Concurrences

REVUE DES DROITS DE LA CONCURRENCE | COMPETITION LAW REVIEW

An economic approach to antitrust analysis of discriminatory licensing, grantbacks and cross-licenses, no-challenge clauses, and patent thickets

Law & Economics | Concurrences N° 3-2019 | pp. 44-51

Jorge Padilla
jpadilla@compasslexecon.com
Senior Managing Director Compass Lexecon, Madrid – London – Brussels
Research Fellow CEMFI, Madrid
Associate Professor Barcelona Graduate School of Economics (BGSE)

Koren W. Wong-Ervin
kwongerv@qualcomm.com
Director of Antitrust & IP Policy Qualcomm Incorporated, Washington, D.C.
Senior Expert and Researcher China's University of International Business & Economics, Beijing
Former Counsel for Intellectual Property and International Antitrust and Attorney Advisor to Commissioner Joshua Wright U.S. Federal Trade Commission, Washington D.C.

INSTITUT de droit de la concurrence

Jorge Padilla*
jpadilla@compasslexecon.com

Senior Managing Director
Compass Lexecon,
Madrid – London – Brussels

Research Fellow
CEMFI, Madrid

Associate Professor
Barcelona Graduate School
of Economics (BGSE)

Koren W. Wong-Ervin
kwongerv@qualcomm.com

Director of Antitrust & IP Policy
Qualcomm Incorporated, Washington, D.C.

Senior Expert and Researcher
China's University of International
Business & Economics, Beijing

Former Counsel for Intellectual Property and International Antitrust and Attorney Advisor to Commissioner Joshua Wright
U.S. Federal Trade Commission,
Washington D.C.

An economic approach to antitrust analysis of discriminatory licensing, grantbacks and cross-licenses, no-challenge clauses, and patent thickets

ABSTRACT

Antitrust enforcement involving intellectual property rights--particularly standard-essential patents--continues to receive significant global attention, including most recently by OECD member countries at the June 2019 OECD Competition Committee meetings. This Article provides an economic approach to antitrust analysis of discriminatory licensing, grantbacks and cross-licenses, no-challenge clauses, and so-called "patent thickets." It also addresses the ex-ante incremental (or "inherent") value approach for the valuation of standard-essential patents.

L'application des règles antitrust relatives aux droits de propriété intellectuelle continue de faire l'objet d'une attention particulière dans le monde entier, notamment pour les brevets essentiels, y compris, très récemment, de la part des États membres de l'OCDE, lors des réunions du comité de la concurrence en juin 2019. Cet article propose une approche économique de l'analyse antitrust de licence discriminatoire, rétrocessions, licences croisées, clauses de non-contestation, et des « enchevêtrements de brevets ». Il étudie également l'approche de la valeur incrémentielle (ou inhérente) ex ante pour l'estimation des brevets essentiels.

1. In June 2019, the Competition Committee of the Organisation for Economic Co-operation and Development (OECD) held a roundtable on "Licensing of IP Rights and Competition Law."1 The roundtable covered a wide variety of topics from refusals to license to so-called "patent thickets." This article provides an economic approach to such conduct, specifically to differential pricing (here, used synonymously with "price discrimination") and discriminatory refusals to license; grantbacks and cross-licenses; and no-challenge clauses. The analysis applies to both intellectual property rights (IPRs) in general, as well as to standard-essential patents (SEPs) as to which the holder has made a commitment to license on fair, reasonable, and nondiscriminatory (FRAND) terms. This note also addresses the alleged "patent thickets" problem and the ex-ante incremental (or "inherent") value approach to SEP valuation.2

I. Differential pricing and discriminatory refusals to license

2. Differential pricing of tangible products and services is defined as selling the same product to different customers at different prices not justified by differences in costs. However, the definition of differential pricing in the intellectual property (IP) licensing context generally turns on variation in licensee traits. That is, offering

1 Written submissions from member countries and others, as well as video-highlights of the roundtable, are available at https://www.oecd.org/daf/competition/licensing-of-ip-rights-and-competition-law.htm.

2 For an economic approach to the assessment of market definition and market power, seeking or enforcing injunctive relief, tying and bundling, and excessive pricing, see J. Padilla, D. H. Ginsburg & K. W. Wong-Ervin, Antitrust Analysis Involving Intellectual Property and Standards: Implications from Economics, *Harv. J. L. & Tech.* (forthcoming 2019), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3119034. For an analysis of the major FRAND cases around the world, see A. Layne-Farrar & K. 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. Rev.* (2017), https://link.springer.com/article/10.1007/s41020-017-0048-9.

* The opinions in this paper are the authors' sole responsibility.

different licensing terms to "similarly situated" licensees is generally viewed as discriminatory. The difference in the definition in the IP context is due to the fact that patents and other forms of IP tend to emerge from costly and risky research and development efforts (i.e., large upfront costs with no assurance of recoupment), yet, once an invention is developed, the marginal costs of licensing it tend to be relatively low.[3] In addition, the relevant licensing terms include both pricing and non-pricing elements, and licensing terms are optimally linked to the added value of the underlying technologies rather than their development costs.

3. The licensee "situation" is therefore determined by a number of characteristics, which are meant to capture the added value of the licensed IP, such as (1) the licensee's particular use for the licensed IP, (2) the licensee's size and expected revenues, (3) its position in the relevant marketplace, and (4) the time span for which the patented technology is expected to remain valuable to the licensee.[4]

4. First-degree (or "perfect") differential pricing involves a licensor charging each licensee different terms reflecting the latter's valuation of the licensed IP. Second-degree differential pricing (or "menu pricing") involves offering a menu of licensing contracts and letting each licensee select its preferred one. For example, offering licensing agreements with different payment options (e.g., upfront fees versus running royalties). Third-degree differential pricing segments licensees using observable characteristics, such as field of use, as proxies for IP valuation.

