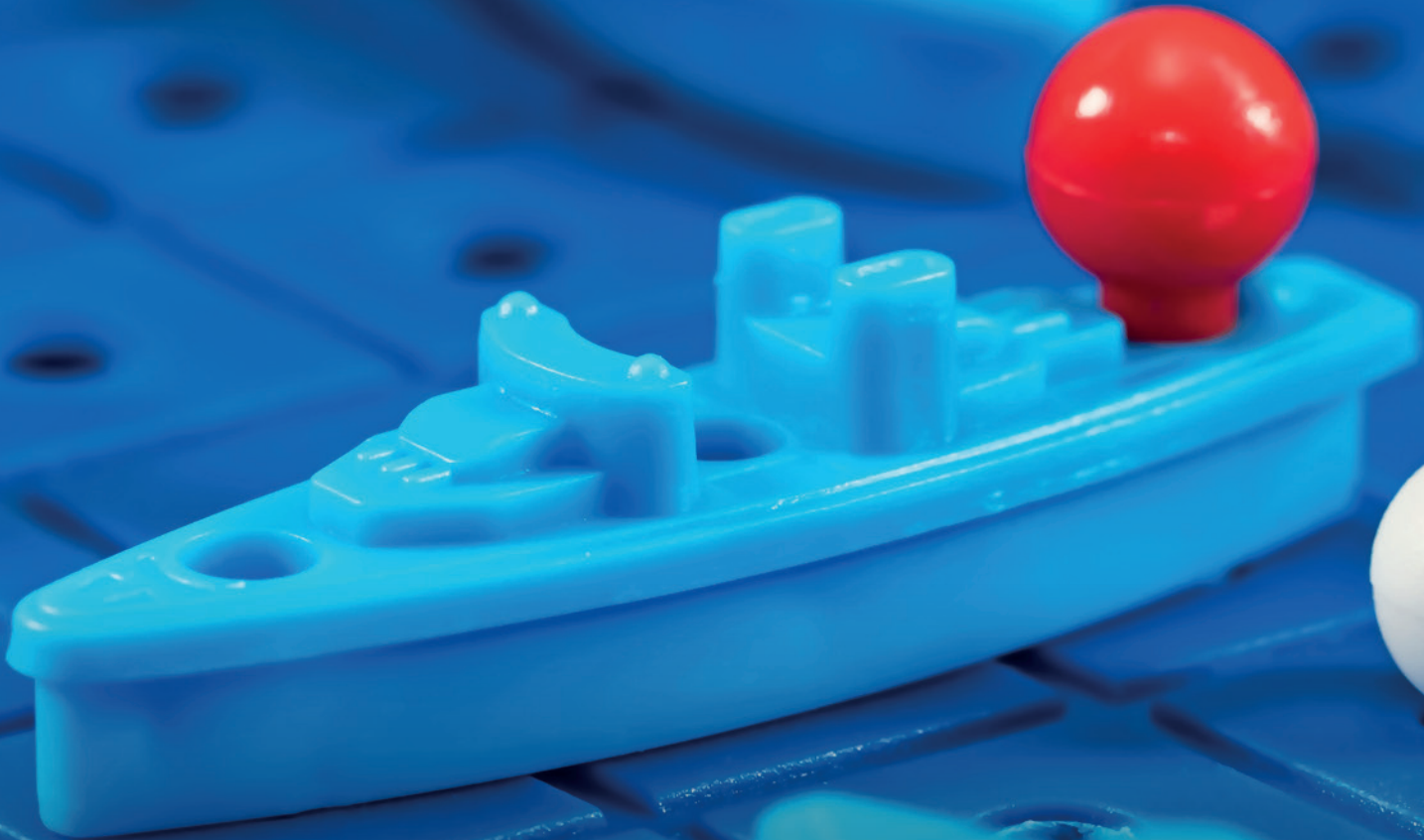


STEALTH COMMODITIZATION: THE MISUSE OF SMARTPHONE ANTITRUST



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I. INTRODUCTION

Like any body of law, antitrust law is susceptible to being misused by private interests for purposes that are not compatible with the law's publicly interested objectives. This concern is especially salient in antitrust law since it can easily be used by laggards against leaders that are outperforming in the market due to legitimate business reasons. Antitrust law deploys a panoply of evidentiary and other screening devices to protect against this type of opportunism, including the underlying principle that plaintiffs must show harm to competition in general, rather than merely harm to a particular competitor.

