THE "LICENSE AS TAX" FALLACY

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ABSTRACT

Intellectual property licenses are commonly portrayed as a "tax" that limits access to technology assets, thereby stunting innovation by intermediate users and inflating prices for end-users. This presumptively skeptical view motivated postwar antitrust's proliferation of per se rules against a wide array of licensing practices and, more recently, has driven recent Supreme Court decisions on IP licensing and enforcement actions by competition regulators in the U.S. and other commercially significant jurisdictions that would effectively rewrite licensing arrangements in wireless communication markets. Renewed skepticism toward IP licensing, and associated judicial and regulatory interventions, overlook the fact that IP licenses typically play an enabling rather than exclusionary function by mitigating expropriation risks that would otherwise frustrate transactions between the holders of complementary specialized IP and non-IP assets. These transactions support a robust innovation ecosystem by facilitating value-creating exchanges of knowledge assets, promoting the division of labor among innovation and production specialists, and lowering entry costs for firms that excel in innovation but lack capital-intensive production and distribution capacities. Illustrative evidence is drawn from paradigm transactional structures that illustrate the principal enabling functions of IP licensing arrangements in content and technology markets.

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I. INTRODUCTION

Casual metaphors can have dangerous consequences. It has long been common in academic, judicial and regulatory commentary to characterize intellectual property ("IP") rights as monopolies[1] and IP licenses as a "tax" that inflates the price of consumer goods and impedes the flow of informational assets.[2] This "license-as-tax" analogy has led IP and antitrust scholars, and antitrust regulators, to focus on the risk that a purportedly monopolistic IP owner can use contractual instruments to expand the effective scope of its IP portfolio, thereby upsetting the legislatively designed balance between maintaining incentives for innovators and access for users. Judicial rhetoric reflects the strong influence that this analogy has exerted on legal reasoning and outcomes. In 1944, the Supreme Court observed dramatically, in an antitrust case involving a tying clause in a patent license agreement, that "the instant case is a graphic illustration of the evils of an expansion of the patent monopoly."[3] In a motion filed in 2017 in its antitrust litigation against Qualcomm, the Federal Trade Commission ("FTC") used the words, "tax" and "taxpayer" or close derivatives, no less than 50 times in a 32-page document, to refer to the defendant's purportedly anticompetitive patent licensing practices.[4] These are not mere words: the FTC's antitrust litigation against Qualcomm has already resulted in a district court order (currently stayed pending an appeal in the U.S. Court of Appeals for the Ninth Circuit[5]) that would compel the leading innovator in wireless communications systems to rewrite hundreds of licensing contracts with device producers and share some of its most valuable technology with direct competitors in the chip supply market.[6] Remarkably, international payment flows in the billions of dollars may turn on whether the enforcers and adjudicators of competition law presumptively view IP licenses as a "tax" or efficient remuneration for R&D investment.

There is a notable exception to this long-running, and recently reinvigorated, skepticism toward IP licensing. In 1995, the U.S. Department of Justice ("DOJ") and the FTC released the Antitrust Guidelines for the Licensing of Intellectual Property (the "1995 IP Guidelines"), which rejected any presumptive treatment of IP owners as monopolists and recognized that IP licenses widely promote efficient purposes in the commercialization of IP assets.[7] The 1995 IP Guidelines largely reflected the nuanced approach adopted by federal case law toward antitrust challenges to vertical restraints in general, and certain licensing arrangements in particular, since approximately the late 1970s and early 1980s.[8] This cautious—and, as I will argue, more empirically informed—approach toward overriding privately negotiated IP licensing arrangements is now under threat. (This is despite the fact that the substance of the 1995 IP Guidelines was largely reaffirmed by the FTC and DOJ in 2017.[9]) Recent regulatory actions and Supreme Court decisions,

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[1] On the historical characterization of patents as monopolies, see Frank H. Easterbrook, *Intellectual Property is Still Property*, 13 HARV. J. L. & PUBLIC POL'Y 108, 108-09 (1990); Roger E. Meiners and Robert J. Staaf, *Patents, Copyrights and Trademarks: Property or Monopoly?*, 13 HARV. J. L. & PUBLIC POL'Y 911, 915-16 (1990).

[2] On the characterization of patent licenses as a "tax" in the software context, see Colleen V. Chien, *Software Patents as a Currency, Not Tax, on Innovation*, 31 BERK. TECH. L. J. 1669 (2016). For examples of the license as tax analogy, see Frederick M. Abbott, Frederick M., *Rethinking patents: From 'intellectual property' to 'private taxation scheme*, in KRITIKA: ESSAYS ON INTELLECTUAL PROPERTY (Vol. I, 2-16, eds. Peter Drahos, Gustavo Ghindi and Hanns Ulrich 2015), at 2 ("[p]atents are, in essence, a private right to tax"); Robin Feldman and Mark A. Lemley, *Do Patent Licensing Demands Mean Innovation?*, 101 IOWA L. REV. 137, 142 (2015) (contemplating that IP licensing intermediaries act as "tax collectors for small inventors"); Michele Boldrin and David K. Levine, THE CASE AGAINST PATENTS, FEDERAL RESERVE BANK OF ST. LOUIS WORKING PAPER SERIES (Working Paper 2012—35A (2012)), at 2 (describing efforts by Microsoft to "impose a licensing fee" on the Android smartphone market) and 5 (describing patent litigation as an attempt to "tax consumers, new entrants and any potential competitor"); Carl Shapiro, *Navigating the Patent Thicket: Cross Licenses, Patent Pools, and Standard Setting*, INNOVATION POLICY AND THE ECONOMY 120, 121, 125 (2000) (analogizing a patent royalty to a "tax" that impedes further R&D).

[3] *Mercoid Corp. v. Mid-Continent Investment Co.*, 320 U.S. 661, 666 (1944).

[4] *Federal Trade Commission v. Qualcomm Inc*., FTC's Opposition to Qualcomm's Motion to Dismiss, Case no. 17-cv-00220-LHK-NMV (N.D. Cal. June 15, 2017).

[5] For extensive discussion, see Jonathan M. Barnett, *Antitrust Overreach: Undoing Cooperative Standardization in the Digital Economy*, 25 MICH. TECH. L. REV. 163, 206-220 (2019).

[6] *See id*.

[7] U.S. DEPARTMENT OF JUSTICE AND THE FEDERAL TRADE COMMISSION, ANTITRUST GUIDELINES FOR THE LICENSING OF INTELLECTUAL PROPERTY (Apr. 6, 1995) [hereinafter 1995 IP GUIDELINES], at §2.2 (stating that the agencies "will not presume that a patent, copyright or trade secret necessarily confers market power upon its owner") and §3.1 (stating that "intellectual property licensing arrangements are typically welfare-enhancing and procompetitive").

[8] *See infra* notes 20-21 and accompanying text.

[9] U.S. DEPARTMENT OF JUSTICE AND THE FEDERAL TRADE COMMISSION, ANTITRUST GUIDELINES FOR THE LICENSING OF INTELLECTUAL PROPERTY (Jan. 12, 2017).

accompanied by supportive commentary from much of the scholarly and policy communities, have restored a reflexive view of IP licensing as posing an inherently high risk of anticompetitive effects, which warrants a commensurately relaxed evidentiary burden to find that a particular licensing practice violates the antitrust laws.[10]

This skeptical approach generally presumes that a license operates as a "tax" that confers a windfall on patent owners and unnecessarily inflates costs for intermediate and end-users, in which case it follows that courts and regulators must strive to "protect" the public by intervening to restrain the overreaching licensing demands of IP owners. This view fundamentally misunderstands the typical function of IP licenses in content and technology markets and the typical competitive position occupied by IP licensors in those markets. In particular, it overlooks the fact that IP licenses generally increase, rather than deplete, economic surplus by overcoming transactional hazards that can otherwise preclude mutually efficient information exchanges among business parties that hold complementary IP and non-IP assets. Determining the appropriate presumption that should drive the antitrust treatment of IP licensing is not merely a strategic exercise in cosmetic burden-shifting. In the hands of courts and antitrust enforcers, a one-sided focus on the presumptively exclusionary effects of IP licensing can lead to limitations erroneously being imposed on licensing transactions that are either innocuous or welfare-enhancing. These "false positive" errors can in turn distort transactional choices, and reach perverse results from a competition policy perspective, by favoring firms that monetize R&D through vertically integrated, end-to-end business models while disfavoring firms that rely on vertically disintegrated, licensing-based business models. Counterintuitively, broadly applied limitations on the permissible range of licensing arrangements can promote a market dominated by a handful of large firms that can feasibly construct and maintain an integrated production and distribution infrastructure in which licensing is unnecessary, rather than a market in which innovation-intensive firms can rely on licensing arrangements to earn returns on R&D by disseminating technology inputs to a large pool of producers and other firms located at downstream segments of the relevant supply chain.

The license-as-tax analogy may be so persistent in part because the everyday uses of IP licensing in technology and content markets both are opaque at the retail point of sale and represent a relatively neglected corner of even economically minded scholarship on antitrust and IP law, which has mostly focused on the use of patents in the context of infringement litigation.[11] Even scholarship on IP licensing tends to employ theoretical models of various levels of formality, or to focus narrowly on particular types of clauses, while paying little attention to either a firm's business model of which licensing is typically only one component or the larger competitive landscape in which a firm's licensing strategy must be situated. This paper seeks to fill this gap by enriching the academic and policy conversation with an "on the ground" perspective informed by the large pool of IP transactions taking place every day in the marketplace, rather than the much smaller pool of IP litigations taking place in the courtroom. In contrast to the license-as-tax analogy and the academic and policy commentary that relies on it, I use real-world licensing transactions (in both content and technology markets) to illustrate how IP licensing operates as an enabling mechanism that facilitates the assembly of complementary inputs held by different entities into goods and services for consumption by end-users. In general, this "assembly" function of IP rights promotes the efficiency objectives of both IP and antitrust law by facilitating the design of maximally efficient supply chains that deliver innovations to the target intermediate or end-user market at the lowest feasible cost.

In general, IP licensing enables two primary types of transactional structures for commercializing IP assets. First, IP licensing supports vertical relationships between upstream firms that excel in innovation and a downstream network of specialized entities that execute the production, distribution and other functions that are necessary to embed a new technology in technically and commercially viable products and services.

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[10] For similar observations, see Joshua D. Wright and Douglas H. Ginsburg, *Whither Symmetry? Antitrust Analysis of Intellectual Property Rights at the FTC and DOJ*, 9 COMP. POLICY INT'L 41, 44-48 (2013).

[11] For related observations, see Jonathan M. Barnett, *Why Is Everyone Afraid of IP Licensing*? 30 HARV. J. L. & TECH. 123, 124-25 (2017) [hereinafter Barnett, *Why Is Everyone*] (arguing that judicial and academic enthusiasm for imposing limitations on licensing freedom ignores the efficiency-enhancing transactional functions of IP licenses); Chien, *supra* note 2, at 1676-78 (observing that academic scholarship on IP tends to focus on the use of patents as an enforcement tool in litigation, rather than the use of patents in sale and licensing transactions).

Second, IP licensing facilitates the exchange of informational assets in joint ventures, alliances and other horizontal relationships that firms would otherwise decline to join given the risk of knowledge leakage to competitors. With the important exception of horizontal arrangements involving IP assets that are potential substitutes, which warrant close scrutiny to guard against collusion risk, an empirically informed understanding of IP markets supports the presumption that IP licensing generally results in net welfare gains by enabling value-enhancing arrangements that would otherwise not be viable. Relatedly, IP licensing can facilitate entry by firms that have specialized expertise in discrete portions of the market supply chain but lack the capital or other technical capacities required to efficiently embody that expertise in consumption goods for the target intermediate or end-user market. These considerations recommend special caution when regulators consider undertaking antitrust enforcement actions, or courts consider antitrust suits, that may erode the legal predicates for licensing-based exchanges of informational assets in content and technology markets.

This Article proceeds as follows. In Part II, I describe historical trends in the treatment of IP licensing under U.S. patent and antitrust law, which I then use to situate recent actions that have limited IP owners' licensing capacities in technology markets. In Part III, I describe the mechanisms by which IP rights efficiently support certain paradigm categories of vertical and horizontal licensing arrangements. In Part IV, I explore the normative implications of the enabling view of IP licensing and address anticipated objections. In Part V, I briefly conclude.

II. LEGAL ENCROACHMENTS ON IP LICENSING

Recent years have witnessed a steady legal contraction of the transactional latitude that had been enjoyed by IP rights holders since approximately the onset of the shift in antitrust jurisprudence starting in the late 1970s and early 1980s. These limitations have arisen through a combination of decisions by the Supreme Court and statements and actions by the antitrust agencies, both starting approximately in the mid-2000s. Below I describe these recent developments, situated within historical trends in the legal treatment of IP licensing, as a matter of both antitrust and patent law.

A. Historical Background

The skeptical view of IP licensing is in large part the heritage of late New Deal antitrust. Under the leadership of Thurman Arnold starting in 1938, the Antitrust Division embarked on a campaign of vigorous antitrust enforcement, which encompassed multiple suits that targeted various licensing practices.[12] The result was a sequence of Supreme Court precedents that considerably increased the antitrust risk exposure of firms engaged in IP licensing transactions. This occurred through two key doctrinal shifts during the 1940s. First, the Court issued decisions that subjected tying, resale price maintenance and certain other clauses in IP licenses to per se, or quasi per se, liability under the antitrust laws.[13] Second, the Supreme Court bolstered the doctrine of patent misuse under which plaintiffs can block enforcement of a patent on the ground that the patentee has deployed it in a manner that exceeds the scope of the patent franchise. Specifically, in *Morton Salt Co. v. Suppiger Co.*, decided in 1942, the Court held that a court can find patent misuse even if the relevant practice would not independently give rise to a violation under applicable antitrust law.[14] In that same year, the Court also held that a patent licensee was not estopped from challenging the validity of a licensed patent.[15]

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[12] For a detailed account, see Jonathan M. Barnett, *The Great Patent Grab*, in WHAT PATENTS REALLY DO: HISTORICAL PERSPECTIVES ON CURRENT POLICY DEBATES (eds. Stephen Haber and Naomi Lamoureaux, forthcoming 2020) [hereinafter Barnett, *Patent Grab*].

[13] *See, e.g., U.S. v. Univis Lens Co.* 316 U.S. 241, 254 (1942) (holding that resale price maintenance clause in patent license is per se illegal under the Sherman Act); *International Salt Co. v. U.S.*, 332 U.S. 392, 396 (1947) (finding a *per se* violation under the antitrust laws with respect to a tying clause in the lease of a patented machine).