5. With respect to SEPs, first- and third-degree differential pricing are most often observed, since we are most often dealing with bilateral negotiations between patent holders and implementers. "*If negotiations reveal enough information, patent licensing may approach first-degree*[-price] *discrimination*."[5] An IP holder may for example require higher royalties from a company that has lower sales volume, i.e., offer volume discounts or lower royalties to a licensee that can offer valuable consideration in trade, such as a cross-license of its IP, which may be netted against the price of a license.

6. First-degree differential pricing unambiguously increases total welfare in a static sense, because it expands output.[6] Although the static welfare effects of second- and third-degree differential pricing are indeterminate theoretically,[7] empirical evidence suggests that their use can be welfare-enhancing.[8] Of course, differential pricing may involve the transfer of rents between licensors and licensees and affect their innovation incentives in ways that affect both the distribution of welfare in the short term, and innovation and total welfare in the long term.

7. The fact that the welfare effects of differential pricing are mixed supports the use of an effects-based approach that recognizes both the anticompetitive and procompetitive uses of differential pricing, including to improve efficiency, grow markets, intensify competition, and enhance consumer welfare. For example, profit-maximizing licensors facing licensees operating in markets with distinct consumer demands may adjust their royalties downwards for licensees facing more price-sensitive customers and increase them to those with less price-sensitive customers. As such, differential pricing can allow licensing by price-sensitive consumers who would otherwise have been priced out of the market.

8. In addition, differential pricing "*helps a firm with fixed costs to recover its outlays and is sometimes necessary* (…) *for a firm to recover those outlays*."[9] Indeed, an important aspect to consider in evaluating differential pricing in licensing as compared to differential pricing for physical goods is the nature of IP development. As discussed above, the innovation process typically involves large upfront investments in research and development yet very low marginal costs at the production stage. "*Economists have observed that* [differential pricing] *can be an important mechanism for recovering fixed costs under these circumstances*."[10]

9. Similarly, licensing to different parties on different terms may serve legitimate, procompetitive ends. For example, an IP holder may decide to license at the end-device level as opposed to at the component-level in order to better align the licensee's incentives with their customers and thereby reduce double-marginalization effects.[11] Recall that double marginalization refers to the distortion caused by the successive markups of independent firms in a distribution channel, which both reduces firm profits and harms consumers. The reason is that each member of the distribution channel typically adds a markup to the markups of all channel members above it, and the accumulation of these markups results in higher prices and lower demand.

10. Incentives are more aligned with end-device royalties (i.e., a payment comprising a percentage of the value of the sales of the end product) because an increase in

3 *See* A. Layne-Farrar, Nondiscriminatory Pricing: Is Standard Setting Different?, 6 *J. Competition L. & Econ.* 811, 815 (2010) (hereinafter "Layne-Farrar").

4 *See* ibid.

5 Id. at 817.

6 First-degree differential pricing is welfare-reducing only if the welfare gains from increased output are less than the informational and implementation costs associated with differential pricing. *See*, e.g., J. Hirshleifer, The Private and Social Value of Information and the Reward to Inventive Activity, 61 *Am. Econ. Rev.* 561 (1971).

7 *See generally* H. R. Varian, Price Discrimination, in 1 *Handbook of Industrial Organization* 597, 619–622 (R. Schmalensee & R. D. Willig eds., 1989); H. R. Varian, Price Discrimination and Social Welfare, 75 *Am. Econ. Rev.* 870 (1985).

8 *See*, e.g., I. Hendel & A. Nevo, Intertemporal Differential Pricing in Storable Goods Markets, 103 *Am. Econ. Rev.* 2722 (2013); P. Leslie, Price Discrimination in Broadway Theater, 35 *and J. Econ.* 520 (2004); A. Cohen, Package Size and Price Discrimination in the Paper Towel Market, 26 *Int. J. Indus. Org.* 502 (2008).

9 Layne-Farrar, *supra* note 3, at 827 (citing W. J. Baumol & D. G. Swanson, The New Economy and Ubiquitous Competitive Price Discrimination: Identifying Defensible Criteria of Market Power, 70 *Antitrust L.J.* 661 (2003)).

10 Ibid.; *see also* C. Shapiro & H. R. Varian, *Information Rules: A Strategic Guide to the Network Economy* (Harvard Business School Press, 1999); Baumol & Swanson, *supra* note 9.

11 G. Llobet & J. Padilla, The Optimal Scope of the Royalty Base in Patent Licensing, 59 *J. L. & Econ.* 45, 47 (2016).

the end-device price increases the value of sales and, hence, the royalty payment, which decreases the licensee's incentives to pass-through. In other words, end-device royalties act as a tax on a price increase by end-device makers. First, a higher price results in reduced quantity sold of the end-device product and then, because end-device royalties are a percentage of the end-device price, the end-device maker must also pay a higher royalty on the lower quantity. This is not the case with component royalties, which increase the marginal cost of the end-device maker on a one-to-one basis, and thus increases incentives for pass-through. That is, end-device royalties are more similar to fixed fees than component royalties.[12]

11. The Cournot Complements, or royalty stacking, problem is also less of a concern under end-device royalties when investment is endogenized. When an SEP holder increases its royalties, "*a trade-off arises between the capacity to extract more surplus and the reduction of that surplus as a result of a higher price*."[13] Under end-device royalties, both SEP holders and end-device makers care about maximizing total revenues, from which each of them obtains a portion. All this results in higher joint profits, which increases incentives to invest for both licensees and licensors. It thus results in better products, and also lower prices to end consumers (again, due to reduced double marginalization and less incentives for pass-through).[14]