For more than a decade, competition regulators around the world (with the exception of the U.S. Department of Justice's Antitrust Division since November 2017)² have adopted policies and pursued actions that seek to limit the enforcement and licensing capacities of the owners of “standard-essential” patents (“SEPs”) in the smartphone and related technology markets. Regulators' actions have rested on the view that lead innovators in these markets widely engage in “patent holdup” that constrains market growth, inflates consumer prices, impedes entry, and holds back innovation. Yet this assertion is not supported by over two decades of real-world market performance. Given the mismatch between theory and fact, regulators' actions do not plausibly target harm to competition; rather, they target costs borne by a particular group of competitors. Specifically, regulators' efforts promote the private interests of downstream producers in securing lower input costs by commoditizing the IP portfolios of upstream innovators that undertake the bulk of the R&D that ultimately drives the smartphone market. It is difficult to reconcile this one-sided policy with the public interest in a dynamically efficient innovation ecosystem that preserves investment incentives throughout the technology supply chain.

The following discussion is organized as follows. First, I present a brief overview of the key constituencies in the smartphone ecosystem and the role each constituency plays in the technology supply chain. Second, I describe how regulatory actions and judicial decisions in competition and patent law have devalued SEPs and advanced the interests of producer-firms and producer-jurisdictions over those of innovator-firms and innovator-jurisdictions. Third, I show how this implicit renegotiation of licensing arrangements between innovators and implementers endangers the legal infrastructure of reliable intellectual property (“IP”) rights and contract enforcement that has supported robust innovation and rapid growth in the wireless communications market.

² U.S. Dept. of Justice, News, *Assistant Attorney General Delrahim Delivers Remarks at the USC Gould School of Law's Center for Transnational Law and Business Conference* (Nov. 10, 2017), <https://www.justice.gov/opa/speech/assistant-attorney-general-makin-delrahim-delivers-remarks-usc-gould-school-laws-center>.

II. CONSTITUENCIES AND INTERESTS IN THE SMARTPHONE ECOSYSTEM

A. Constituencies

In the most general terms, the smartphone market consists of three broadly defined constituencies, as shown in the Table below.

Table 1: Constituencies in the Smartphone Ecosystem

Constituency	Primary Areas of Specialization	Net Technology Producer or User?	R&D Intensity ³	Representative firms
Innovators	R&D, product development	Producer	18-25 percent	Ericsson, Nokia, Qualcomm
Implementers	Device assembly, production, distribution	User	4-8 percent	Apple, LG, Samsung
Consumers	N/A	User	N/A	N/A

A handful of firms have made the most substantial inventive contributions behind the remarkable technological advances from the 2G/GSM standard launched in the 1990s, which mostly handled person-to-person audio communications, through the emergent 5G standard, which will be able to handle a broad range of person-to-person and machine-to-machine communications of audio, video, and other data. While the precise makeup of a list of lead innovators can be reasonably debated, it would include at a minimum Ericsson, Motorola (with respect to the GSM standard), Nokia, and Qualcomm. By contrast, there are hundreds of producers around the world that have made use of the technology developed by these firms. The production segment of the wireless device market has exhibited vigorous entry rates,³ which likely reflects the fact that upstream R&D-specialists have licensed their patented technology to all downstream producers willing to pay the negotiated licensing fee, which substantially lowers the technology bar to entry. The largest constituency by sheer numbers are individual consumers, who number in the billions around the world, reflecting the fact that wireless communications devices have achieved exceptionally high levels of adoption and at a rate that may be the most rapid in technology history.⁴