[14] 314 U.S. 488, 490 (1942). *See also Mercoid Corp. v. Minneapolis-Honeywell Regulator Co.*, 320 U.S. 680, 684 (1944) (declining under patent misuse doctrine to enforce a tying clause in the lease of patented equipment).

[15] *Sola Electric Co. v. Jefferson Electric Co.*, 317 U.S. 173, 177 (1942). *See also Edward Katzinger Co. v. Chicago Metallic Mfg. Co.*, 329 U.S. 394, 401-02 (1947) (holding that a patent licensee is not estopped from challenging the validity of the licensed patent); *McGregor v. Westinghouse Elec. & Mfg. Co.*, 329 U.S. 402, 406 (1947) (same).

In the ensuing decades, the judiciary largely maintained this IP-skeptical approach, regularly declining to enforce tying, resale price maintenance, exclusivity, territorial division and other clauses in IP licenses under either *per se* applications of the antitrust laws or the similarly forgiving standards of the patent misuse doctrine.[16] In a now largely forgotten enforcement campaign, the antitrust agencies secured compulsory licensing orders in over 100 actions concentrated in the 1950s and 1960s, including several directed at the patent portfolios of some of the largest U.S. corporations.[17] Even short of outright expropriation, the judiciary's and antitrust agencies' IP skepticism placed a substantial range of licensing activity under a high risk of liability. In a now-infamous speech in 1970, a senior official at the Department of Justice identified a medley of vertical licensing practices—the so-called "Nine No-Nos"—that were virtually assured legal condemnation under *per se* liability standards.[18]

Starting in the late 1970s, the legal cloud of antitrust liability over IP licensing markets began to dissipate substantially. These changes substantially tracked arguments that had been set forth by Ward Bowman and other scholars on the interface between patent and antitrust law (culminating in a book published by Bowman in 1973)[19], who had critiqued the *per se* treatment of certain IP licensing practices, as well as the broad application of the patent misuse doctrine, that had characterized the postwar antitrust regime. Starting with the landmark *Continental T.V., Inc. v. GTE Sylvania* decision in 1977[20], the Court issued a sequence of decisions that removed or substantially qualified the per se, or quasi per se, rules of antitrust liability that had been applied to tying and other vertical restraints.[21] Those decisions in turn reduced substantially the liability associated with the use of tying, exclusivity, territorial limitation and certain other clauses in licensing contracts, given that the case law now took seriously arguments that these clauses typically were motivated by an efficiency rationale. Within less than a decade, the views of Bowman and similarly-minded scholars on the appropriate antitrust treatment of IP licensing had moved from the periphery to the mainstream of legal thinking and, more importantly, had been embraced by the federal courts and enforcement agencies. In 1983, the head of the Antitrust Division, Assistant Attorney General William F. Baxter, stated: "To enable intellectual property owners to obtain the maximum legitimate rewards possible for their efforts, it is crucial that the courts carefully consider procompetitive benefits when evaluating the lawfulness of intellectual property licensing under the antitrust laws."[22] In 1986, the Court of Appeals for the Federal Circuit similarly reflected the views of "Chicago school" scholars in raising the bar for showing "patent misuse" [23], which diminished the threat that licensing practices could be deemed to have strayed

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[16] *See, e.g.*, *McCullough v. Kammerer Corp.*, 166 F.2d 759, 761 (9th Cir. 1948), *cert. denied* 335 U.S. 813 (1948) (finding patent misuse due to exclusive distributorship clause that "unreasonably" extended the "monopoly of the patent"); *Berlenbach v. Anderson & Thompson Ski Co*., 329 F.2d 782 (9th Cir. 1964) (barring patent infringement suit on the ground that the patentee had entered into an agreement with the defendant-licensee that contained an exclusivity clause in violation of the antitrust laws); *Zenith Radio Corp. v. Hazeltine Research, Inc*., 395 U.S. 100, 103 (1969) (holding that it is patent misuse if a patentee uses its "statutory monopoly . . . to coerce an agreement to pay a percentage royalty on goods not using the patent"); *Key Pharm., Inc. v. Lowey*, 373 F. Supp. 1190, 1193 (S.D.N.Y. 1974) (relying on rule of *per se* illegality against tying clause in patent license that applies to nonpatented articles and noting that this rule requires "no proof of substantial lessening of competition"); *Jack Winter, Inc. v. Koratron Co.*, 375 F.Supp. 1, 61-65, 71-72 (N.D. Cal. 1974); *Dubuit v. Harwell Enters*., 336 F. Supp. 1184, 1187 (W.D.N.C. 1971) (finding antitrust violation and patent misuse due to tying clause in patent license that required licensees to purchase only fabrics and accessories bearing licensor's trademark); *Sonobond Corp. v. Uthe Tech., Inc.*, 314 F. Supp. 878, 880 (N.D. Cal. 1970) (reiterating principle that tying clause requiring or inducing licensee to purchase unpatented components from licensor can constitute patent misuse); *Columbus Auto. Corp. v. Oldberg Mfg. Co.*, 264 F. Supp. 779, 785-86 (D. Colo. 1967) (finding patent misuse due to exclusive manufacture and distribution provision).

[17] For a comprehensive account, see Barnett, *Patent Grab, supra* note 12.

[18] Bruce P. Wilson, Deputy Assistant Attorney General, Antitrust Division, U.S. Dept. of Justice, *Patent and Know-How License Arrangements: Field of Use, Territorial, Price and Quantity Restrictions* (Nov. 6, 1970).

[19] *See, e.g.*, WARD S. BOWMAN, JR., PATENT AND ANTITRUST LAW: A LEGAL AND ECONOMIC APPRAISAL (1973); Ward S. Bowman, Jr., *Tying Arrangements and the Leverage Problem*, 67 YALE L. J. 19 (1957).

[20] 433 U.S. 36 (1977).

[21] See, e.g., *Jefferson Parish Hospital District No. 2 v. Hyde*, 466 U.S. 2 (1984) (relaxing per se treatment of tying, which had been a common basis for antitrust challenges to the enforcement of patent licenses).

[22] Alan J. Weinschel, *Intellectual Property and the Antitrust Laws*, in ANTITRUST ADVISOR, at 5-9 to 5-10 (Irving Scher ed. 2006) (quoting William F. Baxter, *Antitrust Law and the Stimulation of Technological Innovation*, discussion paper for Preparatory Conference on Government Organization and Operation and the Role of Government in the Economy, Univ. San Diego (July 19-21, 1983)).

[23] *Windsurfing Int'l Inc. v. AMF Int'l Inc.,* 782 F.2d 995, 1001-02 (Fed. Cir. 1986) (observing that economic analysis "questions the rationale behind holding any licensing practice per se anticompetitive"). In *Princo Corp. v. Int'l Trade Cmm'n,* 616 F.3d 1318, 1319 (Fed. Cir. 2010), the Federal Circuit subsequently reaffirmed the "narrow scope of the [patent misuse] doctrine."

outside the scope of the patent grant. In 1988, Congress essentially codified the Federal Circuit's new approach by requiring a showing of market power for certain claims of patent misuse.[24]

This substantial shift in the legal treatment of IP licensing under patent and antitrust law was explicitly recognized and endorsed in the 1995 IP Guidelines. The Guidelines endorsed three key principles. First, the Guidelines effectively discarded the "IP = monopoly" equation by lifting the presumption that IP rights necessarily imply market power without supporting evidence.[25] Second, the Guidelines recognized that IP licensing generally yields efficiency gains and therefore concluded that antitrust challenges to licensing transactions must generally provide evidence of competitive harm under the "rule-of-reason" standard.[26] Third, the Guidelines affirmed that IP licensing arrangements can give rise to net anti-competitive effects in certain circumstances, especially in horizontal arrangements involving competitors (although, even in that case, the Guidelines cautioned against reflexive application of *per se* liability rules).[27] For a relatively brief but meaningful interlude in the history of antitrust law, it seemed that all three branches of government were headed toward a grand rationalization of the legal treatment of IP licensing—both under antitrust law and the closely related doctrine of patent misuse—within the nuanced efficiency-guided framework that the federal courts had adopted for antitrust analysis more generally.

B. Judicial Dogmatism Revived

In this Section, I show how federal case law addressing IP licensing has increasingly favored a formalist mode of analysis that applies certain limitations on licensing practices with little substantive consideration of whether any particular practice is likely to give rise to anti-competitive effects. Placed in a historical perspective, this represents a reversion in part to the reflexive IP-skepticism that characterized New Deal and postwar antitrust thinking, although it has been largely operationalized through IP law doctrines. To illustrate this development, I focus on the reasoning behind the Court's decision in *Impression Products, Inc. v. Lexmark Int'l, Inc.*[28], which broadly applied the doctrine of patent exhaustion in a manner akin to a *per se*-style of antitrust reasoning.

1. *General Tendencies*

It is widely observed that the Supreme Court has adopted a highly skeptical view of patents since approximately the mid-2000s, regularly striking down decisions by the Court of Appeals for the Federal Circuit that had bolstered protections for patent holders. Much of the scholarly and policy discussion concerning the Supreme Court's patent jurisprudence has focused on headline decisions that have either limited patent holders' remedies (most notably, the Court's 2006 decision in *eBay, Inc. v. MercExchange LLC* restricting the availability of injunctive relief even after a patentee had defended the validity of its patent and shown infringement[29]) or cast doubt on the validity of broad categories of patents relating to software-related inventions, isolated genetic material, and certain medical diagnostic methods.[30] Comparatively little attention has been paid to lower-profile decisions that have cast doubt on certain types of IP licensing, sale and other transactions. Since 2006, the Supreme Court has issued six precedential decisions relating to IP transactions, of which five upheld or bolstered constraints on IP owners' freedom of action.[31] These decisions are summarized in the Table below.

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[24] PATENT MISUSE REFORM ACT OF 1988, 35 U.S.C. § 271(d)(5).

[25] 1995 IP GUIDELINES, *supra* note 7, at 2. This principle was subsequently adopted by the Supreme Court in *Illinois Tool Works, Inc. v. Indep. Ink, Inc.*, 126 S. Ct. 1281, 1293 (2006).

[26] 1995 IP GUIDELINES, *supra* note 7, at § 3.4 ("In the vast majority of cases, restraints in intellectual property licensing arrangements are evaluated under the rule of reason").

[27] *See id.*, at §§ 3.4, 5.1.

[28] 568 U.S. 519 (2017).

[29] 547 U.S. 388 (2006).

[30] Respectively, these decisions are: *Alice Corp. v. CLS Bank International*, 134 S.Ct. 2347 (2014) (software); *Association for Molecular Pathology v. Myriad Genetics*, 569 U.S. 376 (2013) (genetic material); *Mayo Collaborative Services v. Prometheus Laboratories, Inc.* 132 S. Ct. 1289 (2012) (medical diagnostic products).

[31] The qualifier, "precedential", excludes *Costco Wholesale Corp. v. Omega S.A.*, 562 U.S. 40 (2010), which was a split 4-4 decision and therefore did not have precedential impact. In 2019, the Court issued an opinion in a case involving the treatment of a

Table 1. Precedential Supreme Court decisions relating to IP licensing (2006-Present)

Year	Decision	Key Holding	Limits Transactional Freedom?
2006	*Medimmune Inc. v. Genentech Inc.*[32]	Licensee in good standing may challenge the validity of a licensed patent. Casts substantial doubt on enforceability of covenants not to sue.	Yes
2008	*Quanta Computer, Inc. v. LG Electronics Inc.*[33]	Reaffirms that patent exhaustion bars enforcement of use restrictions against subsequent purchasers (in case where restrictions were set forth in a document ancillary to the license agreement).	Yes
2013	*Kirtsaeng v. John Wiley & Sons Inc.*[34]	First sale doctrine (copyright exhaustion) applies to sales outside the U.S.	Yes
2013	*Bowman v. Monsanto Co.*[35]	Patent exhaustion does not permit subsequent purchaser to make unauthorized copies of patented product.	No
2015	*Kimble v. Marvel Entertainment LLC*[36]	Patent license is unenforceable beyond statutory term.	Yes
2017	*Impression Products, Inc. v. Lexmark Int'l, Inc.*[37]	Patent exhaustion applies to conditional sales and applies outside the U.S.	Yes

These decisions generally adopt a formalist approach that favors literalist applications of doctrines designed to limit purported overreaching by IP licensors, as distinguished from a functionalist approach that would rely substantially on the policy rationales behind these doctrines and require case-specific evidence of adverse net welfare effects. In antitrust terms, these decisions tend to exhibit reasoning that is closer to *per se* rules rather than "rule of reason" standards for determining liability, which inherently raises the risk of suppressing innocuous or pro-competitive practices. Relatedly, the application of per se-style reasoning through the patent misuse doctrine represents a strategic device that effectively enables government or private plaintiffs (and sympathetic courts) to detour around the more demanding rule-of-reason standard that antitrust law would apply to the same practice.

2. *Illustration:* Impression Products, Inc. v. Lexmark International, Inc.

These tendencies and associated "false positive" error risks are illustrated by one of the Court's recent decisions relating to IP transactions, *Impression Products, Inc. v. Lexmark International, Inc.*[38], which addressed the scope of the judge-made "patent exhaustion" doctrine. The plaintiff (Lexmark), a leading manufacturer of printer cartridges, sold two types of cartridges: (i) a higher-priced cartridge that could be refilled and reused without restriction; and (ii) a lower-priced cartridge that was sold with contractual restrictions that barred reuse or transfer to another party. The price differential naturally reflected the extent

trademark license in bankruptcy, *Mission Products Holdings Inc. v. Tempnology, LLC*, 587 U.S. (2019). I omit this case since it principally concerns bankruptcy, rather than IP-related, issues.

32 549 U.S. 118 (2007).

33 553 U.S. 617 (2008).

34 568 U.S. 519 (2013).

35 569 U.S. 278 (2013).

36 379 U.S. 29 (2015).

37 568 U.S. 519 (2017).