12. Although component-level royalties tend to spur more investment by downstream producers and end-device royalties tend to spur more investment by upstream SEP holders, the two effects are not of the same magnitude. As explained above, "[t]*he probability of success is higher under* [end-device] *royalties since the double-marginalization effect is smaller* (…) *and, thus, total profits are higher*," increasing overall incentives to invest.[15] In addition, with multiple upstream innovators with complementary technologies, "*by increasing upstream profits,* [end-device] *royalties increase the productivity of the investment of all parties, which generates a positive-feedback loop*."[16] Increases in upstream research and development make technological success more likely and, due to the complementarity, the incentives to invest downstream increase.[17]

13. Some contend that the above-mentioned results rely on the assumption that component manufacturers can pass-through component-level royalties to end-device makers, which they argue is unrealistic due to lack of market power. We disagree, since common increases in costs, such as increases in royalties, are passed on to a greater extent the more competitive markets are. If the argument is that downstream manufacturers have so much bargaining power that they can force component manufacturers to absorb royalty increases in the form of lower margins, this is an extreme proposition that is unlikely to hold true in industries with a small number of component manufacturers, especially if they are capacity constrained. While component manufacturers may not be able to price independently of their customers, the degree of market power relevant for the double-marginalization problem simply refers to the ability to charge above marginal costs.

14. With respect to differential terms, in order to maximize its income from its patent, an IP holder may require higher royalties from a company that has lower sales volume or offer lower royalties to a licensee that can offer valuable consideration in trade, such as a cross-license of its IP, which may be netted against the price of a license.

15. Nearly all concern (at least for economists) over potentially harmful discriminatory licensing has centered on the practices of vertically-integrated firms that both hold patents and practice them in a downstream market. This is because a nonintegrated patent holder, with no downstream operations, has less to gain by discriminating among licensees with whom it does not compete.[18] Nonintegrated firms will have an incentive to engage in anticompetitive licensing discrimination only if it increases their total royalty revenues, but often it is increased downstream competition that maximizes the upstream patentee's royalty earnings.[19] "*If the patent holder is not vertically integrated, then any analysis into allegations of discriminatory licensing should be even more rigorous, as the circumstances under which an upstream patent holder would have an incentive to disadvantage one downstream licensee over another are narrower*."[20] That said, the possibility of market expansion and other efficiencies, including the recoupment of research and development investments, indicates the need for a cautious approach to assessing discrimination in licensing even when vertically integrated firms are involved.

16. Economic modeling shows that a vertically integrated SEP holder's refusal to license a downstream rival component maker cannot lead to the foreclosure of the component market if (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. Intuitively, when (1) and (2) hold, the bundle (of patents and components) offered by the vertically integrated SEP

12 Id. at 46.

13 Id. at 53.

14 Id. at 48.

15 Id. at 58.

16 Id. at 48–49.

17 Id. at 64 ("innovators invest more and, because of the complementarity-of-investments assumption, the marginal productivity of downstream investment rises").

18 *See*, e.g., H. Hovenkamp et al., Unilateral Refusals to License, 2 *J. Competition L. & Econ.* 1, 5 (2006) ("*An antitrust violation is even less likely where the intellectual property owner does not compete directly with the disfavored licensee; in the absence of some showing of monopoly leveraging, it is not clear what incentive the intellectual property owner would have to try to eliminate competition in the downstream market*").

19 Layne-Farrar, *supra* note 3, at 825.

20 Id. at 828.

holder can be replicated by end-device manufacturers competitively by mixing and matching the component sold by the nonintegrated component supplier and the patent portfolio of the integrated SEP holder. This is because the essential patents (the bundling products) are offered on a standalone basis (i.e., outside the bundle) on competitive terms. Thus, the end-product manufacturers can choose either the bundle of the vertically integrated SEP holder or create their own bespoke bundle by purchasing the component from a nonintegrated component manufacturer and still license the SEPs of the vertically integrated SEP holder on fair and reasonable terms. As a result, the bundle is effectively constrained by the unbundled products and vice versa and, hence, bundling causes no distortion of the competitive process.[21]

17. With respect to an *ex-post* breach of the "ND" prong of a FRAND commitment that was made in good faith, such conduct is properly analyzed under contract not antitrust law. When an SEP holder attempts to renegotiate or deviate from its original FRAND commitment made in good faith to obtain higher royalty rates, it amounts to no more than pure *ex-post* contractual opportunism. As the U.S. Supreme Court explained in *NYNEX Corp. v. Discon, Inc.*, while the evasion of a pricing constraint may hurt consumers, it does not harm the competitive process.[22] The court distinguished the mere breach of a pricing commitment from the unlawful acquisition or exercise of monopoly power by pointing out that, with the former, the "*consumer injury flowed* (…) *from the exercise of market power that is lawfully in the hands of a monopolist*."[23]

18. An antitrust violation requires a showing of *ex-ante* deception in pledging a FRAND commitment and evidence that, but for the deception, the standard-development organization (SDO) would have adopted a different technology. As the U.S. Court of Appeals for the D.C. Circuit explained in *Rambus Inc. v. Federal Trade Commission*, absent such a showing, the SDO would have lost "*only an opportunity to secure a RAND commitment from* [the SEP holder]. *But loss of such a commitment is not a harm to competition from alternative technologies in the relevant markets*. (…) *Indeed, had* [the SDO] *limited* [the SEP holder] *to reasonable royalties and required it to provide licenses on a nondiscriminatory basis, we would expect* less *competition from alternative technologies, not more; high prices and constrained output tend to attract competitors, not to repel them*."[24]

II. Grantbacks and cross-licenses

19. Grantbacks and cross-licenses, like other licensing restraints, are generally procompetitive because they may facilitate the integration of complementary technologies, promote the dissemination of a technology, reduce transaction costs, clear blocking positions, and avoid costly patent infringement litigation.