B. Division of Labor

The global supply chain in the smartphone market reflects a division of labor in which innovation tasks have been largely divorced from production and distribution tasks. This is reflected in the stark differences in R&D intensity between innovators and implementers in the smartphone ecosystem (see Table 1 above). Whereas an R&D-specialist such as Qualcomm expends 25 percent of its total annual revenues on R&D, production, and distribution specialists such as Apple and Samsung each expend, respectively, 5 percent and 7.7 percent of total annual revenues on R&D.⁵ This division of labor rests substantially on upstream innovators' expectations that commensurate returns on R&D investments can be earned through vertical licensing arrangements with downstream implementers. During much of the life of the smartphone industry, those expectations have been met. Innovators have widely licensed the R&D inputs required to produce and assemble a smartphone, for which implementers have paid royalties as agreed upon in governing licenses. While litigations between lead innovators and implementers capture headlines, these are exceptions among the much larger number of licensing transactions that structure technology flows between upstream and downstream segments in the smartphone supply chain. Contrary to theoretical models that predict, and largely anecdotal assertions that claim, that downstream

³ 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, 978-89 (2016); Kirti Gupta, *Technology Standards and Competition in the Mobile Wireless Industry*, 22 GEO. MASON L. REV. 865, 893-94 (2015).

⁴ Michael DeGusta, *Are Smart Phones Spreading Faster Than Any Technology in Human History?* MIT TECH. REV. (May 9, 2012).

⁵ All values based on information disclosed in each firm's most recent Form 10-K, as filed with the Securities & Exchange Commission.

firms are burdened with astronomical royalty rate burdens that threaten to put smartphones out of most consumers' reach,⁶ multiple empirical studies estimate that producers on average bear a total royalty burden in the tolerable range of single to mid-digit percentages of the handset price.⁷ These royalty rate ranges are consistent with vigorous entry rates in the handset production market, constantly expanding output, and quality-adjusted price declines throughout the life of the industry.⁸

C. Fragile Equilibrium

The mostly well-functioning equilibrium in the smartphone industry is, however, fragile. This is due to two potential contingencies. Only the first has received significant attention from the competition law community.

1. Contingency I: Patent Holdup

It is possible that the holders of critical patented technologies could act opportunistically and withhold those technologies from implementers, subject to an upward adjustment in royalty rates that would exceed the value reasonably attributable to those technologies. This contingency corresponds to the “patent holdup” scenario that has been emphasized in much of the scholarly literature⁹ and has been referenced in policy interventions by competition regulators. Stylized theoretical models can identify certain circumstances in which patent holdup maximizes single-period payoffs for an upstream patent holder. However, the constancy and relatively modest estimates of the aggregate royalty paid by handset producers are not consistent with the holdup hypothesis. That inconsistency suggests that upstream IP holders are repeat-players that operate under a multi-period payoff-maximization model in which the risk that implementers will decline to make the necessary investments to adopt, for example, 5G technology in the future renders patent holdup an economically irrational strategy with respect to implementers that have adopted, for example, 4G technology in the present. By the logic of backward induction, the prospect of future punishment disciplines present behavior. Contrary to conventional wisdom, this anticipates that patent holdup is a low-probability risk to which it is imprudent to allocate significant regulatory resources.