38 581 U.S. 1523 (2017). Some of the discussion that follows draws on more extended arguments in an amicus brief on which I was a co-lead author, see BRIEF OF 44 LAW, ECONOMICS AND BUSINESS PROFESSORS AS AMICI CURIAE IN SUPPORT OF RESPONDENT IN IMPRESSION PRODUCTS, INC. V. LEXMARK INTERNATIONAL, INC., filed Supreme Court of the United States, Feb. 23, 2017.

of any limitations on the buyer's use of the purchased cartridge. Despite being aware of those contractual restrictions, the defendant (Impression Products) purchased the lower-priced cartridges from other buyers, refilled them and resold them—a classic arbitrage strategy that threatened Lexmark's two-tier price discrimination system. The Court refused to uphold enforcement of the restrictions on re-use of the lower-priced cartridges, on the ground that the initial sale transactions had triggered exhaustion of the underlying patents and therefore, as a matter of patent law, those restrictions had no legal force against subsequent users like the defendant. Given the lack of privity between the patent owner and the defendant (which had not purchased directly from Lexmark, the producer and patent owner), no contractual cause of action was feasible. Consistent with a per se-style analysis, the Court did not engage in any inquiry to ascertain whether the patent owner exercised market power, whether the use restrictions were made sufficiently clear to subsequent purchasers (in which case the pricing would have presumably reflected those restrictions), or whether the use restrictions resulted in net negative welfare effects.[39] As Herbert Hovenkamp has observed, Lexmark's market share was too small to support any plausible assertion of market power, in which case the usage restrictions could not plausibly have caused competitive harm—for the simple reason that any customer who did not like Lexmark's terms could have moved to one of its larger competitors in search of a better deal.[40]

The Court's decision overturned a long-standing Federal Circuit interpretation of patent exhaustion doctrine, *Mallinckrodt, Inc. v. Medpart, Inc.*[41] That decision had adopted a more complex but nuanced standard that distinguished between unconditional and conditional sales. Under that standard, patent exhaustion was only triggered in the case of unconditional sales, a principle that effectively enabled patentees to "waive" the exhaustion doctrine by entering into a conditional sale subject to use restrictions (provided that due notice was given of any such restrictions).[42] The Federal Circuit's interpretation of the exhaustion doctrine as a waivable presumption had provided licensors and licensees with the leeway to engineer a wide range of transactional structures for the distribution of products embodying patented technologies. More generally, the Federal Circuit's approach reflected the fact that, as an economic matter, there is nothing intrinsically objectionable about placing a restriction on the use of an IP asset, so long as the restriction is made known to the purchaser and therefore reflected in market pricing. Additionally, the IP holder's ability to specify enforceable use restrictions enables it to offer users a menu of differently priced consumption bundles, which can yield both efficient and progressive welfare effects by expanding access for lower-valuation and lower-income consumers.[43] As illustrated by the *Impression Products* case, it could be perfectly rational for a buyer to accept restrictions on use in exchange for a commensurate discount—just as a car lessee may accept a stricter limit on mileage in exchange for a lower monthly fee. The economic consequence of the Court's unqualified interpretation of the exhaustion doctrine is that, barring contractual workarounds[44] or a technological means by which to regulate and meter usage, manufacturers such as

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[39] For a similar view of the *Impression Products* decision as having promulgated the equivalent of a *per se* approach to use restrictions in the sale of patented assets, see Herbert Hovenkamp, *Reasonable Patent Exhaustion*, 35 YALE J. REG. 513 (2018) [hereinafter Hovenkamp, *Reasonable Patent Exhaustion*], and for similar views with respect to the Court's application of the patent exhaustion doctrine in the earlier *Quanta v. LG* decision, see Herbert Hovenkamp, *Post-Sale Restraints and Competitive Harm: The First Sale Doctrine in Perspective*, 66 N.Y.U. ANN. SURVEY AMER. L. 487 (2011).

[40] Hovenkamp, *Reasonable Patent Exhaustion*, *supra* note 39, at 518-19.

[41] 976 F.2d 700 (Fed. Cir. 1992). The *Mallinckrodt* decision had already been placed in some doubt given the Court's ruling in *Quanta Computer, Inc. v. LG Electronics, Inc.*, 553 U.S. 617 (2008), which had affirmed that the patent exhaustion doctrine applies to method patents and combination products of which the patented component is only a part.

[42] *Mallinckrodt, Inc. v. Medpart, Inc*., 976 F.2d 700, 706-09 (Fed. Cir. 1992). For a similar subsequent decision, see *B. Braun Medical, Inc. v. Abbott Laboratories*, 124 F.3d 1419, 1426-27 (Fed. Cir. 1997) (holding that only an unconditional sale triggers patent exhaustion).

[43] For a formal model showing that the ability to waive patent exhaustion enables the IP holder to engage in welfare-enhancing price discrimination, see Olena Ivus, Edwin L.-C. Lai, and Ted Sichelman, *An Economic Model of Patent Exhaustion*, CESIFO WORKING PAPERS (2017).

[44] It is possible that patentees could circumvent the exhaustion obstacle to some extent by requiring that any subsequent purchaser enter into a contractual relationship with the patentee or simply restructure the initial sale relationship as a license or lease. For discussion, see SULLIVAN & CROMWELL LLP, *Supreme Court Sets New Rules for Patent Exhaustion Doctrine*, May 31, 2017. Both strategies, however, suffer from significant limitations. In the first case, the patentee relies as a practical matter on the willingness of the initial purchaser to enforce contractual conditions against subsequent purchasers, which may be difficult to enforce. In the second case, lease or license arrangements may not be practically feasible in the case of certain (especially, physical) goods or, at least, may be less efficient compared to a sale arrangement.

Lexmark would be compelled to offer a single uniform price to all buyers. While this may lower the price that would have been paid by higher-intensity users who had typically purchased the full-use version, it most likely increases prices for lower-intensity users, who can no longer purchase the discounted restricted-use product. The effects of this distortion may be both inefficient (reducing innovation incentives by reducing total expected returns under a compelled uniform-pricing regime) and regressive (shifting wealth from lower-income to higher-income consumers).

The Court's decision in *Impression Products* represented a significant departure from well-established legal understandings and market practice, in place at least since the *Mallinckrodt* decision in 1992.[45] In 2010, the Federal Circuit had succinctly described this understanding: "[E]xpress conditions accompanying the sale or license of a patented product . . . are generally upheld."[46] Despite commentary by some scholars claiming that a non-waivable interpretation of the exhaustion doctrine is vital to protect IP markets from an impenetrable web of use restrictions[47], this commonly expressed view faces one inconvenient fact. Namely: there is no empirical evidence demonstrating that IT markets were harmed by judicial deference to private contracting among well-informed buyers and sellers of IP or IP-embedded assets during the over two-decade period that had elapsed since the *Mallinckrodt* decision (and the even longer period during which courts inconsistently applied the exhaustion doctrine in determining whether to uphold use restrictions in the case of conditional sales[48]). In the world after *Impression Products*, even use restrictions that are made explicit at the point of sale (and therefore priced into the license) will no longer be upheld as a matter of patent law (and, given the absence of privity, could not be enforced as a matter of contract law against subsequent users).

The implications of the per se-style reasoning adopted in the *Impression Products* case may have further ramifications. We cannot exclude the possibility that courts will extend the Court's formalist application of the patent exhaustion doctrine (and underlying IP-skepticism) to challenge long-standing assumptions that a contract that is designated as a license cannot be deemed to constitute a "sale" for purposes of either patent exhaustion doctrine or copyright law's analogous "first sale" doctrine (which triggers exhaustion of the copyright owner's exclusive distribution right after an initial authorized sale[49]).[50] If the exhaustion doctrine is understood to be a means by which courts can protect users against overreaching by monopolist IP holders, then a court may conclude that it is bound to "see through" a nominally designated license and treat the relevant transaction as a sale. This is far from a matter of mere semantics: courts' treatment of "sale-like" transactions as licenses has provided the legal basis for the restrictions on reuse, transfer and other terms (and associated pricing schedules) typically set forth in the end-user license agreements accompanying software applications. Barring technological means by which to meter and otherwise regulate usage (which may be feasible to some extent in "software-as-a-service" environments), a legal regime that declined to enforce those end-user agreements would compel software vendors to adopt uniform pricing, which can have the adverse efficiency and distributional effects described above.

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45 The line of judicial argument pursued in *Mallinckrodt* could be dated substantially earlier. In *General Talking Pictures v. Western Electric Co.*, 304 U.S. 175, *aff'd on reh'g,* 305 U.S. 124 (1938), the Court upheld the enforcement against a downstream purchaser of use restrictions set forth in the agreement with the initial licensee, on the ground that the restrictions were notified to the licensee and the subsequent purchaser was aware of those restrictions. Even earlier, the Court had held that patent exhaustion applied to cases where "the sale is absolute, and without any conditions," *see Mitchell v. Hawley*, 83 U.S. (16 Wall.) 544, 548 (1872), suggesting that it does not apply in the case of a conditional sale.

46 *Princo Corp. v. Int'l Trade Cmm'n,* 616 F.3d 1318, 1328 (Fed. Cir. 2010).

47 *See, e.g.*, Molly Shaffer Van Houweling, *The New Servitudes*, 96 GEO. L. J. 885, 932-46 (2008). For a somewhat more attenuated position, see Ariel Katz, *The First Sale Doctrine and the Economics of Post-Sale Restraints,* 2014 B.Y.U. L. REV. 55, 63 (2014) (arguing that contractual waivers of the exhaustion doctrine should generally be held invalid "in the absence of a compelling case-specific explanation as to why the work-around should be upheld"). For a more aggressive position, see Aaron Perzanowski & Jason Schulz, *Digital Exhaustion*, 58 UCLA L. REV. 889, 892 (recognizing that the first sale doctrine is motivated by concerns about transaction-cost obstacles to commerce in copyright-protected goods but arguing that the doctrine should be extended to encompass the derivative right).

48 For discussion of this case law, see Hovenkamp, *Reasonable Patent Exhaustion, supra* note 39, at 521.

49 The doctrine is codified at 17 U.S.C. §109.

50 For decisions that endorse this approach to distinguishing between "sales" and "licenses" for purposes of the first sale doctrine in copyright law, see *UMG Recordings, Inc. v. Augusto*, 629 F.3d 1175, 1179 (9th Cir. 2011); *Adobe Systems Inc. v. Christenson*, 809 F.3d 1071, 1078-79 (9th Cir. 2015); *Vernor v. AutoDesk, Inc.*, 621 F.3d 1102, 1111-12 (9th Cir. 2010); *DSC Communications Corp. v. Pulse Communications, Inc*., 170 F.3d 1354, 1360-61 (Fed. Cir. 1999); *Krause v. Titleserv, Inc.*, 402 F.3d 119, 123-24 (2d Cir. 2005).

C. Regulatory Anti-Empiricism

Since approximately the mid-2000s, competition law enforcers around the world (with the exception of a policy shift announced by the U.S. Department of Justice in November 2017[51]) have ambitiously sought to rewrite the rules that govern the licensing infrastructure of the global smartphone market. Such a far-reaching policy objective inherently carries the risk of socially costly error costs if the theoretical and empirical underpinnings behind these interventions prove to be incorrect. Remarkably, this regulatory campaign has been premised on almost entirely theoretical propositions. Anchored in a handful of scholarly contributions published in the early and mid-2000s[52], competition regulators have expressed concern that the high numbers and dispersed ownership of "standard-essential" patents ("SEPs") in the smartphone and related IT markets give rise to two types of net welfare losses: (i) "patent holdup," in which SEP owners demand exorbitant royalties from producers that have made "relationship-specific" investments in the relevant technology, and (ii) "royalty stacking," a variant of the standard double marginalization problem[53] in which uncoordinated rate-setting by monopolist patent holders impose an aggregate royalty burden that inflates device prices above collectively revenue-maximizing levels.[54]

1. *Policy Objectives*

Based on this pair of largely untested hypotheses, antitrust agencies in the U.S. and other commercially significant jurisdictions have devoted significant resources to scrutinizing and, in some cases, taking action against the long-standing licensing practices of lead SEP holders (which typically happen to be the lead innovators) in the smartphone industry. In particular, the agencies have advocated, and some courts have implemented, in each case to varying degrees depending on the particular jurisdiction, three key principles that significantly limit SEP holders' transactional freedom of action.

Principle I: SEP owners are not entitled to injunctive relief against infringers.

U.S. courts have effectively adopted this principle, holding that SEP owners generally are not entitled to injunctive relief, unless an infringing user is unwilling to enter into a license on terms that comply with the SEP owner's commitment to offer FRAND terms. [55] In at least two cases, courts have awarded attorneys' fees to the infringer because the SEP owner was found to have pursued injunctive relief in circumstances inconsistent with its FRAND commitment.[56] Additionally, as shown in the Table below, the FTC has conditioned approval of a major acquisition involving a large SEP portfolio (Google's 2012 acquisition of Motorola Mobility) on a commitment by the acquiring firm not to pursue injunctive relief against infringers of the target's SEP portfolio. In Europe, courts have adopted somewhat more attenuated forms of the

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[51] U.S. DEPT. OF JUSTICE, ASS'T ATTORNEY GENERAL MAKAN DELRAHIM DELIVERS REMARKS AT THE USC SCHOOL OF LAW'S CENTER FOR TRANSNATIONAL LAW AND BUSINESS CONFERENCE (Nov. 10, 2017).

[52] *See, e.g.*, Mark A. Lemley and Carl Shapiro, Patent Holdup and Royalty Stacking, 85 TEX. L. REV. 1991, 2013-16 (2007); Mark A. Lemley, *Ten Things To Do About Patent Holdup of Standards (and One Not to)*, 48 B. C. L. REV. 149, 152 (2007); Joseph Farrell, John Hayes, Carl Shapiro and Theresa Sullivan, *Standard Setting, Patents and Hold-Up*, 74 ANTITRUST L. J. 603, 608 (2007); Daniel G. Swanson and William J. Baumol, *Reasonable and Nondiscriminatory (RAND) Royalties, Standards Selection, and Control of Market Power*, 73 ANTITRUST L. J. 1, 19-21 (2005). For a detailed account of the genealogy of scholarly publications that have provided some of the intellectual underpinnings behind regulatory interventions in SEP markets, see Barnett, *Has the Academy Led Patent Law Astray?*, 32 BERK. TECH. L. J. 1313, 1316, 1324-28, 1345-46 (2017) [hereinafter Barnett, *Has the Academy*].

[53] For the standard source, see AUGUSTE A. COURNOT, RECHERCHE SUR LES PRINCIPES MATHEMATIQUES DE LA THEORIE DES RICHESSES (1838).

[54] *See supra* note 52.

[55] See, e.g, *Apple Inc. v. Motorola Inc.*, 757 F.3d 1286, 1332 (Fed. Cir. 2014) (rejecting any blanket no-injunction principle for SEP owners but holding that a SEP owner is only entitled to seek injunctive relief if the infringer exhibited unwillingness to enter into a FRAND-compliant license).

[56] *Microsoft Corp. v. Motorola, Inc*., 795 F.3d 1024, 1049 (9th Cir. 2015); *Apple, Inc. v. Motorola, Inc*., 869 F.Supp. 2d 901, 913-15 (N.D. Ill. 2012), modified on other grounds, 757 F.3d 1286 (Fed. Cir. 2014).