20. Grantbacks provide a means for the licensee and the licensor to share risks and to reward the licensor for possible further innovations based upon or informed by the licensed technology. They can therefore address market failures related to sequential innovation. Innovation is typically a sequential process. Future innovations build on previous innovations. Firms innovating early in the sequence are unlikely to benefit from all innovations that build upon their efforts, because many of those would have been achieved by others. Firms may thus underinvest at early stages of the sequence. But this is not the only difficulty related to sequential innovation. Future investment may also be suboptimal if, for example, those who innovate early can leverage their IPRs to hold up sequential innovation. In this context, therefore, the prospect of a grantback combined with a license is an incentive both for innovation in the first place and for the subsequent licensing of the results of that innovation.

21. On the other hand, grantbacks may adversely affect competition if they substantially reduce the licensee's incentives to engage in research and development and thereby limit rivalry in innovation. Grantbacks may also "*be used as a way to 'leverage' the market power of the licensor into other markets or as a way to extend patent protection beyond the term of the patents that are covered by the initial agreement*."[25]

22. With cross licenses, each firm is free to compete, both in designing its products without fear of infringement and in pricing its products without the burden of making a per unit royalty payment due to its counterparty. Therefore, cross-licenses can solve the complements problem, at least as between two firms, and be highly procompetitive. The complements problem, or the "tragedy of the anti-commons," arises when there are multiple gatekeepers, each of which must grant permission before a resource can be used, the result of which can be to prevent the resource from being used and hence stifle innovation. In addition, when the technologies exchanged under a cross-license are not only complementary, but are each essential for the production of a good, "*cross-licensing increases consumer welfare regardless of the level of*

21 J. Padilla & K. Wong-Ervin, Portfolio Licensing to Makers of Downstream End-User Devices: Analyzing Refusals to License FRAND-Assured Standard-Essential Patents at the Component Level, 62 *Antitrust Bull*. 494 (2017).

22 *NYNEX Corp. v. Discon, Inc.*, 525 U.S. 128, 135-37 (1998).

23 Id. at 136.

24 *Rambus Inc. v. Federal Trade Commission*, 522 F.3d 456, 466 (D.C. Cir. 2008).

25 P. Regibeau & K. Rockett, Assessment of Potential Anticompetitive Conduct in the Field of Intellectual Property Rights and Assessment of the Interplay Between Competition Policy and IPR Protection at 40 (Nov. 2011), available at http://ec.europa.eu/competition/consultations/2012_technology_transfer/study_ipr_en.pdf.

contractual royalties."[26] This is because the cross-license provides the Coasean solution to the anti-commons/successive monopoly problem.

23. Cross-licenses can also have anticompetitive effects in certain limited circumstances, such as when they are used as a cover for price-fixing or market division. Some have also raised concerns that SEP holders who demand licenses to patents that are not essential to the same standard and/or force licensees to take a license to patents that are not essential to the relevant standard could decrease licensees' incentives to innovate. Concerns have also been raised that such an SEP holder could leverage its SEPs to force a cross-license of differentiated patents and/or engage in anticompetitive tying.[27] However, empirical evidence substantiating these theories in the real world is not well developed, if it exists at all. Cross-licenses can also be used by vertically-integrated firms to lower their costs while charging to nonintegrated rivals in order to obtain an insurmountable competitive advantage vis-à-vis the latter.

24. Given the various potential pro- and anticompetitive effects, grantbacks and cross-licenses, like other licensing restraints, should be analyzed case by case, under an effects-based approach.

III. No-challenge clauses

25. A no-challenge clause prevents a patent licensee from challenging the validity of a licensed patent. Importantly, implementers have the opportunity to challenge the validity of an IPR at any moment from the time the patent office grants the patent at issue (and, even earlier in some jurisdictions) until the time it executes a license with a no-challenge clause. A no-challenge clause constrains the implementer's ability to challenge the validity of an IPR only after it has already executed a license agreement.

26. Patent licensing negotiations typically revolve around "proof packages" that are used to demonstrate a licensing program's value. Such packages may include a portfolio overview, innovation story, demonstration of technology leadership, benefits to licensees, use cases, and potential exemplary claim charts. When a licensor and a licensee negotiate a license for a large IP portfolio, both parties understand that some of the hundreds or thousands of patents (or claims within patents) in the portfolio may be invalid. The parties do not invest extensive resources in identifying those potentially invalid patents, which would make the transaction prohibitively costly. Instead, the parties assess generally the value of the licensed portfolio (typically through proof packages) and determine a royalty that accounts for the possibility that some of the portfolio's patents may be invalid.