2. Contingency II: Patent Holdout

It is possible that producers could act opportunistically and withhold payment of licensing fees from innovators, subject to a downward adjustment in royalty rates that would fall short of the value reasonably attributable to those technologies. This “patent holdout” strategy is a rational option in an environment in which (i) a patent owner's technology can be substantially replicated and implemented by sophisticated third parties, and (ii) patent owners have no credible threat of seeking injunctive relief against infringing users. If those conditions are satisfied, then a sufficiently well-resourced implementer may engage in what is now sometimes called “efficient infringement”: that is, the implementer elects to use an innovator's technology without entering into a license (or continuing to use an innovator's technology while suspending payments under an existing license) given that the worst-case scenario consists of having to pay legal fees plus reasonable royalty damages as determined in litigation. So long as there is a sufficiently low likelihood of an injunction or supercompensatory damages for willful infringement, the implementer can defer payment of royalties to the licensor while paying legal fees in exchange for the opportunity to invalidate the licensor's patents or secure a reduced royalty in the litigation process. This strategy is likely to be most attractive for the largest implementers that can sustain extended litigation and represent a large portion of an innovator's revenues, in which case the costs and uncertainty attendant to litigation may induce the innovator to offer a reduced royalty rate.

6 See, e.g. Ann Armstrong, Joseph J. Mueller & Timothy D. Syrett, *The smartphone royalty stack: Surveying royalty demands for the components within modern smartphones*, WILMERHALE Working Paper, at 68-69 (May 29, 2014), <https://www.wilmerhale.com/en/insights/publications/the-smartphone-royalty-stack>; Mark A. Lemley & Carl Shapiro, *Patent Holdup and Royalty Stacking*, 85 TEX. L. REV. 1991, 2026-27 (2007). In both cases, royalty estimates do not adequately reflect cross-licensing offsets that can reduce rates substantially. For detailed analysis, see Barnett, *Has the Academy*, *supra* note 1, at 1345-51.

7 Alexander Galetovic, Stephen Haber & Lew Zaretski, *An estimate of the average cumulative royalty yield in the world mobile phone industry: Theory, measurement and results*, 42 TELECOMMUNICATIONS POLICY 263, 266 (2018); Alexander Galetovic, Stephen Haber & Lew Zaretski, *Is There an Anticommons Tragedy in the World Smartphone Industry?* 32 BERK. TECH. L. J. 1527, 1527, 1532-33 (2017); Mallinson, *supra* note 4; J. Gregory Sidak, *What Aggregate Royalty Do Electronic Manufacturers of Mobile Phones Pay to License Standard-Essential Patents?* 1 CRITERION J. ON INNOVATION 701 (2016).

8 On entry rates, see *supra* note 4; on output, see Jason Dedrick & Kenneth L. Kraemer, *Intangible assets and value capture in global value chains: the smartphone industry*, WIPO Economic Research Working Paper No. 41, at 3-4 (Nov. 2017) (citing IDC Worldwide Mobile Phone Tracker (2017)); on price declines, see Alexander Galetovic, Stephen Haber & Ross Levine, *An Empirical Examination of Patent Holdup*, 11 J. COMPETITION L. & ECON. 549 (2015).

9 For the leading source of this assertion, see Lemley & Shapiro, *supra* note 7. For a critical review of this literature, see Barnett, *Has the Academy*, *supra* note 1, at 1344-45.

III. COMMODITIZATION BY REGULATION

A. Conventional Wisdom: SEP Royalties are “Too High”

Any firm rationally seeks to maximize revenues and minimize costs, resulting in the highest possible net gain for its shareholders. Applied to the smartphone market, this elementary principle implies that upstream innovators will seek to maximize fees paid for the technology inputs they supply to downstream producers, while the latter will seek to minimize those fees. As in tangible goods markets, the market forces of supply and demand would be expected to set the price of those IP assets, reflecting the value those assets contribute to the relevant device in the target consumer market. Implementers, and many regulators and commentators, take the view that arm’s-length negotiations will not set a “reasonable” price for SEP owners’ IP assets. This line of argument rests on the same theoretical and empirically unsubstantiated assertions concerning the allegedly high risk of “patent holdup,” which imply that innovators are predisposed to exploit what is assumed to be their inherent bargaining advantage over implementers that have made substantial investments in adopting the relevant technology.¹⁰ As a result, scholarly and policy discussion has focused on the danger that royalty rates will be set “too high,” resulting in a disproportionate share of the market surplus being appropriated by patentee-innovators. Note that this concern is somewhat difficult to reconcile with the fact that, as of 2017, all IP licensors were estimated to capture in total approximately 5 percent of the retail price of each “iPhone 7” sold, as compared to 42 percent for Apple, a lead downstream producer.¹¹