"almost-no-injunction" principle, placing moderately more emphasis on the infringing user's obligation to negotiate in good faith in order to enjoy effective immunity from the threat of injunctive relief.[57]

Principle II: SEP owners must license at the component, rather than the device, level.

In the *FTC v. Qualcomm* litigation, the district court stated that "device-level licensing is "inconsistent with . . . Federal Circuit case law on the smallest salable patent practicing unit"[58], implying that U.S. patent law had adopted Principle II. This is largely incorrect. As shown by an exhaustive survey of district court litigation by David Kappos and Paul Michel (current as of 2018)[59], courts have generally only adopted *Principle II* for the limited purpose of determining a "reasonable royalty" in patent infringement litigation adjudicated by a jury (which therefore does not even encompass bench trials in which a judge determines damages). Specifically, the Federal Circuit has rejected any blanket obligation on the part of patent owners to license at the component level.[60] However, this does not preclude private entities from adopting *Principle II* as a matter of internal practice. Most notably, in 2015, the IEEE, a leading standard-setting organization that administers the 802.11 WiFi standard, modified its definition of FRAND in a manner that arguably mandates component-level licensing.[61]

Principle III: "Excessive" SEP royalty rates can constitute an independent competition law violation.

This principle has been applied in various forms by certain non-U.S. regulators in 2015, 2016 and 2017 (see Table below), resulting in several hundreds of millions of dollars in fines (some of which are under appeal or have been subsequently reduced) and orders that substantially modified the terms of Qualcomm's licensing relationships with local device producers. Relatedly, it is worth noting that portions of the Northern District of California's opinion against Qualcomm idiosyncratically appear to find an antitrust violation on the basis that the defendant's royalty rates were deemed to be "unreasonably high."[62] This is "idiosyncratic" since it seems to be a tacit endorsement of *Principle III*, which would be flatly inconsistent with U.S. antitrust law's commitment to safeguarding the competitive conditions under which prices (or royalty rates) are determined through the forces of supply and demand (as strictly distinguished from making determinations as to whether any particular price (or royalty rate) is "too high").

2. *Policy Actions*

The Table below sets forth actions or statements by leading regulators or courts that advance, or seek to advance, one or more of the three Principles.

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[57] *Unwired Planet Int'l Ltd. v. Huawei Techs. Co.* [2017] EWHC (Pat) 711; Case C-170/13, *Huawei Techs. Co. v. ZTE Deutschland GmbH* 2014 E.C.R. 477 ¶¶ 61-67. The *Unwired Planet* decision, and a related case, *Conversant v. Huawei and ZTE*, are currently on appeal at the U.K. Supreme Court.

[58] FTC v. Qualcomm, Inc., N.D. Cal., Case No. 17- CV-00220-LHK, May 21, 2019 (Koh, J.), at 172-73.

[59] David Kappos and Paul Michel, *The Smallest-Saleable Patent-Practicing Unit: Observations on its Origins, Development and Future*, 32 BERK. TECH. L. REV. 1433 (2018).

[60] *Commonwealth Science and Industrial Research Organization v. Cisco Systems, Inc.*, 809 F.3d 1295, 1303-04 (Fed. Cir. 2015); *Ericsson, Inc. v. D-Link Systems, Inc.*, 773 F.3d 1201, 1226 (Fed. Cir. 2014).

[61] Specifically, the IEEE amended the FRAND commitment to provide that: (i) patentees are barred from assessing a royalty rate that reflects any value attributable to the inclusion of the relevant technology in the standard, and (ii) patentees "may" assess a reasonable royalty based upon the "smallest salable practicing unit." *See* IEEE STANDARDS ASSOCIATION (IEEE-SA), INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS, IEEE-SA STANDARD BOARD BYLAWS § 6.2 (2016).

[62] *Federal Trade Commission v. Qualcomm, Inc.*, FINDINGS OF FACT AND CONCLUSIONS OF LAW, N.D. CAL., Case No. 17-CV-00220-LHK (Koh, J., May 21, 2019), at 156 ("Qualcomm's royalty rates are unreasonably high").

Table 2. The regulatory campaign against SEP licensors (selected actions)

Year	*Regulator/Court*	*Jurisdiction*	*Action*
2012	9th Cir., N.D. Ill.[63]	U.S.	Holds that seeking injunction is inconsistent with SEP owner's FRAND commitment.
2012	DOJ	U.S.	Approves acquisition by Google of Motorola Mobility, on condition that acquiror agrees not to seek injunctive relief against patent infringers.[64]
2013	DOJ, USPTO	U.S.	Issues guidance that SEPs not entitled to injunction if licensee is willing to enter into license on FRAND terms.[65]
2014	Fed. Cir.	U.S.	Adopts similar principle.[66]
2015	DOJ	U.S.	Business review letter approving SSO bylaw change to mandate component-level SEP licensing.[67]
2015	NDRC	China	Antitrust action against certain Qualcomm licensing practices.[68] Order requires Qualcomm to reduce royalty.
2016	KFTC	South Korea	Antitrust action against certain Qualcomm licensing practices. Assesses $854M fine (under appeal).[69]
2017	TFTC	Taiwan	Antitrust action against certain Qualcomm licensing practices. Assesses $773M fine (reduced substantially upon settlement).[70]
2018	EC	EU	Antitrust action against certain Qualcomm licensing practices. Assesses $1.2B fine (under appeal).[71]
2019	N.D. Cal. (FTC litigation)	U.S.	Antitrust action against certain Qualcomm licensing practices. Order requires Qualcomm to renegotiate licenses with device producers and offer licenses to other chipmakers.[72] Order stayed pending appeal.
2019	CSAMR	China	Antitrust investigation of Ericsson concerning IP licensing practices.[73]

Legend: CSAMR = China State Administration for Office Regulation; DOJ = Dept. of Justice; EU = European Commission; FTC = Federal Trade Commission; KFTC = Korea Fair Trade Commission; NDRC = National Development and Reform Commission; TFTC = Taiwan Fair Trade Commission; USPTO = U.S. Patent & Trademark Office

63 *Microsoft Corp. v. Motorola, Inc*., 696 F.3d 872, 877, 884 (9th Cir. 2012); *Apple Inc. v. Motorola, Inc.*, 869 F.Supp. 2d 901, 914-15 (N.D. Ill. 2012).

64 FEDERAL TRADE COMMISSION, GOOGLE AGREES TO CHANGE ITS BUSINESS PRACTICES TO RESOLVE FTC COMPETITION CONCERNS IN THE MARKETS FOR DEVICES LIKE SMART PHONES, GAMES AND TABLETS, AND IN ONLINE SEARCH, Jan. 3, 2013.

65 U.S. DEPT. OF JUSTICE & U.S. PAT. & TRADEMARK OFF., POLICY STATEMENT ON REMEDIES FOR STANDARD-ESSENTIAL PATENTS SUBJECT TO VOLUNTARY F/RAND COMMITMENTS 9 (2013).

66 *Apple Inc. v. Motorola Inc.*, 757 F.3d 1286, 1332 (Fed. Cir. 2014).

67 Letter from Renata B. Hesse, Acting Assistant Attorney General, Antitrust Division, U.S. Dept. of Justice, to Michael A. Lindsay, Dorsey & Whitney LLP, Feb. 2, 2015.

68 Noel Randwich and Matthew Miller, *Qualcomm to pay $975 million to resolve China antitrust dispute,* REUTERS, Feb. 9, 2015.

69 Anne Cullen, *Korean High Court Axes $243M Qualcomm Fine,* LAW360, Feb. 11, 2019.

70 Ian King and Debby Wu, *Qualcomm Wins Taiwan Reprieve Amid Global Antitrust Battle,* BLOOMBERG, Aug. 9, 2018.

71 Laurence Norman, *Qualcomm Hit by Second Antitrust Fine in Europe*, WALL ST. J., July 18, 2019.

72 *Federal Trade Commission v. Qualcomm, Inc.,* FINDINGS OF FACT AND CONCLUSIONS OF LAW, N.D. CAL., Case No. 17-CV-00220-LHK (Koh, J., May 21, 2019), at 224-233.

73 Yoko Kubota and Dan Strumpf, *China Investigates Ericsson Over Licensing as 5G Competition Heats Up,* WALL ST. J., Nov. 10, 2019.

The ambitious scope of these judicial and regulatory interventions into SEP licensing markets stands in a roughly inverse relationship to the strength of the evidence that supports the theoretical basis for these interventions. If the patent holdup and royalty stacking theories were correct, then we should expect to observe that consumer prices would rise, output would fall, and, over time, SEP-intensive markets would attract less entry and R&D investment. As a matter of economic logic, those theories predict that the smartphone market, which is characterized by large numbers and fairly dispersed ownership of SEPs[74], would suffer from some combination of reduced output, inflated prices and delayed innovation. Over two decades of market performance (since the launch of the GSM standard in the early 1990s) have not supported these predictions. To the contrary: the wireless communications market appears to provide an almost textbook case of market efficiency, whether assessed from a static or dynamic perspective. The market has been characterized by explosive growth and continuous innovation, consistently robust rates of entry into the smartphone device production market[75], and continuous declines in quality-adjusted prices in SEP-reliant industries.[76] Based on all available evidence, the IP licensing framework through which innovator-firms transmit valuable IP assets to device producers and other intermediate users appears to have worked well to achieve widespread adoption by end-users of this breakthrough communications technology. Subject to the non-excludable counterfactual in which net efficiency gains would be even greater under a weaker IP regime (which I address below[77]), the existing state of affairs appears to be a net-positive welfare outcome in which the patent system has successfully induced the R&D and commercialization investments that have driven adoption of 3G and 4G (and emergent 5G) wireless technologies. If that is the case, then there is no clear evidence of market failure and little basis for expansive interventions by antitrust authorities, and some courts, to "correct" alleged overreaching by SEP owners.[78] The effect of such intervention is, at best, a short-term reduction in the retail prices paid by consumers in the device market (assuming producers have a sufficient competitive incentive to pass on any savings in royalty fees) in exchange for a potential long-term reduction in R&D investment or, as I discuss further below[79], a distortion in the types of firms that have the capacity to undertake the innovation investments without which the market cannot proceed forward.

III. THE ENABLING VIEW OF IP LICENSING

Skepticism toward IP licensing, both in its historical and newly revived forms, has reflected a presumptive characterization of IP licenses as an exclusionary tool by which the patentee impedes competitive entry through actual or threatened litigation and thereby expands its state-granted monopoly franchise, which in turn inflates prices and restrains output in the target end-user market. Law-and-economics scholars had mostly critiqued this position indirectly as part of the "Chicago" school's larger project of identifying the economic illogic behind the *per se* rules of liability that agencies and courts in the postwar decades had widely applied against contractual practices such as tying, territorial division and exclusivity commitments that sometimes happen to be elements of IP licenses.[80] This project was primarily a reactive undertaking: scholars sought to challenge then-prevailing assumptions that attributed anti-competitive effects to certain

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[74] It is estimated that the top 20 patentees held almost 87% of all SEP families relating to the 4G standard and, as of July 2019, hold approximately 65% relating to the 5G standard. Author's calculations, based on: for 4G, WORLD INTELLECTUAL PROPERTY REPORT: INTANGIBLE CAPITAL IN GLOBAL VALUE CHAINS, CHAPTER 4: SMARTPHONES: WHAT'S INSIDE THE BOX? (2017), at Fig. 4.9; and for 5G, Tim Pohlmann, *Industry report – Who will be technology leader for 5G? Part two,* iam.com, July 18, 2018. Note that these figures are estimates and subject to certain inherent methodological limitations, including the lack of any measure for quality. For discussion of these issues, see Matthew Noble, Jane Mutimear and Richard Vary, *Determining which companies are leading the 5G race*, IAM-MEDIA.COM, July/August 2019; ERICSSON, ESTIMATING THE FUTURE 5G PATENT LANDSCAPE (Oct. 2018).

[75] Keith Mallinson, *Don't Fix What Isn't Broken: The Extraordinary Record of Innovation and Success in the Cellular Industry under Existing Licensing Practices,* 23 GEO. MASON L. REV. 967, 894-900, 993-94 (2016); Kirti Gupta, *Technology Standards and Competition in the Mobile Wireless Industry,* 22 GEO. MASON L. REV. 865, 893-94 (2015).

[76] Alexander Galetovic, Stephen Haber and Ross Levine, *An Empirical Examination of Patent Holdup,* 11 J. COMPETITION L. & ECON. 549, 551-54 (2015).

[77] *See infra* Part III.B. and C.

[78] For further discussion of this point, see Barnett, *Antitrust Overreach*, *supra* note 5, at 226-35.

[79] *See infra* Part III.B. and C.

[80] For the most direct treatments of IP licensing from this early law-and-economics critique of postwar antitrust, see BOWMAN, *supra* note 19, at 53-139; Bowman, *supra* note 19. For leading works that critiqued antitrust law more generally (with implications for IP licensing), see ROBERT H. BORK, THE ANTITRUST PARADOX: A POLICY AT WAR WITH ITSELF (1978); Aaron Director and Edward H. Levi, *Law and the Future: Trade Regulation,* 51 NW. U. L. REV. 281 (1956).

contractual practices based largely on form rather than economic substance or actual evidence of adverse net welfare effects. For the most part, neither these early law-and-economics scholars nor the follow-on legal literature has undertaken the proactive task of developing an understanding of the economic functions, and associated welfare effects, specifically attributable to IP licensing in real-world technology and content markets.[81] In this Part, I take a preliminary step toward that larger project by identifying and analyzing a set of paradigm transactional scenarios in which IP licenses operate as an enabling tool that facilitates cooperative arrangements among differently specialized entities involved in various steps of the innovation and commercialization process. Contrary to standard theoretical assertions, substantial evidence suggests that IP-intensive content and technology markets consistently engineer transactional structures that facilitate efficient information exchange while mitigating the transaction costs and royalty burdens that might unduly limit access and inhibit subsequent innovation.