27. In addition, IPR holders may add newly issued (or newly relevant) patents to their licensed portfolios after the parties execute a license agreement. This practice further reduces the risk that the presence of some invalid patents would impose any significant cost on the licensee. Encouraging a licensee to challenge the validity of individual licensed patents invites opportunistic litigation by the licensee so as to delay paying the IPR holder the agreed-upon royalty for the use of the many more valid patents in its licensed portfolio. Thwarting an IPR holder's ability to receive prompt compensation for its innovative contribution lessens the IPR holder's incentive to invest in innovation, which in turn imposes significant harm on consumers.[28]

28. Some argue that these clauses have a negative welfare impact since they make it more difficult to challenge patent validity. It is argued that implementers need to enter into licensing agreements with SEP owners to avoid infringement claims and, therefore, their only chance to challenge validity is after the agreement has been signed. It is also claimed that paying for patents that are invalid reduces the implementers' return on investment and, therefore, their incentive and ability to invest. However, these allegations fail to reflect the discussion above about the process leading to a licensing agreement and, in particular, the fact that licensing terms for patent portfolios take account of the probabilistic nature of patents in the portfolio. A rule that allowed licensees to negotiate terms under the assumption of probabilistic patents and then allowed them to exercise the option to challenge validity would naturally undercompensate upstream innovators.[29]

29. With respect to competition laws, given that the purpose of such laws is to protect the competitive process and not individual competitors, it is difficult to see how including a no-challenge clause in a license agreement could amount to the unlawful acquisition or maintenance of monopoly power or dominance. No-challenge clauses do not provide the IPR holder any enhanced leverage. Implementers have the opportunity to challenge the validity of a patent at any time after the patent is granted but before a no-challenge clause is executed. Furthermore, the negotiated royalty rate reflects the possibility that some of the portfolio's patents may be invalid. The basic effect of the no-challenge clause is to decrease transaction costs associated with negotiations by decreasing the incentive of *ex-post* opportunism by the licensee after the licensing agreement has been signed.[30]

---

26 Id. at 18.

27 For an analysis of tying and bundling SEPs and non-SEPs, *see* K. W. Wong-Ervin et al., Tying and Bundling Involving Standard-Essential Patents, 24 *Geo. Mason L. Rev.* 1091 (2017).

28 *See* J. G. Sidak, Evading Portfolio Royalties for Standard-Essential Patents Through Validity Challenges, 39 *World Competition* 191 (2016).

29 *See* P. Larouche, J. Padilla & R. S. Taffet, Settling FRAND Disputes: Is Mandatory Arbitration a Reasonable and Nondiscriminatory Alternative?, 10(3) *J. Competition L. & Econ.* 581 (2014).

30 For an analogous discussion, *see*, e.g., R. Kenney & B. Klein, The Economics of Block Booking, 26 *J. L. & Econ.* 497 (1983). The authors demonstrate that "block booking" contractual arrangements, which serve to prevent buyers from rejecting parts of a package of products that has been average-priced, is an efficient contractual mechanism when a portfolio of goods is comprised of individual products whose individual values are not easily known—i.e., a precise estimate of value for each underlying product would require costly and often duplicative and wasteful examination.

IV. Patent thickets

30. The "patent-thicket problem" posits "*that the issuance of large numbers of patents held by large numbers of owners is likely to depress innovation by burdening innovators with significant transaction costs relating to dispute resolution or licensing activities*."[31] Patent thicket concerns are generally linked to the "tragedy of the anti-commons" problem, which refers to the situation in which numerous entities control the rights to use some asset or related cluster of assets. The "problem" refers to the idea that, in such situations, users would need permission from multiple rights holders in order to use the assets, and that the difficulties of coordination would lead to inefficient underuse. A related concern is the Cournot Complement problem (often referred to in the SEP context as "royalty stacking"), which posits that patent holders will set their royalty rates without regard to the other strictly complementary patent holders, such that a cumulative royalty "stack" can emerge for the good's producer that is so high that it cripples the product market. Others have also raised concerns that patent thickets will result in inadvertent infringement of patents issued after products are designed, and that patent owners can use thickets to block follow-on complementary innovation.

31. While there are many anecdotes about the harm done by the dispersion of the ownership of complementary IPRs, we are aware of only one rigorous empirical study that suggests that the welfare effect of thickets might be ambiguous. Galasso and Schankerman (2008) analyze how the fragmentation of patent rights ("patent thickets") affected the duration of patent disputes.[32] Based on a model of patent litigation, they predict that settlement agreements are reached more quickly in the presence of fragmented patent rights. This prediction is confirmed in their empirical work. "*This means that patent thickets have two opposite effects on the speed with which functional licensing agreements can be reached. On the one hand, the presence of thickets increases the number of required patent negotiations; on the other hand, patent disputes are resolved more quickly.*"[33]

32. In the specific context of licensing FRAND-committed SEPs, for number of reasons, the concerns expressed above do not appear to have borne out in the real world.

33. First, industry practice is for SEP holders to license their patents (including related non-SEPs should the implementer so choose) on a worldwide portfolio basis. This practice significantly reduces transaction costs and provides implementers with freedom to design and operate. In addition, as the U.S. Court of Appeals for the Federal Circuit (which has nationwide jurisdiction over patent disputes) has recognized, not all SEP holders assert their patents. "*The mere fact that thousands of patents are declared to be essential to a standard does not mean that a standard-compliant company will necessarily have to pay a royalty to each SEP holder.*"[34] In fact, many SEP holders do not assert. The expected return to licensing their SEPs is likely to be insufficient to cover the costs of launching an active licensing program. This makes sense given empirical evidence on the distribution of SEP contributions. For example, the distribution of SEPs for 3G and 4G is a long tail with 60% of contributions coming from 9 firms out of 492 firms that participated in the development of those standards.[35]

34. Additional important points to understand include: "*One of the assumptions underlying the Cournot complements problem is that each input suppler will price their inputs without regard to the price charged for other needed inputs, but there is no reason to assume that will necessarily be the case in standard-setting contexts. First, SEPs may have limited or no applications outside of the standard, in contrast to the zinc and copper inputs Cournot had in mind for brass production. With only one market in which to license their patents, SEP holders may have insufficient leverage to push supra-*[F]*RAND rates. Moreover, the SEP holders will be cooperating with one another—and all other* [standard-setting organization] *SSO members—in the development of the standard, and are thus likely to know what patents are expected to be asserted and by whom. As a result, there is no reason to presume that SEP holders will set rates without regard to the full complement of known SEPs. As long as the inputs for multi-component products are priced according to the value of the patented contribution to the end product, no SEP holder can be faulted for either hold up or stacking. Proper apportionment is a reasonable means to accomplish this goal. When rates are properly focused on the value that the specific patents contribute to products compliant with a standard—and not on other product features, the value of the overall standard, or implementer switching costs—then the risk of either patent hold-up or royalty stacking is eliminated.*"[36]

35. Second, the vast majority of SDOs—and seemingly all major cellular wireless SDOs—require patent holders to disclose any IPRs contributed to the standard. As such, it is highly unlikely that product manufacturers will be unaware of the potential SEPs that their products read upon.