IV. REDISTRIBUTION BY FRAND

Regulatory interventions to “protect” implementers against the threat of innovator opportunism have piggybacked on existing private-sector efforts to address this risk through the standard-setting organizations (“SSOs”) that promote interoperability in the smartphone and other technology markets. Since the launch of the GSM standard in the 1990s, SSOs have typically conditioned inclusion of a firm’s technology in the relevant standard on the firm’s commitment to license any patents covering that technology on a “fair, reasonable and non-discriminatory” (or “FRAND”) basis. In most cases, SSOs have not assigned any precise meaning to the FRAND commitment. As a result, its substantive content has been reflected through the cumulative effect of market negotiations between innovators and implementers. As I have argued elsewhere, FRAND can be analogized to a “good faith” clause in a long-term relationship in which contractual terms cannot be fully specified up-front and must be periodically negotiated subject to a mutual agreement to refrain from opportunism that takes advantage of each party’s relationship-specific investments.¹² It is often overlooked that the FRAND principle is necessarily a *two-sided* commitment. While implementers make investments in adopting a SEP owners’ technology that cannot easily be redeployed to other uses, and are therefore subject to the risk of patentee opportunism, SEP owners make substantially larger R&D investments that are principally monetized through licensing relationships, and are therefore subject to the risk of licensee opportunism.

Since at least the mid-2000s, implementers have sought to “pin down” the meaning of FRAND by converting what is arguably a question of contract interpretation into a question of antitrust law, with an exclusive focus on the risk of patentee opportunism. Implementers have been active advocates before regulators and courts in connection with enforcement actions and litigations that impact the interpretation of the FRAND commitment.¹³ These advocacy investments have achieved substantial returns by effectively instituting something akin to a compulsory licensing regime for SEP owners in the global smartphone market. In particular, implementers have secured a legal understanding that the otherwise undefined FRAND commitment implies that the patent owner has forfeited its right to seek injunctive relief and can even incur some combination

¹⁰ For examples of these statements in the scholarly literature, see *supra* note 10; for examples of such statements by regulators, see U.S. Dept. of Justice & U.S. Patent & Trademark Office, *Policy Statement on Remedies for Standards-Essential Patents Subject to Voluntary FRAND Commitments* 4, 6, n.13 (2013); Fed. Trade Comm’n, *The Evolving IP Marketplace: Aligning Patent Notice and Remedies with Competition* 28, 191 n.61, 234-35 (2011).

¹¹ Jason Dedrick & Kenneth L. Kraemer, *Intangible assets and value capture in global value chains: the smartphone industry* 16-17 (WIPO, Economic Research Working Paper No. 41 (2017)).

¹² Barnett, *Antitrust Overreach*, *supra* note 1, at 202-04. Following standard usage in the institutional economics literature, a “relationship-specific” investment is an investment that has no or lesser value in any use outside the relationship.