A. Vertical Licensing I: Hub-and-Spoke Structures

Two dichotomous organizational tendencies recur in innovation environments. First, there tend to be *diseconomies of scale* in innovation. Theoretical models anticipate, and technology history[82] and empirical studies show, that breakthrough types of innovation tend to arise in smaller-firm environments in which founder-entrepreneurs have a large degree of control over, and substantial stake in, the enterprise. With some exceptions, large-firm organizations, and the bureaucratic apparatus and separation of ownership and management that are typical in those organizations, tend to discourage investment in the highest-risk innovation projects that may render obsolete an existing dominant technology.[83] Second, there tend to be *economies of scale* in the commercialization of innovation assets. Even in market segments in which innovation may be a relatively low-cost endeavor, the actions required to commercialize an innovation on a mass scale typically require substantial fixed-cost investments in a testing (especially in the case of pharmaceutical products), production and distribution infrastructure.[84] This is compounded by the fact that most novel technologies or creative works fail to deliver a net positive return to the entities that incurred the costs to develop and bring those products to market.[85] That risk can be feasibly borne, however, by intermediaries or other large entities that fund a diversified portfolio of technological projects or creative properties, which in the aggregate can yield a net positive return. In short: size tends to be a disadvantage in the innovation process but an advantage in the commercialization process.

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[81] There are limited exceptions to this statement among scholars who have studied how IP licenses can support different types of business models in IT and other markets, see Robert W. Gomulkiewicz, *Is the License Still the Product?*, 60 ARIZ. L. REV. 425 (2018); Barnett, *Why Is Everyone Afraid*, *supra* note 11; Chien, *supra* note 2. Other scholars have analyzed more generally how patents facilitate commercialization relationships, see, e.g., Jonathan M. Barnett, *Intellectual Property as a Law of Organization*, 84 S. CAL. L. REV. 785 (2011); F. Scott Kieff, *Coordination, Property and Intellectual Property: An Unconventional Approach to Anticompetitive Effects and Downstream Access*, 56 EMORY L. J. 327 (2006); F. Scott Kieff, *IP Transactions: On the Theory and Practice of Commercialization Innovation*, 42 HOUSTON L. REV. 727 (2005); Robert P. Merges, *A Transactional View of Property Rights*, 20 BERK. TECH. L. J. 1477 (2005).

[82] For a leading historical study on the technological contributions of the independent inventor, see JOHN JEWKES, DAVID SAWERS, AND RICHARD STILLERMAN, THE SOURCES OF INVENTION (2nd ed. 1969).

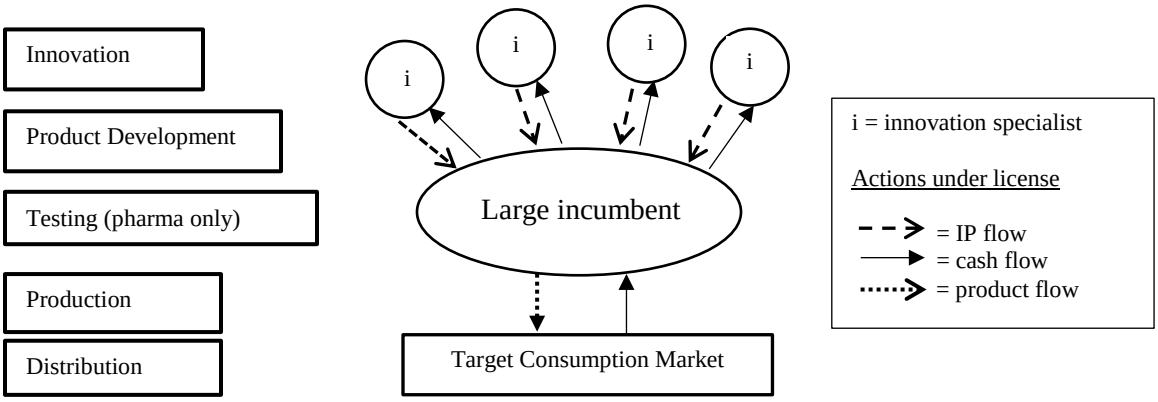
[83] For primarily theoretical discussion of these points, see David J. Teece, *Firm Organization, Industrial Structure, and Technological Innovation*, 31 J. ECON. BEHAV. & ORG. 193, 200-01, 212-13 (1996); Bengt Holmstrom, *Agency Costs and Innovation*, in MARKETS FOR INNOVATION, OWNERSHIP AND CONTROL 131-154 (eds. Richard H. Day, Gunnar Eliasson, Clas Wihlborg, and Kenneth J. Arrow (1993)); Kenneth. J. Arrow, *Innovation in Large and Small Firms*, 2 JOURNAL OF ENTREPRENEURIAL FINANCE 111 (1993). For a review of the relevant empirical literature (showing generally that smaller firms tend to favor higher-risk innovation projects, and larger firms tend to favor lower-risk or process-oriented innovation projects), see Wesley M. Cohen, *Fifty Years of Empirical Studies of Innovative Activity and Performance*, in HANDBOOK OF THE ECONOMICS OF INNOVATION 137-40 (eds. Bronwyn Hall and Nathan Rosenberg 2010); NAT'L ACAD. OF ENG'G, RISK & INNOVATION: THE ROLE AND IMPORTANCE OF SMALL HIGH-TECH COMPANIES IN THE U.S. ECONOMY 37-39, 48-51 (1995); WILLIAM L. BALDWIN AND JOHN T. SCOTT, MARKET STRUCTURE AND TECHNOLOGICAL CHANGE 63-113 (1987); EDWIN MANSFIELD, THE ECONOMICS OF TECHNOLOGICAL CHANGE 107-110 (1968).

[84] On large firms' advantages in the commercialization process, see CHRISTOPHER FREEMAN, THE ECONOMICS OF INDUSTRIAL INNOVATION 209 (1974), Teece, *supra* note 83, at 204-05.

[85] On low rates of project success in technology markets, see F.M. Scherer & Dietmar Harhoff, *Technology Policy for a World of Skew-Distributed Outcomes*, 29 RES. POL'Y 559 (2000); F.M. Scherer, Dietmar Harhoff & Jorg Kukies, *Uncertainty and the Size Distribution of Rewards from Innovation*, 10 J. EVOLUTIONARY ECON. 175 (2000). On low rates of project success in content markets, see Jonathan M. Barnett, *Copyright Without Creators*, 9 REV. L. & ECON. 389, 398-99 (2013).

These two organizational tendencies in innovation environments explain why technology and content environments that otherwise have little in common often adopt a "hub-and-spoke" structure. In this structure, the hub is populated by a small handful of large entities, which primarily engage in "run-of-the-mill" but capital-intensive production, marketing and distribution activities, while the spokes are populated by a substantially larger group of smaller firms that focus on lower-cost but higher-risk innovation activities. The hub-and-spoke structure simply applies the standard principles of division of labor to informational asset markets. While upstream entities often have unique innovative capacities that would not be fully exploited in a large-firm environment, downstream entities tend to have lower-cost access to the capital resources and operational expertise without which the relevant technology or creative properties could not be efficiently produced, marketed and distributed. This hub-and-spoke structure, which is shown in simplified form below, appears in content markets such as motion pictures (in which studios finance and source content from smaller production companies) and technology markets such as biopharmaceuticals (in which "Big Pharma" sources R&D inputs from small biotech firms). The recurrence of similar organizational structures across otherwise disparate market environments suggests a common economic logic.

Figure 1. Hub and Spoke Structure[86]



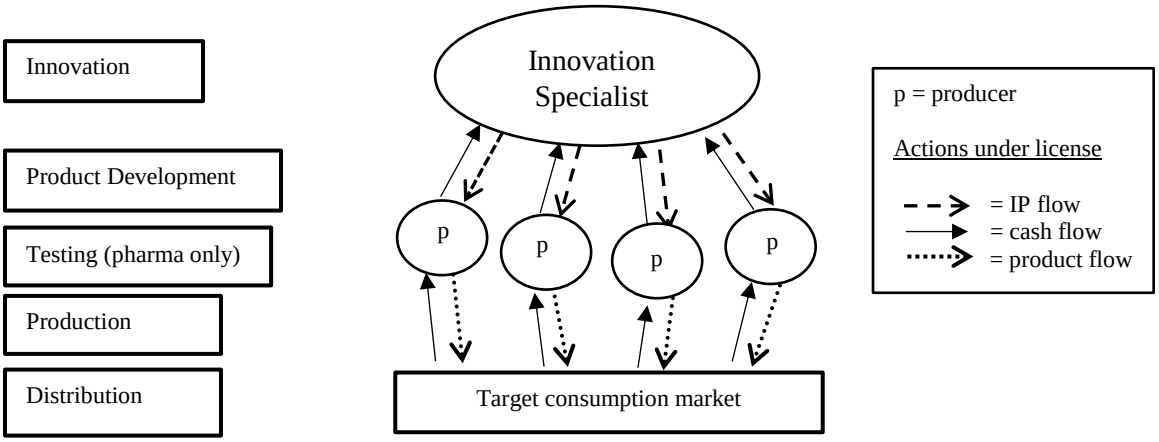
IP licensing transactions, anchored in a foundation of reasonably secure IP rights, supply the legal mechanism that underlies the hub-and-spoke structure. I will illustrate by reference to the creative markets, although the same logic applies in technology settings. In the motion picture context, the combination of secure IP rights and licensing contracts structure the relationship between an outside production company (the "spoke") and a studio (the "hub"). Each of these parties specializes in a different portion of the supply chain and it is therefore mutually beneficial to enter into a contractual relationship in order to execute the innovation and commercialization process. Without a secure copyright portfolio, the production company could not safely negotiate the terms of its relationship with the studio, which must address ahead of time the financing of the production and agreed-upon split of the revenue streams after box-office release. In a legal environment in which IP-enabled contractual agreements could not be reliably enforced, content production would move in-house as firms sought to protect creative properties from third-party imitators and to preserve the ability to earn a positive return at market release. That weak-IP environment would be inhospitable for independent production companies, which lack the capital and expertise required to establish and maintain a distribution infrastructure, in part because they cannot spread the costs of that fixed-cost investment across a large pool of creative properties. Far from blocking entry, it is precisely the combination of secure IP rights and reliably enforced IP licenses that lowers entry barriers and spreads economic rewards across the creative ecosystem.

[86] This Figure is adapted from Barnett, *Why is Everyone*, *supra* note 10, at 138 Fig. 3.

B. Vertical Licensing II: Cultivating IP Prospects

In a classic article, Edmund Kitch proposed that the holder of a broadly defined patent would have incentives to cultivate efficiently what he called the "prospect" of derivative applications arising from a single fundamental innovation.[87] Much of the novelty (and controversy) in Kitch's argument lay in the fact that he emphasized how a patent can enable its owner to coordinate the development of an intellectual territory of follow-on innovations, potentially in cooperation with other firms that provide complementary commercialization or follow-on innovation capacities.[88] While Kitch's argument was mostly theoretical, it closely tracks a common transactional structure in which a firm that owns a "disembodied" IP asset but lacks downstream commercialization capacities to convert that asset into a marketable good licenses the asset to a downstream pool of intermediate users, which then embed the technology in a wide range of applications for the target end-user market. As shown in the Figure below, this structure flips the many-to-one "hub-and-spoke" structure into a one-to-many "IP prospect" structure.

Figure 2. "IP Prospect" Structure



This monetization structure has been used successfully by technology pioneers such as Dolby Laboratories, which licenses its dominant audio technology to downstream device producers in the consumer electronics and theatrical exhibition markets; ARM Holdings, which licenses its dominant "chip architecture" to semiconductor firms that design chips for the smartphone and other IT markets; and Qualcomm, which licenses its dominant wireless communications technology to smartphone device manufacturers.[89] Contrary to the license-as-tax view of patent licensing, these firms have not hoarded their foundational technologies in order to capture the bulk of available economic surplus in the relevant market. Rather, they have used licensing mechanisms to disseminate their technologies widely to a broad population of downstream producers and other customer-facing firms that are best situated to embed those technologies in devices for the end-user market. This licensing structure in turn generates a royalty stream that enables upstream innovators to earn a return on their past R&D investments and fund additional R&D investments to push forward the technology frontier.

Kitch acknowledged the obvious objection that a broad patent may enable the patent owner to exercise market power, but observed that this would not always or even usually be the case given that "[m]any

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87 Edmund W. Kitch, *The Nature and Function of the Patent System*, 20 J. L. & ECON. 265 (1977).

88 *Id.*, at 277.

89 For further details, see DOLBY LABORATORIES INC., FORM 10-K (2018), at 4-6; ARM HOLDINGS PLC, ANNUAL REPORT 2015: STRATEGIC REPORT (2015), at 24; QUALCOMM, INC., FORM 10-K (2018), at 8. Note that I relied on the 2015 Form 10-K for ARM because it was taken private in an acquisition transaction by Softbank in 2016.

patents face competition from other processes or products."[90] That is: the "IP = monopoly" equation that underlies conventional economic analysis, and much of legal analysis, of IP rights, is not the typical scenario. It turns out that Kitch's unconventional intuitions were largely on the mark. As discussed further below[91], Kitch's modest estimation of IP holders' pricing power has been supported by empirical findings that patents generate relatively modest royalties (as well as economic premiums measured by other indicators) in a wide range of industries (with the exception of pharmaceuticals). In a market that has been studied especially closely, researchers have found that the total royalties assessed by SEP owners in the smartphone market represent a relatively low percentage of the device price, even though SEPs tend to cover technologies for which there is no immediate feasible substitute. This apparently generous licensing policy is far from idiosyncratic. As I also discuss below[92], U.S. technology history supplies multiple cases in which the owners of highly valuable patents have elected to license those patents widely and at rates that are perceived to be below short-term profit-maximizing levels.

To illustrate this "rationally altruistic" licensing policy, consider the landmark "Cohen-Boyer" patent[93], which covers the fundamental recombinant DNA techniques that launched the biotechnology industry in the 1980s. The patent owner, Stanford University, elected to offer this valuable patent for licensing on a non-exclusive basis and at a lump-sum fee plus percentage running royalty rate that was widely perceived to be "below-market" (with further reduced rates for smaller firms). During the life of the Cohen-Boyer patent, it was licensed to 468 companies, some of which (notably, Genentech and Amgen) grew from start-ups to biotech leaders, and resulted in over 2,442 new products.[94] While this licensing policy could be ascribed to the publicly-minded mission of a university, there is a sensible economic explanation for this apparent benevolence (as well as the apparent benevolence of other cases in which dominant and entirely for-profit licensors have adopted restrained licensing strategies). Given that the owner had no downstream commercialization capacities (and, as a non-profit entity, could not acquire any such capacities by law), it had little incentive to erect a barrier to entry for any particular biopharmaceutical firm. Rather, Stanford most likely expected to maximize revenues by licensing all interested firms at a "low" rate that would then elicit widespread adoption; by contrast, a "high" rate may have discouraged smaller firms from taking a license or induced those firms to use the technology without seeking a license (which would have required Stanford to incur substantial enforcement costs). In the case of the Cohen-Boyer patents, private self-interest in maximizing revenues and social interest in maximizing access largely coincided: the patent owner's revenue-maximization incentives resulted in broad dissemination of the IP-protected technology, laying the foundation for the modern biotechnology industry through a single patent-licensing framework. This is a clear real-world realization of Kitch's "IP prospect" theory.