36. Some have raised concerns about over-declaration of SEPs to SDOs and called for improved transparency. While improved transparency may serve both licensors and licensees, it is important to understand that some error rate and uncertainty are inherent to the process of

31 J. M. Barnett, Has the Academy Led Patent Law Astray?, 32 *Berkeley Tech. L.J.* 1313, 1321 (2017).

32 A. Galasso & M. Schankerman, Patent Thickets and the Market for Innovation: Evidence from Settlement of Patent Disputes (Centre for Economic Performance, *CEP Discussion Paper* No. 889, 2008), available at http://cep.lse.ac.uk/pubs/download/dp0889.pdf.

33 Regibeau & Rockett, *supra* note 25, at 16.

34 *Ericsson v. D-Link*, 773 F.3d 1201, 1234 (Fed. Cir. 2014).

35 J. Baron & K. Gupta, Unpacking 3GPP Standards, 27 J. *Econ. & Mgm't Strat.* 433 (2018).

36 A. Layne-Farrar & K. W. Wong-Ervin, An Analysis of the Federal Circuit's Decision in *Ericsson v. D-Link*, *CPI Antitrust Chron.* 5 (Mar. 2015), available at www.competitionpolicyinternational.com/assets/Uploads/LFWEMar-151.pdf.

identifying and declaring potential SEPs. This is because, among other things, the process involves standards that evolve over time, as well as changes in the patent claims being prosecuted. In addition, there are competing incentives that arise from possible risks to both under- and over-declaration. For example, patent holders may be incentivized to under-declare patents as essential to a standard in order to avoid the FRAND commitment required by most SDOs. On the other hand, patent holders may be incentivized to over-declare (including through blanket declarations as required by some SDOs) in light of the Federal Trade Commission's (FTC's) 2007 decision against Rambus, in which the Commission held that Rambus violated Section 5 of the FTC Act by deceptively failing to disclose to an SDO the patent interests it held in technologies it contributed to a standard.[37] While the U.S. Court of Appeals for the D.C. Circuit set aside the Commission's order, establishing a stricter standard (but for the alleged deception, the SDO would have adopted a different technology), the court confirmed that antitrust liability is possible for knowing or deceptive failures to disclose.[38] Regardless of whether there is in fact a transparency problem, this should not affect the alleged patent thicket problem given the industry practice of worldwide portfolio licensing.

37. Third, FRAND commitments impose contractual obligations on patent owners to "*mak*[e] *licenses available*," limiting any power of the patent owner to block follow-on complementary innovation.[39] Another mitigating factor is the low likelihood of obtaining injunctive relief on SEPs, particularly in the United States following the U.S. Supreme Court's *eBay v. MercExchange* decision.

38. Fourth, "[a]*nticommons situations may not give rise to inefficiencies when parties have access to patented goods and strategically choose to infringe*."[40] Given that patents are not self-enforcing, implementers can and routinely do use patented technology without permission. Unlike real property owners, "*patent holders cannot physically withhold their patented technology from implementers who have not paid for the right to use it; instead, patent holders have to resort to costly and risky litigation in order to protect their rights*."[41] 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 typically only on a patent-by-patent basis) is merely paying the FRAND royalty that it should have agreed to pay when first asked, it is easy to understand why holdout can be an attractive strategy for an implementer.

39. Four potential solutions to the so-called patent thicket problem have been proposed: cross-licensing, patent pools, standardization, and package licensing for complementary patents. With respect to the first two, "*one should remember that we currently know next to nothing about the size of the inefficiencies associated with patent thickets. In other words, while cross-licensing and patent pools might be effective approaches to solving thicket problems, we have no idea of what the corresponding efficiency gains are*."[42] That said, it is important to allow private-ordering mechanisms to enable markets to identify and preempt potential patent thickets. The apparent success of such mechanisms "*derives from pure self-interest: a thicket prevents patent holders from earning a return on their R&D investment, giving them a powerful incentive to avoid litigation and* (…) *reach a mutually agreeable allocation of property rights and split of the surplus value that is unlocked as a result*."[43]

V. *Ex-ante* incremental (or "inherent") value approach

40. Some have recommended an *ex-ante* incremental value approach to SEP valuation, under which courts would cap the royalty at the incremental value of the patented technology over alternatives available at the time the standard was defined. As Dr. Anne Layne-Farrar and Koren W. Wong-Ervin have explained: "*The underlying theory is well-established, based on decades of pricing theory for physical goods.* (…) *The problem, however, is that determining an 'incremental' value for intangible intellectual property is* [more] *difficult* [than determining] *the incremental cost for a physical good in a number of ways. First, as Judge Robart observed* [in *Microsoft v. Motorola*]*, two flaws in the approach are 'its lack of real-world applicability' and 'its impracticability with respect to implementation by courts.' Second, the approach crucially depends on the point of comparison: incremental value as compared to what? The state of the art prior to any standard solution emerging, which is often the starting point for innovators? The price or value of the 'next best alternative' competing for inclusion in the standard? This latter approach entails valuing two intangible contributions instead of one, so the workload is far higher (reinforcing Judge Robart's point of impracticability for courts)*."[44]

37 Final Order, *In the Matter of Rambus Inc.*, FTC Docket No. 9302, available at www.ftc.gov/sites/default/files/documents/cases/2007/02/070205finalorder.pdf.