¹³ *Id.* at 230; Barnett, *Has the Academy*, *supra* note 1, at 1374-75 Tbl. 4.

of fee-shifting awards or antitrust liability for even doing so.¹⁴ While the Court of Appeals for the Federal Circuit and recent decisions in European and UK courts have attenuated this principle,¹⁵ SEP owners in smartphone markets cannot typically make a credible “shutdown” threat against an infringing user who has the resources and capacities to replicate the SEP owner’s technology and support an extended litigation process. Relatedly, implementers have sought to secure a legal understanding that SEP royalties should be determined at the component, rather than the device, level, contrary to nearly universal industry practice.¹⁶

V. AN UNCONVENTIONAL THOUGHT: ARE SEP ROYALTIES “TOO LOW”?

If the patent holdup scenario has not been systematically realized in practice, then it follows that (i) as a factual matter, there is no sound economic case for competitive harm and (ii) as a normative matter, regulatory interventions to limit SEP owners’ enforcement and licensing capacities are prone to distort the prices negotiated for the IP assets that are necessary to produce and assemble a smartphone. This raises the largely overlooked risk that the royalty rates for SEPs have been artificially re-set at levels that are “too low,” rather than “too high,” through a regulatory campaign that has been advocated by firms that self-evidently benefit from any downward movement in royalty rates.¹⁷ (Keep in mind that the primary objective of antitrust law is *not* to minimize prices; rather, it is to maximize consumer welfare by preserving the conditions under which markets can set *efficient* prices.) Remarkably, much of the evidence relied upon by the Northern District of California in ruling in May 2019 for the FTC in its antitrust lawsuit against Qualcomm¹⁸ consisted of inherently conflicted testimony from the defendant’s licensees in the device market or horizontal competitors in the chip market. That litigation, and other enforcement actions by competition regulators against purportedly “excessive” SEP licensing rates, inherently raise a concern that regulatory interventions have merely advanced the interests of implementers who are net IP consumers at the expense of innovators who are net IP producers. Absent evidence that these regulatory actions have operated to the benefit of the public interest in preserving competitive market conditions, this amounts to a misapplication of the competition law apparatus for the purpose of redistributing economic surplus from the “sell-side” to the “buy-side” of the smartphone supply chain.

VI. REGULATORY MERCANTILISM

I have argued that implementer firms have sought to extract a greater portion of the total economic surplus in the smartphone market by advocating that regulators act to preclude “patent holdup” and restrain licensors’ ability to enforce their patent rights against actual and potential licensees. As I show in detail elsewhere,¹⁹ the same strategic logic can be extrapolated from the level of the firm to the level of an entire jurisdiction. That is: just as individual firms that are net technology users have an interest in minimizing input costs by commoditizing IP assets through the competition and patent law apparatus, so too jurisdictions that are net technology users have an interest in doing so. This is most clearly illustrated in the case of Chinese regulators’ actions against Qualcomm, which was alleged to have set “excessive” royalty rates under “abuse of dominance” principles.²⁰ The result: in addition to a \$975 million fine, Qualcomm agreed in 2015 to lower the royalty rate paid by local

14 For court decisions, see *Microsoft v. Motorola*, 795 F.3d 1024, 1049 (9th Cir. 2015) (holding that seeking injunctive relief breaches the patentee’s contractual RAND obligation and upholding the award of attorneys’ fees to the infringer in light of such breach); *Apple, Inc. v. Motorola, Inc.*, 869 F.Supp. 2d 901, 913 (N.D. Ill. 2012), modified on other grounds, 757 F.3d 1286 (Fed. Cir. 2014) (holding that, except in limited circumstances, a SEP owner is not entitled to injunctive relief and shifting attorneys’ fees to the SEP owner for seeking an injunction). On regulatory statements concerning antitrust liability for seeking injunctive relief to enforce SEPs, see Maureen K. Ohlhausen, *The Elusive Role of Competition in the Standard-Setting Antitrust Debate*, 20 *STAN. TECH. L. REV.* 93, 118-19 (2017).

15 *Apple, Inc. v. Motorola, Inc.*, 757 F.3d 1286, 1332 (Fed. Cir. 2014) (rejecting a “no-injunction” rule for SEPs but limiting injunctive relief to circumstances in which the infringer is unwilling to enter into a “FRAND-compliant” license); *Unwired Planet International Ltd. v. Huawei Technologies Co. Ltd. et al.* [2017] EWHC 711 (Pat.) (SEP owner entitled to injunctive relief only if the prospective licensee declines a FRAND-compliant license offer); *Huawei Technologies Co. Ltd. v. ZTE Deutschland GmbH*, Case C-170/13 (Court of Justice of the European Union, Nov. 20, 2014), at §§ 61-67 (same).