C. Hybrid Licensing: Pools and Anti-Licenses

So far I have considered transactional structures that have two characteristics in common: (i) they are comprised exclusively of vertical relationships between upstream entities that originate or control IP assets, on the one hand, and downstream entities with specialized capacities in realizing the commercial value of those assets, on the other hand; and (ii) they are comprised of many-to-one or one-to-many transactions in which the relevant IP asset is held by a single entity. There is an important category of licensing structures that do not share these characteristics. These hybrid structures combine both horizontal flows of IP assets among upstream IP owners and vertical flows of IP assets from upstream owners to downstream intermediate users. Below I discuss two key examples: patent pool arrangements and IP giveaway strategies in IT markets. In both cases, a secure IP rights and contracting infrastructure is a predicate condition for being able to form

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[90] Kitch, *supra* note 87, at 274. Richard Posner made a similar observation. *See* Richard A. Posner, *Intellectual Property: The Law and Economics Approach*, 19 J. ECON. PERSP. 57, 68 (noting that the "monopolistic effects of patents are exaggerated . . . if close substitutes exist for a patented product, the patent may confer little power over price").

[91] *See infra* note Part III.A.

[92] *See infra* note Part II.C.2.

[93] U.S. Patent 4,237,224, "Process for producing biologically functional molecular chimeras" (issued Dec. 2, 1980).

[94] Maryann P. Feldman, Alessandra Colaianni and Connie Kang Liu, *Lessons from the Commercialization of the Cohen-Boyer Patents: The Stanford University Licensing Program*, in INTELLECTUAL PROPERTY MANAGEMENT IN HEALTH AND AGRICULTURAL INNOVATION: A HANDBOOK OF BEST PRACTICES (eds. A. Krattiger, R.T. Mahoney, L. Nelsen, et al. 2007). MIHR: Oxford, UK, and PIPRA: Davis, USA. Available at www.iphandbook.org.

these transactional structures and secure the efficiency gains arising from commercialization of the underlying technology.

1. *Patent Pools*

Academic commentary has frequently *theorized* that the intensive issuance of IP rights, coupled with the dispersion of those rights among multiple holders, creates a "patent thicket" that slows down innovation or inflates end-user prices under the burden of licensing-related and litigation-related costs.[95] Yet facts have largely failed to support these expectations. Empirical evidence from both contemporary and historical markets show remarkably little support for the view that IP thickets have arisen and persisted in commercially significant markets.[96] As first observed by Robert Merges[97], what the evidence does show is that both content and technology markets are remarkably adept at engineering licensing and other transactional solutions to potential patent or other IP rights thickets. In particular, Merges observed that the music industry had devised collective licensing arrangements in order to preempt any potential IP thicket that could arise from the fact that the public performance rights relating to musical compositions[98] were dispersed among multiple owners, which would appear to pose an insuperable obstacle to administering, licensing and enforcing these rights.[99] Based on the best available evidence, the theoretical possibility of an IP thicket was not realized in practice.

This "surprising" avoidance of market failure in the music copyright licensing market, as well as other IP-intensive markets that have devised comparable solutions to potential IP thickets[100], should be neither surprising nor exceptional. If IP rights generate a transactional roadblock to the profitable exploitation of IP rights (or are expected to do so), then firms in competitive markets—whether IP rights owners or third-party intermediaries—have a profit incentive to engineer a detour around that roadblock and capture the economic value arising from the resulting stream of new products and services.

This expectation has been confirmed repeatedly in IT markets. These markets are characterized by intensive patenting and relatively dispersed patent ownership and therefore should be a ripe candidate for the market failure anticipated by the IP thicket thesis. If the patent thicket thesis were factually cogent, then the IT markets, in which hundreds to thousands of patents can relate to a single device and are held by multiple firms, would exhibit exorbitant prices, slow growth, and meager entry (since firms would not be eager to enter, or invest R&D resources in, a market that exhibited these characteristics). Yet what we actually observe is just the opposite. Data covering the period since the late 1990s show that the U.S. computing and electronics markets (including PCs, laptops, tablets and mobile phones) have exhibited high growth rates, declining prices (adjusted for quality), and a constant stream of new products.[101] A comparison of the price ($328) and functionalities of a smartphone in 2017 with the price ($1565, equivalent to approximately $4147 in 2019 dollars) and far more limited functionalities of an IBM PC in 1981 illustrates dramatically these historical tendencies in electronics markets, which have continuously delivered to consumers increasing product quality at a decreasing cost.[102]

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95 For the leading source, see Michael A. Heller and Rebecca S. Eisenberg, *Can Patents Deter Innovation? The Anticommons in Biomedical Research*, 280 SCIENCE 698 (1998).

96 For a review of the evidence generally, Jonathan M. Barnett, *The Anti-Commons Revisited*, 29 HARV. J. L. & TECH. 127 (2015) [hereinafter Barnett, *Anti-Commons*]. For a review of the evidence on patent thickets in the biomedical sector in particular, see Charles McManis and Brian Yagi, *The Bayh-Dole Act and the Anticommons Hypothesis: Round Three*, 21 GEO. MASON L. REV. 1049 (2014).

97 Robert P. Merges, *Contracting into Liability Rules: Intellectual Property Rights and Collective Rights Organizations*, 84 CALIF. L. REV. 1293 (1996).

98 Under U.S. copyright law, the copyright covering a musical composition includes a "bundle" of rights, among which is the right to public performance of the composition. Historically, this primarily relates to radio play.

99 Merges, *supra* note 97, at 1295-98, 1328-40.

100 Barnett, *Anti-Commons*, *supra* note 96, at 141-82 (2015) [hereinafter Barnett, *Anti-Commons*] (covering the IT, automotive and aircraft industries); Jonathan M. Barnett, *From Patent Thickets to Patent Networks: The Legal Infrastructure of the Digital Economy*, 55 JURIMETRICS 1 (2014) [hereinafter Barnett, *From Patent Thickets*] (covering pooling structures in the IT industry).

101 Barnett, *Anti-Commons*, *supra* note 96, at 143.

102 On the 2017 average price of a smartphone, see Troy Wolverton, *The average price consumers are paying for smartphones is going back up*, Business Insider, Jan. 25, 2018; on the 1981 listed price for an IBM PC, see "The birth of the IBM PC," IBM, available at https://www.ibm.com/ibm/history/exhibits/pc25/pc25_birth.html

A particular type of licensing structure can explain in part why IT markets have avoided the high prices, low output and slow growth anticipated by the IP thicket thesis. Starting in the late 1990s, certain IT markets that are governed by common technology standards have made use of patent pooling structures, which preempt potential litigation among patent owners and enable all firms in the industry to efficiently access the technologies required to produce devices in conformity with the governing standard.[103] In some cases, these structures have taken the form of consortia assembled by leading IP owners; in other cases (and more often), these structures have been engineered by for-profit entities that specialize in the assembly and administration of patent pools. These externally administered pools typically consist of three elements: (i) a relatively small group of IP licensors, who contribute patents to a pool relating to a technology standard; (ii) a relatively large group of IP licensees (which may also include IP licensors) who pay royalties for access to the pool; and (iii) the third-party administrator entity that assembles and administers the pool (in exchange for a transaction fee collected from royalty payments, which are then allocated among the IP licensors). While the patent thicket thesis anticipates that licensing activity in IP-intensive markets will impede access, inflate prices and deter innovation, real-world IT markets show that parties use licensing arrangements to avoid thickets and accrue the efficiency gains that arise from replacing multiple licensing transactions with a single transaction through the pooling mechanism.

Of course, any patent pooling mechanism inherently raises the risk of collusion, whether directly at the level of the royalty rate or indirectly at the level of the device sold in the end-user market. For this reason, patent pools were prohibited as a *de facto* matter from the late 1930s through the 1990s.[104] Given the observed performance of patent pools in current IT markets, this wholesale prohibition (as distinguished from a nuanced approach that subjects such arrangements to special scrutiny) almost certainly resulted in false positive errors by suppressing efficient licensing arrangements and inducing firms to develop stand-alone technology packages, which in turn tends to reduce informational dissemination, raise entry costs and promote industry concentration. Current patent pools reflect a more nuanced approach that balances the procompetitive interest in facilitating solutions to potential IP roadblocks against the collusion risk that is inherent to the horizontal exchange of IP assets among licensors. In particular, the modern revival of patent pools was accompanied by the issuance by the DOJ of a sequence of "business review letters"[105], which established a standard template for organizing patent pools at a low level of antitrust risk. That template generally consists of the following key elements: (i) the pool is open to all interested licensees on "reasonable and nondiscriminatory terms"; (ii) the pool is restricted to complementary patents that are deemed "essential" for the relevant standard, (iii) licensors are free to license independently of the pool; and (iv) the pool does not specify prices in the relevant product market.[106] Additionally, at least some pools require that licensors pay the same royalty rate as licensees, which tends to limit a licensor's incentive to lobby the pool to adopt high royalty rates (since it will bear a portion of any rate increase to the extent it is a licensee).[107] Assuming that these elements sufficiently mitigate collusion risk, pooling structures are almost certainly a net-welfare-positive mechanism that has mitigated potential patent thickets, fostered dissemination of IP assets among a broad population of intermediate users, and lowered entry costs by enabling firms to enter IT markets without having to develop independently a complete package of technology assets.

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103 Barnett, *From Patent Thickets, supra* note 100, at 14-16.

104 *See id.*, at 3.

105 Letter from Charles A. James, Assistant Attorney General, Antitrust Division, U.S. Dept. of Justice, to Ky P. Ewing (Nov. 12, 2002) (concerning proposed structure for 3G Patent Platform Partnership); Letter from Joel I. Klein, Acting Assistant Attorney General, Antitrust Division, U.S. Dept. of Justice, to Gerard R. Beeney, Sullivan & Cromwell LLP (June 26, 1997) (concerning proposed structure for MPEG-2 patent pool); Letter from Joel I. Klein, Acting Assistant Attorney General, Antitrust Division, U.S. Dept. of Justice, to Carey R. Ramos, Esq. (June 10, 1999) (concerning proposed structure for DVD patent pool).

106 Barnett, *From Patent Thickets, supra* note 100, at 19. For fuller discussion of these principles, see U.S. DEP'T OF JUSTICE & FED. TRADE CMM'N, ANTITRUST ENFORCEMENT AND INTELLECTUAL PROPERTY RIGHTS: PROMOTING INNOVATION AND COMPETITION (2007).

107 Barnett, *From Patent Thickets, supra* note 100, at 36.

2. *Anti-Licenses: The Surprising Frequency of IP Giveaways*

The license-as-tax approach assumes that IP holders can and will impose maximal royalties on intermediate users, which in turn translates into high prices for consumers. Even assuming an IP holder exercises market power (an atypical case outside the pharmaceutical markets, as I discuss further below[108]), this view ignores the reasonable possibility that (i) IP holders are engaged in a long-term payoff maximization game, and (ii) in the context of that game, may expect to maximize long-term revenues by fully or partially giving away their patented technology assets. Historically, the holders of valuable IP assets have often adopted this apparently curious strategy. Notable examples include such "crown jewel" IP assets as the transistor (released by AT&T), the Ethernet (released by Xerox, Intel and DEC), the USB interface (released by Intel), the Java programming language (released by Sun Microsystems) and Bluetooth technologies (released by multiple firms).[109] All these IP assets were released at a zero royalty subject to limited contractual conditions (with the partial exception of the transistor, which was licensed at what was widely perceived to be a modest one-time royalty fee).[110] These apparently altruistic giveaway licensing strategies (which often rely on the underlying IP right to enforce the license's non-price terms) have a cogent economic rationale. Under certain conditions, firms can expect to maximize long-term revenues by licensing a valuable technology broadly and at a low or zero rate. Those circumstances tend to arise in markets that inherently converge upon a single standard, in which case IP asset owners have a strong incentive to avoid being the "losing" standard by adopting a generous licensing policy in order to seed adoption with the expectation of subsequently deriving revenues from the sales of complementary goods and services. Those incentives are strengthened further in the case of repeat-play licensors, who may seek to maximize long-term licensing revenues over the course of multiple technology releases (3G, 4G and so on in the context of the smartphone market) by maintaining a reputation for "fair" pricing with respect to any given iteration of the relevant technology. Contrary to the license-as-tax view, there is no necessary basis to assume that licensing will always be used as a tool by which to limit access and increase prices for intermediate and end-users, even in the case in which an IP owner holds an especially valuable technology and would otherwise appear to be immune from price discipline.

IV. REVISITING THE "LICENSE AS TAX" ANALOGY

It may be argued that this account of IP licensing markets is overly optimistic, or at least substantially incomplete, insofar as it makes an obvious omission. In particular, it overlooks the fact that, outside the cases of zero-royalty or nominal-royalty licensing (as noted, far from an atypical case), IP licenses require that intermediate users pay a fee to the holders of those rights (or suffer the costs associated with an infringement suit), thereby inflating the costs incurred by producers and other downstream entities to secure the required set of technology inputs and ultimately inflating the prices borne by end-users in the relevant product market. This is the core contention of the license-as-tax approach and almost certainly the core motivating principle behind both the long-standing tradition of IP skepticism in patent and antitrust law and scholarship[111] and recent regulatory interventions in the smartphone market.

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[108] *See infra* Part IV.A.

[109] Jonathan M. Barnett, *The Host's Dilemma: Strategic Forfeiture in Platform Markets for Informational Goods*, 124 HARV. L. REV. 861, 1870-71, Tbl. I (2011). For related discussion of "zero-royalty" licensing strategies, see Eli Greenbaum, *Puzzles of the Zero-Rate Royalty*, 27 FORDHAM INTELL. PROP., MEDIA AND ENTERTAINMENT L. J. 1 (2016).

[110] Although AT&T's transistor technology was subject to a compulsory licensing order in a 1956 consent decree, the firm had distributed the technology to all interested parties at "below-market" royalty rates prior to that time, together with complementary know-how. *See* Richard C. Levin, *The Semiconductor Industry*, in GOVERNMENT AND TECHNICAL PROGRESS: A CROSS-INDUSTRY ANALYSIS 75 (Richard R. Nelson ed., 1982).