38 *Rambus, Inc. v. Fed. Trade Comm'n*, 522 F.3d 456 (D.C. Cir. 2008).

39 *See*, e.g., D. J. Teece, The "Tragedy of the Anticommons" Fallacy: A Law and Economics Analysis of Patent Thickets and FRAND Licensing, 32 *Berkeley Tech. L.J.* 1489, 1507 (2017).

40 Id. at 1498.

41 Ibid.

42 Regibeau & Rockett, *supra* note 25, at 17.

43 Barnett, *supra* note 31, at 1343.

44 A. Layne-Farrar & K. 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 Jindal Global L. Rev.* 127, 151–152 (2017) (internal citations omitted).

41. In addition to administrability, the primary problem with an *ex-ante* incremental value approach (at least with respect to cellular wireless technologies like 5G) is that it misunderstands the nature of technology development within SDOs. The notion that there are several similarly situated technologies available prior to standardization ignores that these technologies are developed over time. In other words, technological options do not just appear like mushrooms after a rainstorm, but rather are collaboratively developed over significant time periods within SDOs. In equilibrium, once an SDO signals a specific direction (e.g., once a particular technology is selected for further development), competing technology holders will have no incentive to continue to develop alternative technologies. As such, an *ex-ante* incremental value approach could result in very high royalties given the likely large differential between the fully developed technology and any abandoned technologies at the time a standard is defined.

42. The U.S. Court of Appeals for the Federal Circuit in *Ericsson v D-Link* has held that SEPs should be valued based on their *ex-ante* or inherent value (tied to the value added to the product at issue), divorced from any value from standardization.[45] It is important to understand that this approach excludes technology developers from sharing adequately in the full value of standardization. This is so even when the technology developers were significant contributors to (or even key drivers of) that value. As such, *ex-ante* value approaches prevent patent holders from recouping investments in risky research and development based on the fully realized potential of their technology.

43. *Ex-ante* proponents argue that SEP holders already obtain some of the value of standardization in the form of volume (i.e., increased unit sales on which to earn royalties), as well as a potential competitive edge in product markets (assuming they compete in such markets). But, "*higher unit sales are not the same as having rates determined under market conditions considering the technologies' full contribution, in which royalty rates, product prices, and volumes are considered jointly. No volumes can compensate for unreasonably low* ex ante *rates*."[46] This is because standardization boosts consumer willingness to pay and increases the volume of sales demanded at any product price. In other words, the demand curve shifts out, costs are reduced and the volume that can be produced for a given price increases, and the supply curve also shifts out, moving the market equilibrium point. "*The post-standardization price* […] *may be higher or lower than* [before standardization] *depending on whether demand or supply effects dominate*."[47] As such, an *ex-ante* rate may undercompensate SEP holders while providing a windfall for implementers given that the pass-through rate to end consumers is likely less than 100%. Given that firms ordinarily expect to share the gains from cooperative efforts, it is likely that it is the prospect of a share of the full incremental surplus that motivates developers to invest fixed amounts in technology and standardization. "*Unless all groups are appropriately incentivized, some may reduce innovation and/or withdraw from standards setting, with general economic harm*."[48]

VI. Conclusion

44. Antitrust analysis is fundamentally economic analysis. This should not change when the conduct at issue involves IPRs, including FRAND-committed SEPs. It is our hope that this article (along with our prior work) will serve as a roadmap for competition enforcers and courts around the world. ■

45 While the Federal Circuit uses the term "incremental value," it uses that phrase to mean the *ex-ante* "inherent" value that an SEP adds to a product, separate from "*any value added by the standardization of that technology*." *Ericsson v. D-Link*, 773 F.3d 1201, 1232 (Fed. Cir. 2014).

46 D. J. Teece, et al., Maintaining Ecosystem Innovation by Rewarding Technology Developers: FRAND, Ex Ante Rates and Inherent Value 6 (Tusher Initiative for the Management of Intellectual Capital, *Working Paper* No. 21, 2017), available at https://businessinnovation.berkeley.edu/wp-content/uploads/2017/04/Tusher-Center-Working-Paper-No.-21.pdf.

47 Id. at 26.

48 Id. at 53.

Concurrences

Concurrences est une revue trimestrielle couvrant l'ensemble des questions de droits de l'Union européenne et interne de la concurrence. Les analyses de fond sont effectuées sous forme d'articles doctrinaux, de notes de synthèse ou de tableaux jurisprudentiels. L'actualité jurisprudentielle et législative est couverte par onze chroniques thématiques.

Editoriaux

Jacques Attali, Elie Cohen, Claus-Dieter Ehlermann, Jean Pisani Ferry, Ian Forrester, Eleanor Fox, Douglas H. Ginsburg, Laurence Idot, Frédéric Jenny, Arnaud Montebourg, Mario Monti, Gilbert Parleani, Jacques Steenbergen, Margrethe Vestager, Bo Vesterdorf, Denis Waelbroeck, Marc van der Woude...

Interviews

Sir Christopher Bellamy, Lord David Currie, Thierry Dahan, Jean-Louis Debré, Isabelle de Silva, François Fillon, John Fingleton, Renata B. Hesse, François Hollande, William Kovacic, Neelie Kroes, Christine Lagarde, Johannes Laitenberger, Emmanuel Macron, Robert Mahnke, Ségolène Royal, Nicolas Sarkozy, Marie-Laure Sauty de Chalon, Tommaso Valletti, Christine Varney...