16 For a description of these efforts, see Barnett, *Antitrust Overreach*, *supra* note 1, at 64-67; David Kappos & Paul Michel, *The Smallest Saleable Patent-Practicing Unit: Observations on its Origins, Developments and Future*, 32 *BERK. TECH. L. J.* 1433, 1466-47 (2018).

17 For a contribution that has recognized this risk, see J. Gregory Sidak, *Patent Holdup and Oligopsonistic Collusion in Standard-Setting Organizations*, 5 *J. COMPETITION L & ECON.* 123 (2009). On potentially excessively low royalties in the patent pool context, see Jonathan M. Barnett, *From Patent Thickets to Patent Networks: The Legal Infrastructure of the Digital Economy*, 55 *JURIMETRICS J.* 34-35, 46-47 (2014).

18 Findings of Fact and Conclusions of Law, *Federal Trade Commission v. Qualcomm, Inc.*, No. 17-CV-00220-LHK (N.D. Cal., May 21, 2019).

19 Barnett, *Antitrust Overreach*, *supra* note 1, 230-35.

20 Allen & Overy, *Antitrust in China: NDRC v. Qualcomm* (Feb. 12, 2015).

device producers.²¹ Setting aside the legal basis for this enforcement action (as to which I express no view), it serves the regulatory jurisdiction's interest in minimizing input costs for its local producers and, as I show elsewhere with respect specifically to China, is part of a broader strategy to ameliorate the country's negative "IP balance of trade" by developing technology standards based on indigenous IP portfolios.²²

VII. MINIMIZING PRODUCERS' INPUT COSTS DOES NOT MAXIMIZE CONSUMER WELFARE IN INNOVATION MARKETS

The commoditization of IP assets through the competition law apparatus has starkly different effects for each constituency in the smartphone ecosystem. While a weak-IP regime benefits implementers in the form of reduced input costs, and *may* benefit consumers in the short term in the form of lower retail prices (if implementers pass on some portion of their cost-savings), it hurts innovators, who suffer from reduced license fees and a lower return on R&D investment. Hence, as a policy matter, the critical question is whether consumers are better or worse off from a longer-term dynamic efficiency perspective under a regulatory regime that prioritizes producers' input costs over innovators' returns on R&D. There are two possible approaches to this question. Both approaches suggest that the commoditization strategy advocated by implementers and pursued by regulators is likely to harm consumer welfare in the medium to long term.

A. *Dynamic > Static Efficiencies*

We can attempt to weigh the short-term static efficiency gains, possibly enjoyed immediately by consumers in the form of lower retail prices, against the long-term dynamic efficiency losses, possibly suffered in the longer-term by consumers in the form of reduced innovation (based on the reasonable expectation that reduced royalty fees would divert investment capital away from wireless R&D). While this exercise cannot be carried out with certainty, there are two reasons to believe that deferred losses are likely to outweigh immediate gains. First, it is not clear that the static efficiency gains would be especially significant. If total royalty rates represent a relatively modest percentage of the total device price, then even a dramatic reduction in those rates would not substantially reduce the handset price paid by the individual consumer. Second, even if we counterfactually assume that handset prices would fall significantly, the resulting welfare gains would almost certainly be exceeded by the welfare losses from a reduction in R&D investment and technological innovation. The reasoning is intuitive: the increase in social well-being from reducing the price of kerosene lamps by even a large fraction is obviously exceeded by the increase in social well-being from replacing kerosene lamps with electric lighting. As Judge Frank Easterbrook once suggested, the error costs from "false positive" antitrust interventions are magnified when they suppress a "new method of making and distributing a product."²³