[111] For an especially strong version of this view, see Feldman and Lemley, *supra* note 2 (describing survey of a limited sample of in-house counsel, finding that external patent licensing and litigation demands typically do not lead to a settlement or license, but rather, are most commonly ignored or declined, and observing that the results suggest that "ex post" patent licenses generally do not promote technology transfer). Setting aside the methodological imitations inherent to a small response sample and the absence of statistically significant results (which the authors acknowledge, see *id.*, at 139, 148-49), I note that the scenario addressed in this study—an adversarial demand by an unknown third-party patentee, supported by the threat of litigation (or, in some cases, following the filing of a lawsuit)—has little in common with more typical IP licensing transactions, which are likely to consist of a friendly arm's-length negotiation among potential business partners who hold complementary IP and non-IP assets and are often negotiating a larger

It is important to observe that the royalties owed to IP licensors (and passed on to end-users) only represent *net* social losses to the extent that they are not offset by the social gains that arise from enabling firms and other inventors to monetize R&D investments through license-based relationships. At least some commentators feel that this is unlikely to be the case. Judge Frank Easterbrook argued: "An antitrust policy that reduced prices by 5 percent today at the expense of reducing by 1 percent the annual rate at which innovation lowers the cost of production would be a calamity."[112] Even granting this reasonable proposition, however, it could nonetheless still be objected that firms often have means other than IP rights by which to capture returns on innovation investments.[113] This raises the possibility that the social gains attributable to innovative effort could be secured at a lower social cost through those alternative mechanisms, resulting in a higher net welfare gain—or more precisely, resulting in a state of affairs in which we enjoy the dynamic efficiency gains attributable to innovative effort but suffer reduced static efficiency losses inherent to positive pricing of a nonrivalrous informational asset. After all, in the multi-decade postwar period during which antitrust law heavily constrained the range of enforceable IP licensing terms[114] (and courts generally did not enforce patents vigorously[115]), innovation seems to have persisted: among other examples, AT&T invented the transistor in 1947, IBM launched the System 360 modular computing system in 1965, and Intel invented the microprocessor in 1972.[116] These observations might suggest that at least a portion of the royalties extracted through IP licensing represent deadweight losses that are not necessary to support innovation, but rather do constitute at least in part a "tax"—precisely stated, a payment that is not socially justified from an efficiency perspective—earned by the innovator at the expense of intermediate and end-users.

Even this more refined version of the license-as-tax line of argument exhibits two key points of weakness.

A. IP Rights Do Not Usually Confer Pricing Power

The license-as-tax approach is ultimately a special application of the "IP = monopoly" equation that characterizes the standard economic analysis of IP rights. Following this framework, the IP owner is typically treated as a monopolist that exercises unrestrained pricing power given that prospective licensees lack by assumption any reasonable technological alternatives (and, implicitly, lack other comparable or superior investment opportunities in any other market). Despite the widespread use of this assumption (and associated rhetoric in policy commentary and some case law), the empirical evidence suggests that IP rights do not typically confer pricing power. Several well-established bodies of evidence support the somewhat surprising observation that the "IP = monopoly" equation is not commonly satisfied in practice.

1. *Survey and Patent Premium Data*

Survey studies conducted in the 1980s and 1990s found that large U.S. firms (outside the pharmaceutical and chemicals industries) tended to place patents toward the bottom of the "pecking order" of mechanisms by which to extract returns from innovation.[117] Hence, if these firms enjoy monopoly rents, this apparently is

investment, joint venture, cross-license or other long-term relationship. Additionally, a licensing demand from a non-practicing entity (which describes some of the observations in the study's sample) has significantly reduced "threat value" due to the near-impossibility of securing injunctive relief, in which case failure to enter into a license may simply represent the bargaining leverage enjoyed by a well-resourced infringing party in a legal environment in which the patentee's remedies are typically restricted to monetary damages (discounted by the probability of actually securing those damages) less legal fees.

[112] Frank H. Easterbrook, *Ignorance and Antitrust*, in ANTITRUST, INNOVATION AND COMPETITIVENESS 122-23 (Thomas M. Jorde and David J. Teece eds. 1992).

[113] On these other mechanisms, see Jonathan M. Barnett, *Private Protection of Patentable Goods*, 25 CARDOZO L. REV. 1251 (2004).

[114] For discussion, see *supra* note 16 and accompanying text.

[115] Barnett, *Great Patent Grab*, *supra* note 17.

[116] This observation is partly made for rhetorical purposes. As I discuss elsewhere, the postwar innovation record is mixed insofar as private R&D activities relied heavily on federal government funding and tended to take place in large firms who were the principal recipients of that funding. *See* Barnett, *Great Patent Grab*, *supra* note 17.

[117] For the leading studies, see Wesley M. Cohen, Richard R. Nelson and John P. Walsh, *Protecting their intellectual assets: appropriability conditions and why U.S. manufacturing firms patent or not*, NATIONAL BUREAU OF ECON. RES., WORKING PAPER NO.

mostly attributable to assets and capacities other than IP rights. This implication is consistent with studies of patent renewal data showing that only a small minority of patents are renewed through the full term of the patent, suggesting that most patents are commercially valueless or lose commercial value rapidly (especially given the relatively low fees that must typically be paid to maintain a patent in force).[118] Similarly, a widely cited study that estimates the "patent premium" (defined as the increase in the value of an innovation attributable to patenting it) finds that the premium is only positive on average in a few industries, although there is significant variance in the size of the premium across individual patents and across industries (with the highest premia observed in the biotechnology, medical device and pharmaceutical markets).[119] I note that the more limited body of survey studies of smaller firms do find that those firms in certain industries (in particular, biotechnology, medical devices and certain IT hardware markets) tend to ascribe greater value to patent protection[120] (a welcome finding from a policy perspective since it suggests that patents are more highly valued by smaller firms that may rely on patents to challenge an incumbent with more developed production, distribution and other non-IP-dependent capacities). To be clear, these considerations are not intended to suggest that patents typically lack any positive marginal value in general or even for larger firms in particular (which would be inconsistent with those firms' investments in securing patent protection); rather, I am making the more modest observation that any blanket assumption that patents universally confer pricing power is not consistent with available empirical evidence.

2. *Licensing and Royalty Rate Data*

Licensing data in sufficient volume and reliability for purposes of empirical inquiry are notoriously difficult to obtain given that most licensing arrangements are not publicly disclosed. However, there is a small literature (mostly authored by licensing practitioners) that, subject to certain methodological limitations (discussed further below), provide some potential insight into industry rate-setting practices. In general, that literature reports average royalties that seem to be relatively modest percentages of the relevant sales base (subject to the qualification that we typically lack any competitive benchmark by which to measure whether a particular royalty rate is "modest" or "exorbitant" from an efficiency perspective). A study of almost 3000 licensing agreements filed as "material contracts" in SEC filings during 1994-2009 found median royalty rates of 10% in software and 5% in hardware, medical and pharmaceutical markets.[121] Another study that relied on a proprietary database of licensing agreements found an estimated range of average royalty rates during 2007 of 4% to 6% for consumer goods, computing hardware, chemicals, telecom and semiconductor industries and 8% for the pharmaceutical industry.[122] In the electronics market, multiple studies that relied on either proprietary databases or survey evidence found, over periods ranging from the late 1980s through the 2000s, that patent royalties occupy a range of 3.2% to 6.8%.[123] Survey studies of technology transfer

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7552 (2000), Richard C. Levin, Alvin K. Klevorick, Richard R. Nelson and Sidney G. Winter, *Appropriating the returns from industrial R&D*, BROOKINGS PAPERS ON ECONOMIC ACTIVITY, Vol. 3 (1987).

[118] Mark Schankerman and Ariel Pakes, *Estimates of the Value of Patent Rights in European Countries During the Post-1950 Period*, NAT'L BUREAU OF ECON. RES. WORKING PAPER NO. 1650 (June 1985) (patent renewal data from United Kingdom, France and Germany); Mark Schankerman, *How Valuable is Patent Protection? Estimates by Technology Field*, 29 RAND J. ECON. 77 (1998) (patent renewal data from France); Ariel Pakes and Margaret Simpson, *Patent Renewal Data*, BROOKINGS PAPERS: MICROECONOMICS 331-401 (1989) (patent renewal data from Finland and Norway).

[119] Ashish Arora, Marco Ceccagnoli and Wesley M. Cohen, *R&D and the Patent Premium*, NATIONAL BUREAU OF ECONOMIC RESEARCH (Working Paper 9431, Jan. 2003).

[120] Stuart J.H. Graham, Robert P. Merges, Pamela Samuelson and Ted M. Sichelman, *High Technology Entrepreneurs and the Patent System: Results of the 2008 Berkeley Patent Survey*, 24 BERKELEY TECH. L. J. 255 (2009).

[121] Thomas R. Varner, *Technology Royalty Rates in SEC Filings*, LES NOUVELLES (Sept. 2010).

[122] Stephen L. Becker and Jiaqing Lu, *Royalty Rate and Industry Structure: Some Cross-Industry Evidence;* (Working Paper 2009) (using RoyaltySource data).

[123] Robert Goldscheider et al., *Use of the Twenty-Five Percent Rule in Valuing Intellectual Property*, in ROYALTY RATES FOR LICENSING INTELLECTUAL PROPERTY 31, 47 Ex. 3.3 (Russell L. Parr ed., 2007) (based on Royalty Source data, reporting royalties for the late 1980s– 2000s: electronics (4%), telecom (4.7%); semiconductors (3.2%); computers (4%) and software (6.8%)); *Industry Royalty Rate Data Summary*, LICENSING ECON. REV. (Dec. 2007), at 6, 6 tbl.1 (Dec. 2007) (reporting average royalty rates as of 2007 as follows: telecom (5.5%), semiconductors (5.1%), computers (5.3%)); *Royalty Rate Data Summary*, LICENSING ECON. REV. (Dec. 2006), at 2, 7 fig.1 (for 2004-06, reporting royalty rates of 4% for electronics and semiconductors and 5% for semiconductors); Bob Held & Joel Parker, *Royalty Rate and Deal Terms Survey: Licensing Executives Society* (Oct. 2011), http://www.lesusacanada.org/docs/surveys/ 2011_hts_royaltyratesurveyexecutivesummary.pdf?sfvrsn=2 (reporting average royalty rate

transactions in the life sciences (mostly involving academic and other nonprofit licensors) during 2008-09 and 2018 found median royalty rates of 4% to 6% for earlier-stage technologies and 7% to 13% for later-stage technologies that were close to market launch.[124] All of these studies' results must be qualified given that royalty rates interact with other contractual terms (for example, lump-sum payments and know-how, field-of-use, territorial and exclusivity clauses) and survey-based studies can suffer from small sample sizes, low response rates and, as a result, imperfect representativeness. Nonetheless it is noteworthy that average or median royalty rates across a significant body of studies and covering a variety of industries seem to occupy a relatively limited and modest range, with the exception of certain biopharmaceutical innovations.

3. *The Error Costs of "IP = Monopoly"*

While further empirical inquiry is certainly warranted, it is clear that, at a minimum, the "IP = monopoly" equation is often not satisfied in real-world markets or, stated more conservatively, cannot be assumed to be satisfied in any particular case without further inquiry. This well-founded observation has been appropriately embedded in much of patent and antitrust law relating to IP licensing: the Patent Misuse Reform Act of 1988 required a showing of market power in the tying product market[125], the 1995 IP Guidelines rejected any presumption that a patentee enjoys market power, and the Supreme Court in 2006 rejected any such presumption for purposes of antitrust law.[126] Each of these legal pronouncements require that market power be shown, rather than assumed, which is a precautionary principle that is well-grounded in our current state of knowledge concerning actual IP licensing and rate-setting practices. To be clear, this is not to say that patent owners rarely exert market power that could raise antitrust concern, especially given the high observed variance in the values of individual patents and in royalty rates across individual patents[127] and, as some evidence suggests, even different transaction types within a single industry.[128] However, since it appears that a largely unrestrained IP monopolist is not the typical case, with the possible exception of the biopharmaceutical market (and even in that market, some portion of a patentee's "market power" may not properly reflect monopoly rents[129]), any attribution of market power to a patent owner must be grounded in firm evidence, as is currently required under federal antitrust law and reflected in antitrust agency guidelines.

The dangers of not abiding by this principle can be illustrated by recent policy actions by competition regulators in the SEP licensing markets, which, as noted previously, had in turn relied on largely theoretical arguments made by a handful of academic and other commentators concerning the antitrust risks potentially posed by SEP licensing practices.[130] To illustrate these potential risks, some of these publications had referred to anecdotal reports that owners of SEP portfolios in the smartphone markets were burdening

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for IT equipment and device and consumer products of 5.5%, based on responses from 52 companies, with total of 228 deals completed in 2008–2011).

124 LICENSING EXECUTIVES SOCIETY, USA CANADA, GLOBAL "LIFE SCIENCES" ROYALTY RATES & DEAL TERM SURVEY 47-48 (2018) [hereinafter LES 2018]; LICENSING EXECUTIVES SOCIETY, USA CANADA, GLOBAL BIOPHARMACEUTICAL ROYALTY RATES & DEAL TERM SURVEY 36 (2009) [hereinafter LES 2009]. Among transactions that involved variable rates that adjust as a function of product sales, the 2018 survey found that early-stage technologies exhibited median rates of 6%, increasing to 8% while later-stage technologies exhibited median rates of 11%, increasing to 16%. LES 2018, *supra* note 124, at 73.

125 35 U.S.C. § 271(d)(5).

126 *Illinois Tool Works Inc. v. Independent Ink, Inc.*, 547 U.S. 28 (2006).

127 On the latter point, see LES 2018, *supra* note 124, at 83; LES 2009, *supra* note 124, at 66; Roy J. Epstein & Paul Malherbe, *Reasonable Royalty Patent Infringement Damages After* Uniloc, 39 AIPLA Q.J. 3, 8–10 (2011).

128 *See* Varner, *supra* note 121, at 122 (noting difference of seven percentage points in median royalty rates, depending on whether the license only involved the patent or comprised know-how or other services).

129 The parenthetical qualification deserves further clarification. The comparatively higher royalty rates paid for licenses to pharmaceutical patents may not be entirely indicative of market power but rather, reflect in part the fact that a pharmaceutical innovation is typically the result of exceptionally large R&D investments undertaken under an exceptionally low probability of success. A higher royalty rate therefore may appropriately compensate the successful innovator-entrepreneur for bearing these high costs and risks. Put differently: some portion of the royalty earned by a valuable pharmaceutical patent in the marketplace reflects "Ricardian" rents that reflect the scarcity of a particular resource (in this case, innovative acumen and the willingness to bear entrepreneurial risk), rather than a deliberate restriction of output. On the distinction between these two concepts of economic rent, and application to the entrepreneurial process, see Tay-Cheng Ma, *Accounting Profits and Ricardian Rents: An Application to Antitrust Enforcement*, 25 RES. IN L. & ECON. 15, 16-17 (2012).