Dossiers

Jacques Barrot, Jean-François Bellis, David Bosco, Murielle Chagny, John Connor, Damien Géradin, Assimakis Komninos, Christophe Lemaire, Ioannis Lianos, Pierre Moscovici, Jorge Padilla, Emil Paulis, Robert Saint-Esteben, Jacques Steenbergen, Florian Wagner-von Papp, Richard Whish...

Articles

Guy Canivet, Emmanuelle Claudel, Emmanuel Combe, Thierry Dahan, Luc Gyselen, Daniel Fasquelle, Barry Hawk, Nathalie Homobono, Laurence Idot, Frédéric Jenny, Bruno Lasserre, Luc Peeperkorn, Anne Perrot, Nicolas Petit, Catherine Prieto, Patrick Rey, Joseph Vogel, Wouter Wils...

Pratiques

Tableaux jurisprudentiels : Actualité des enquêtes de concurrence, Contentieux indemnitaire des pratiques anticoncurrencielles, Bilan de la pratique des engagements, Droit pénal et concurrence, Legal privilege, Cartel Profiles in the EU...

International

Belgium, Brésil, Canada, China, Germany, Hong-Kong, India, Japan, Luxembourg, Switzerland, Sweden, USA...

Droit & économie

Emmanuel Combe, Philippe Choné, Laurent Flochel, Frédéric Jenny, Gildas de Muizon, Jorge Padilla, Penelope Papandropoulos, Anne Perrot, Nicolas Petit, Etienne Pfister, Francesco Rosati, David Sevy, David Spector...

Chroniques

Ententes

Ludovic Bernardeau, Anne-Sophie Choné Grimaldi, Michel Debroux, Etienne Thomas

Pratiques unilatérales

Laurent Binet, Frédéric Marty, Anne Wachsmann

Pratiques commerciales déloyales

Frédéric Buy, Valérie Durand, Jean-Louis Fourgoux, Rodolphe Mesa, Marie-Claude Mitchell

Distribution

Nicolas Ereseo, Dominique Ferré, Didier Ferrier, Anne-Cécile Martin

Concentrations

Jean-François Bellis, Olivier Billard, Jean-Mathieu Cot, Ianis Girgenson, Sergio Sorinas, David Tayar

Aides d'État

Jacques Derenne, Bruno Stromsky, Raphaël Vuitton

Procédures

Pascal Cardonnel, Alexandre Lacresse, Christophe Lemaire

Régulations

Orion Berg, Hubert Delzangles, Emmanuel Guillaume

Mise en concurrence

Bertrand du Marais, Arnaud Sée

Actions publiques

Jean-Philippe Kovar, Francesco Martucci, Stéphane Rodrigues

Droits européens et étrangers

Walid Chaiehloudj, Sophie-Anne Descoubes, Marianne Faessel, Pierre Kobel, Silvia Pietrini, Jean-Christophe Roda, François Souty, Stéphanie Yon-Courtin

Livres

Sous la direction de Stéphane Rodrigues

Revues

Christelle Adjémian, Mathilde Brabant, Emmanuel Frot, Alain Ronzano, Bastien Thomas

Tarifs 2019

Abonnement Concurrences +

Devis sur demande
Quote upon request

Revue et Bulletin : Versions imprimée (Revue) et électroniques (Revue et Bulletin) (avec accès multipostes pendant 1 an aux archives)
Review and Bulletin: Print (Review) and electronic versions (Review and Bulletin)
(unlimited users access for 1 year to archives)

Conférences : Accès aux documents et supports (Concurrences et universités partenaires)
Conferences: Access to all documents and recording (Concurrences and partner universities)

Livres : Accès à tous les e-Books
Books: Access to all e-Books

Abonnements Basic

	HT Without tax	TTC Tax included
e-Bulletin e-Competitions | **e-Bulletin** e-Competitions		
☐ Version électronique (accès monoposte au dernier N° en ligne pendant 1 an, pas d'accès aux archives) *Electronic version (single user access to the latest online issue for 1 year, no access to archives)*	785,00 €	942,00 €
Revue Concurrences | **Review** Concurrences		
☐ Version électronique (accès monoposte au dernier N° en ligne pendant 1 an, pas d'accès aux archives) *Electronic version (single user access to the latest online issue for 1 year, no access to archives)*	565,00 €	678,00 €
☐ Version imprimée (4 N° pendant un an, pas d'accès aux archives) *Print version (4 issues for 1 year, no access to archives)*	615,00 €	627,92 €

Renseignements | Subscriber details

Prénom - Nom | *First name - Name* . . . . . .
Courriel | *e-mail* . . . . . .
Institution | *Institution* . . . . . .
Rue | *Street* . . . . . .
Ville | *City* . . . . . .
Code postal | *Zip Code* . . . . . Pays | *Country* . . . . . .
N° TVA intracommunautaire | *VAT number (EU)* . . . . . .

Formulaire à retourner à | Send your order to:

Institut de droit de la concurrence
68 rue Amelot - 75011 Paris - France | webmaster@concurrences.com

Conditions générales (extrait) | *Subscription information*
Les commandes sont fermes. L'envoi de la Revue et/ou du Bulletin ont lieu dès réception du paiement complet. Consultez les conditions d'utilisation du site sur www.concurrences.com ("Notice légale").

Orders are firm and payments are not refundable. Reception of the Review and on-line access to the Review and/or the Bulletin require full prepayment. For "Terms of use", see www.concurrences.com.

Frais d'expédition Revue hors France 30 € | *30 € extra charge for shipping Review outside France*