VIII. STRUCTURAL DISTORTIONS

It might be objected that a weak-IP regime would not necessarily divert investment capital away from supporting R&D in wireless communications. Rather, capital may flow to firms that can monetize R&D investment through non-IP-dependent business models that embed technology in hardware and software bundles that cannot be easily replicated or have a unique brand profile in the consumer market. Apple's acquisition of Intel's 5G patent portfolio in July 2019 is consistent with an explicitly stated strategy to create a largely integrated end-to-end smartphone supply chain.²⁴ The relevant policy question then becomes: would consumer welfare be harmed by a shift from licensing-based to vertically integrated models for monetizing R&D? There are two reasons to believe that the answer is positive. First, any bias in the market's organizational choices inherently yields potential efficiency losses given our lack of information concerning the most efficient mix of organizational structures in any particular market at any particular time.²⁵ Second, from a competition policy perspective, licensing-based structures are likely to outperform vertically integrated structures insofar as the former tend to promote broad dissemination of the underlying pool of technology assets, whereas the latter tend to confine those assets to a single firm. Qualcomm has an incentive to license its IP portfolio as widely as possible among producer firms, creating a broad royalty base from which it can extract licensing fees during the portfolio's finite commercial life. Apple has an incentive

²¹ QUALCOMM, FORM 8-K (filed Feb. 9, 2015).

²² Barnett, *Antitrust Overreach*, *supra* note 1, at 234-35.

²³ Frank H. Easterbrook, *The Limits of Antitrust*, 63 TEX. L. REV. 1, 5 (1984). For related discussion, see Geoffrey A. Manne & Joshua D. Wright, *Innovation and the Limits of Antitrust*, 6 J. COMPETITION L. & ECON. 153, 168, 170-71 (2010).

²⁴ Shara Tibken, *Why Apple Wants Intel's modem business*, CNET.COM (July 25, 2019).

²⁵ For further discussion, see Jonathan M. Barnett, *Intellectual Property as a Law of Organization*, 84 S. CAL. L. REV. 785 (2011).

not to license its IP portfolio so that it can internalize the gains from R&D within its largely closed technology environment. This has been its historical practice with respect to the Mac operating system in the personal computer market, iOS in the mobile computing market, and, subject to any residual FRAND commitments, presumably will be its practice with respect to the 5G patent portfolio acquired from Intel. Counterintuitively, commoditizing IP assets could raise entry barriers and reduce competitive intensity by undermining the vertical licensing arrangements that have enabled any producer to access the technology inputs required to enter, and compete vigorously in, the handset market.

IX. FINAL THOUGHTS

In its ongoing litigation against Qualcomm (currently on appeal to the Court of Appeals for the Ninth Circuit), the FTC has expressed the view that it is protecting consumers' interests by relieving the smartphone market from the "tax" purportedly imposed by the market's lead innovator.²⁶ In its opinion in that litigation, the federal district court adopted roughly the same view.²⁷ Tellingly, the court's opinion is virtually bereft of any objective evidence of competitive harm. The FTC's litigation and the court's opinion are the latest steps in a misguided regulatory campaign that has sought to provide a solution to a problem for which no credible evidence exists. Over two decades of experience have shown how a robust IP rights and licensing infrastructure has supported precisely the type of efficient market promoted by competition policy: expanding output, declining quality-adjusted prices, robust entry and continuous innovation. Fixing a market that is not broken has a price. The continued commoditization of IP rights through the guise of competition law may advance implementers' private interests in reduced input costs but is incompatible with the public interest in a dynamically efficient innovation ecosystem.

²⁶ Federal Trade Commission, Press Release, *FTC Charges Qualcomm with Monopolizing Key Semiconductor Device Used in Cell Phones* (Jan. 17, 2017).

²⁷ Findings of Fact, *supra* note 19.

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