130 For some of the most influential papers, see *supra* note 52. For extensive discussion of the interaction between the academic literature, regulatory actions and judicial outcomes, see Barnett, *Has the Academy*, *supra* note 52, at 1324-1338.

device manufacturers with double-digit royalty rates.[131] However, these assertions either overlooked or did not substantially take into account other contemporaneous evidence that licensees with significant patent portfolios could secure "offsets" through negotiations that would substantially reduce or even eliminate the net royalty owing to the licensor.[132] This oversight mattered. Multiple empirical studies subsequently found, subject to certain methodological qualifications, that patent licensors collectively impose an estimated aggregate royalty burden in a range of 3 to 5% of global handset revenues.[133] While we cannot definitively say whether that rate is "too high" or "too low" relative to an unknown socially efficient benchmark, it is a far cry from the double-digit rates that had been initially reported and that may have motivated in part intervention into a market that does not appear to suffer from the constrained output, rising prices or delayed innovation that are the typical warning signs for competition regulators.

The series of analytical missteps in the mainstream academic and regulatory understanding of SEP markets highlights the importance of carefully taking into account market-specific and firm-specific factors that may effectively discipline the pricing (and non-pricing) behavior of even the holders of especially valuable IP-protected technology assets. As described previously, this is hardly an "outlier" scenario: technology history provides multiple examples where firms that hold valuable technology assets have elected to make those technologies available at a zero or "below-market" rate, apparently in order to seed adoption and maximize profits over a technology's long-term life cycle.[134] This rationale may apply to at least some SEP owners in the wireless communications market. A firm that holds patented technologies that are critical to the current technology standard (e.g., "4G/CDMA" in the wireless communications market) has both short-term and long-term incentives to select a relatively "low" royalty rate and other terms that are favorable to the firms that must invest resources to adopt its standard. In the short term, a firm that has made substantial expenditures on developing a new technology has significant pressure from investors to extract returns expeditiously from that R&D investment by successfully inducing producers to adopt the technology over competing alternatives. That pressure is especially intensive in the "standards races" that are recurrent features in technology history, in which network effects tend to result in "winner-take-all" outcomes in which only a single technology standard prevails and runner-ups must exit the market. A low or zero rate accelerates adoption by downstream producers, which in turn generates a broad royalty base for the licensor and lower retail prices for end-users. It might, however, be assumed that the winning licensor would then increase the royalty rate to exploit "locked in" licensees who had made investments in adopting the now-dominant technology, which would then face few if any competing alternatives. But this objection ignores the fact that a dominant licensor is typically a repeat-player who seeks to maximize profits over multiple generations of a technology life cycle, each of which is often being developed, standardized and "rolled out" while the existing iteration of the relevant technology is still being adopted, implemented and refined. In the long-term, a licensor that accumulates goodwill with the licensee population by both initiating and maintaining a "reasonable" rate is likely to enjoy gains in the future through broad adoption of its technology over competing alternatives in the next iteration of the relevant standard (e.g., 4G leads to 5G and so on). Far

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131 Lemley and Shapiro, *supra* note 54, at 2026-27 (citing reports of total royalties on a smartphone device equal to 22.5% for CDMA technology and 15-20% for GSM technology); Lemley, *supra* note 54, at 152 (citing report that essential patents submitted to a standard-setting organization for 3G wireless standard would generate a cumulative royalty rate of 130%); and Ann Armstrong, Joseph Miller and Tim Syrett, *The Smartphone Royalty Stack: Surveying Royalty Demands for the Complements Within Modern Smartphones* (May 2014), at 2, available at https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2443848 (based on royalty rates announced by SEP owners in the smartphone market, estimating a total royalty in excess of $120 on a $400 device, equivalent to a 30% aggregate royalty rate).

132 For discussion, see Barnett, *Has the Academy*, *supra* note 52, at 1349-51.

133 Alexander Galetovic, Stephen H. Haber and Lew Zaretski, *An Estimate of the Average Cumulative Royalty Yield in the World Mobile Phone Industry: Theory, Measurement and Results*, 42 TELECOM. POL'Y 263 (2018) (average estimated cumulative royalty equal to 3.4% at device level); Alexander Galetovic, Stephen Haber and Lew Zaretski, *Is There an Anticommons Tragedy in the World Smartphone Industry?*, 32 BERKELEY TECH. L. J. 152, 1532-33 (2017) (total royalty burden represents 3.4% of average selling price of device at retail level); J. Gregory Sidak, *What Aggregate Royalty Do Manufacturers of Mobile Phones Pay to License Standard-Essential Patents*, 1 CRITERION J. ON INNOVATION 701 (2016) (total SEP royalty represents 4-5% of global handset revenues in the 3G and 4G markets); Keith Mallinson, *Cumulative Mobile-SEP Royalty Payments No More Than Around 5% of Mobile Handset Revenues*, WISEHARBOR (2015), available at https://www.wiseharbor.com/pdfs/Mallinson%20on%20cumulative%20mobile%20SEP%20royalties%20for%20IP%20Finance%202015Aug19.pdf (total royalties paid by smartphone producers equal to approximately 5% of mobile handset revenues in the 2G, 3G and 4G markets).

134 *See supra* note 109 and accompanying text.

from suffering from a "license tax", IT markets may enjoy a virtuous cycle that rewards licensors that restrain royalty rates in order to induce and re-induce adoption of each new technology standard.

B. The Nirvana Counterfactual

The argument that current rates of innovation could be maintained or improved at a lower social cost under a weaker IP regime (but with recourse to non-IP-dependent mechanisms for generating supracompetitive premia that reward firms that undertake the costs and risks associated with R&D) assumes that, in the absence of secure IP rights and licenses, the market environment would otherwise remain the same. This type of argument exhibits symptoms of what Harold Demsetz famously called the "nirvana fallacy": an observed state of affairs is deemed inefficient relative to an alternative state of affairs that is practically infeasible (and therefore policy-irrelvant) for technological or other reasons.[135] Specifically, this argument implicitly assumes that, under a legal regime in which IP rights and licenses do not enjoy robust protection, there would be roughly the same quality-adjusted volume of innovative output but at a significantly lower price since producers would bear a lower or even zero royalty burden. The difficulty with this assumption is that, once the legal environment changes so that firms can no longer rely on IP rights and licensing relationships to monetize R&D investments, *everything else* will change in the relevant market. In particular, firms that cannot rely on a secure legal infrastructure for IP licensing will then be compelled to capture returns on R&D through non-licensing-based business strategies. Even if those strategies are practically viable (in which case, R&D investment may not decline), this may give rise to *other* inefficiencies that result in a net negative welfare outcome in the aggregate. More specifically, in a weak-IP environment in which licensing relationships are legally insecure (and therefore expropriation risk is high), it would be expected that firms would either reduce R&D investment or migrate away from licensing-based models for monetizing R&D in favor of vertically integrated models in which a firm can earn returns on R&D by integrating forward into the target product market.[136] Assuming there is no technological or contractual mechanism by which to sufficiently mitigate expropriation risk when knowledge assets are exchanged among sophisticated parties, a biotech start-up could not securely negotiate the terms of developing a new therapy with a "Big Pharma" firm in a hub-and-spoke structure and the inventor of a new research tool could not license it on a positive-royalty basis among a broad population of intermediate users in an "IP prospect" structure. This does not imply that innovation would come to a standstill. Rather, innovators would be forced to take up employment with a "Big Pharma" firm that would provide an internal market for disclosing, financing and commercializing technological innovations. Rather than expanding access, an environment in which licensing transactions are legally insecure may simply advantage larger and more integrated firms that have the capacity to execute and fund the innovation and commercialization process internally.

The logic of this argument was anticipated by *Continental T.V., Inc. v. GTE Sylvania*[137], the landmark Supreme Court decision that is often regarded as having endorsed the economic approach to antitrust law and embedded it within federal antitrust case law.[138] In *U.S. v. Arnold, Schwinn & Co.*[139], decided in 1967, the Supreme Court had addressed an antitrust challenge to a distribution system in which Schwinn, then a leading bicycle manufacturer, assigned exclusive territories to retailers that sold its products. The Court held that whether or not these limitations on retail competition would be deemed *per se* violations of the antitrust laws depended on whether Schwinn sold and transferred title to the products to the retailer. The plaintiff-friendly *per se* rule would only apply in vertical relationships in which the retailer purchased and took title to the products from Schwinn (that is, a "sale" transaction); otherwise, the defendant-friendly rule-of-reason standard would apply and courts would require evidence of competitive harm before deeming

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135 Harold Demsetz, *Information and Efficiency: Another Viewpoint*, 12 J. L. & ECON. 1 (1969).

136 This is a specific application of the more general argument that the efficiency effects of changes in IP protection can only be assessed by anticipating the extent to which firms will shift to non-IP-dependent mechanisms for capturing returns on R&D, which in turn give rise to a different mix of static and dynamic efficiency effects relative to existing levels of IP protection. For further discussion, see Jonathan M. Barnett, *Three Quasi-Fallacies in the Conventional Understanding of Intellectual Property*, 12 J. L. ECON. & POL'Y 1, 6-20 (2016).

137 433 U.S. 36 (1977).

138 For related discussion of this point, see Barnett, *Why is Everyone*, *supra* note 10, at 142-44.

139 388 U.S. 365 (1967).

a territorial limitation to be anticompetitive. In its *Sylvania* decision, decided only ten years later, the Court reversed its ruling in *Schwinn*, recognizing that the distinction between sale (*per se* treatment) and nonsale transactions (rule of reason treatment) reflected a wooden doctrinalism that lacked economic substance. The Court's about-face embodied a functionalist approach that recognized that firms like Schwinn could effectively detour around the quasi-prohibition on territorial restrictions in sale transactions by dismantling the franchise structure and vertically integrating forward, which would then disadvantage small businesses that could otherwise have operated as independent franchisees.[140] This would not only render moot the arbitrary distinction between "sales" and "nonsales" but, in doing so, would perversely advantage larger, integrated firms while impeding entry by potential franchisees, who are likely to be smaller firms that face barriers to entry in the form of high capital and expertise requirements. Adhering to doctrinal distinctions between transactions that were nominally characterized as "sales" or "nonsales" was liable to distort organizational structures in a manner that runs counter to the underlying purposes of antitrust law.

The *Impression Products* opinion by the Court in 2017 is a return, under the rubric of patent law's exhaustion doctrine, to the discredited "logic" of the *Schwinn* decision. Specifically, the *Impression Products* opinion rehabilitates approximately the same formalist distinction between "sales" and "nonsales"—now replaced by the distinction between "sales" (exhaustion) and "licenses" (no exhaustion)—that the Court had rejected in *Sylvania* four decades earlier. The *Sylvania* court had it right. Preserving arbitrary distinctions between transactions that are formally structured as a "sale" or "license" as the basis for determining the legality of a use restriction makes little economic sense and, at least within the efficiency framework of modern antitrust law, little policy sense. Even more generally, *Sylvania*'s condemnation of what the Court then called "barren formalism"[141] applies to current arguments made by commentators and policymakers who seek to constrain IP licensing in order to "protect" consumers and follow-on innovators from the "excessive" power of the patent licensor but make little factual inquiry into whether or not the targeted practices plausibly cause (or, in markets that have been in operation for a considerable period of time, actually have caused) any net competitive harm. Even if concerns about patentee overreaching are plausible under certain stylized theoretical models that simply assume market power and a one-period payoff-maximization structure, there is little firm evidence to support the proposition that patent owners typically do have appreciable market power or, at least in long-term revenue-maximization models, even have rational incentives to deploy any such market power to impose "exorbitant" licensing fees or other adverse terms on intermediate and end users.

These considerations suggest that the license-as-tax analogy describes, at best, an exceptional case and, as such, provides a poor guiding principle for the legal treatment of IP licensing practices in general. As demonstrated by the core transactional structures discussed earlier[142], IP licensing commonly enables a broad range of interfirm relationships that enable IP asset owners to extract returns from those assets without having to incur the costs of independently implementing the commercialization steps required to reach market. This vertically disintegrated structure enables entry at both upstream segments of the supply chain, by relieving R&D-specialists from having to acquire capital-intensive production and distribution capacities, and downstream segments of the supply chain, by relieving production and distribution specialists from having to acquire knowledge-intensive R&D capacities. As judicial and agency actions incrementally revert to New Deal and postwar skepticism toward IP licensing and, as a practical matter, erode the legal infrastructure that supports licensing transactions, the rich panoply of IP-dependent transactional mechanisms is liable to shrink as firms retreat from market-based contracting in favor of internal commercialization structures. Empirically unfounded interventions in IP licensing markets are likely to yield a legal regime that is hospitable for larger, integrated firms (which, not incidentally, have always lobbied for regulatory intervention in the wireless communication markets[143]) but unwelcoming for smaller or less integrated innovation-specialist firms that rely on licensing revenue in order to fund and monetize their R&D efforts. Regulatory and judicial

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140 *Continental T.V., Inc. v. GTE Sylvania*, 433 U.S. 36, 57 n.26 (1977).

141 *See id.*, at 48 n.13 (citing Donald I. Baker, *Vertical Restraints in Times of Change: From White to Schwinn to Where?*, 44 ANTITRUST L. J. 537, 538 (1975)).

142 *See infra* Part III.

143 On the advocacy efforts of device producers and other implementer-firms calling for antitrust intervention in the SEP markets, see Barnett, *Has the Academy*, *supra* note 52, at 1373-1377.

interventions in IP licensing markets that do not suffer from any soundly evidenced form of market failure are not only unnecessary but may give rise to outcomes that run precisely counter to competition law objectives.

V. CONCLUSION

While IP infringement litigation—"patent wars" and "copyright wars"—often takes the headlines in press coverage of technology and content markets, humdrum IP licensing relationships constitute the transactional plumbing without which those markets would function far less efficiently and, what is often overlooked, would likely operate under more concentrated conditions. The communications and computing devices that are now a ubiquitous part of everyday life rely on a dense network of licensing relationships among a myriad of entities that together assemble the complementary package of innovation and non-innovation inputs that are required to deliver to consumers a technically and economically viable good or service. Contrary to conventional assumptions in scholarly and policy commentary that rely on the license-as-tax analogy, both theory and evidence suggest that IP licenses generally facilitate information-exchange transactions that generate value for both licensors and licensees, which in turn promotes the specialization of labor that is inherent to a well-functioning innovation ecosystem and ultimately redounds to the benefit of consumers. If that is the case, then it may be time to rethink the recent renewal of skepticism toward IP licensing.