GUIDANCE].

[84] JFTC, THE GUIDELINES FOR EXCLUSIONARY PRIVATE MONOPOLIZATION UNDER THE ANTIMONOPOLY ACT parts II 4(1) & (2) (2009), http://www.jftc.go.jp/en/legislation_gls/imonopoly_guidelines.files/guidelines_exclusionary.pdf.

[85] KFTC IP GUIDELINES, *supra* note 13, at § III(3)(D)(5).

[86] *Jefferson Paris Hosp. Dist. No. 2 v. Hyde*, 466 U.S. 2, 25 (1984) (confirmed the continued role of a per se analysis, yet emphasizes that market power in the tying product was a requirement for per se illegality). Later that same year, the Supreme Court explained that the application of the per se rule to tying had evolved to incorporate a market analysis: "[T]here is often no bright line separating per se from Rule of Reason analysis. Per se rules may require considerable inquiry into market conditions before the evidence justifies a presumption of anticompetitive conduct. For example, while the Court has spoken of a 'per se' rule against tying arrangements, it has also recognized that tying may have procompetitive justifications that make it inappropriate to condemn without considerable market analysis." *Nat'l Collegiate Athletic Ass'n v. Bd. of Regents of the Univ. of Okla.*, 468 U.S. 85, 104 n.26 (1984) (citation omitted).

[87] *Wells Real Estate, Inc. v. Greater Lowell Bd. of Realtors*, 850 F.2d 803, 815 (1st Cir. 1988) ("The tying claim must fail absent any proof of anti-competitive effects in the market for the tied product."); *Fox Motors, Inc. v. Mazda Distribs. (Gulf), Inc.*, 806 F.2d 953, 958 (10th Cir. 1986) (declining to apply the *per se* rule to a tie that "simply does not imply a sufficiently great likelihood of anticompetitive effect").

[88] *United States v. Jerrold Elecs. Corp.*, 187 F. Supp. 545, 557-58 (E.D. Pa. 1960), *aff'd per curiam*, 365 U.S. 567 (1961) (concluding that a tie was justified for a limited time in a new industry to assure effective functioning of complex equipment); *Mozart Co. v. Mercedes-Benz of N. Am., Inc.*, 833 F.2d 1342, 1348-51 (9th Cir. 1987) (upholding verdict for defendant because the tie may have been found to be the least expensive and most effective means of policing quality); *Dehydrating Process Co. v. A. O. Smith Corp.*, 292 F.2d 653, 655-57 (1st Cir. 1961) (affirming a judgment of a district court that directed a verdict in favor of the defendant because a tie was necessary to assure utility of two products when separate sales led to malfunctions and widespread customer dissatisfaction); *see also Brantley v. NBC Universal, Inc.*, 675 F.3d 1192, 1200 (9th Cir. 2012) ("Like other vertical restraints, tying arrangements may promote rather than injure competition.").

[89] U.S 2017 IP GUIDELINES, *supra* note 15, § 5.3.

[90] InterDigital, *supra* note 80.

[91] Wong-Ervin, *Antitrust and IP in China*, *supra* note 54, at 5-6; *see also* Qualcomm Press Release, *supra* note 554.

[92] E.C. IP Guidelines, *supra* note 3, ¶¶ 129–32. Article 5(1)(a) of the Technology Transfer Block Exemption Regulations (TTBER) states, "The exemption provided for in Article 2 shall not apply to any of the following obligations contained in technology transfer agreements: (a) any direct or indirect obligation on the licensee to grant an exclusive licence or to assign rights, in whole or in part, to the licensor or to a third party designated by the licensor in respect of its own improvements to, or its own new applications of, the licensed technology." Comm'n Regulation (EU) No. 316/2014 on the application of Article 101(3) of the Treaty on the Functioning of the European Union to Categories of Technology Transfer Agreements, 2014 O.J. (L 93) 17, 22.

[93] CCI IP GUIDANCE, *supra* note 82, at 5.

[94] *Id*.

[95] JFTC IP GUIDELINES, *supra* note 11, at pt. 4(5)(viii),(xi).

[96] *Id*. at pt. 3(2)(iii).

[97] KFTC IP GUIDELINES, *supra* note 13, at § III(4)(B)

[98] *Id.*; *see id.* at § III(4)(A)(1)–(3) (discussing certain conditions in patent pools that also apply to cross-licensing arrangements).

[99] U.S 2017 IP GUIDELINES, *supra* note 15, at § 5.6 (citing *Transparent-Wrap Machine Corp. v. Stokes & Smith Co.*, 329 U.S. 637, 645–48 (1947)).

[100] *Id.* at § 3.1.