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SUMMARY			
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Abstract:

In this chapter, the weakening of intellectual property rights in wireless technology markets is examined. This trend was mainly driven by regulatory concerns over patent holdup and royalty stacking. Standard-essential patents (SEPs) enable interoperability across wireless communication devices and require fair, reasonable, and non-discriminatory (FRAND) licensing terms and conditions. Regulators, influenced by theoretical models, limited SEP owners’ ability to obtain injunctions, shifting bargaining power to major device manufacturers. Empirical evidence, however, suggests no systemic patent holdup or excessive royalties, with stable licensing rates fostering innovation. Cases like *FTC v. Qualcomm* highlight the adverse effects of weakening SEP enforcement, favoring large firms over innovators. The author argues this regulatory approach undermines innovation incentives, risking reduced competition and technological advancement. In other words, there is a need for evidence-based IP policies to sustain long-term innovation cycles and maintain balance in global wireless ecosystems.

Chapters in the Book:

Part 3- Unmaking Patent Law
Chapter 10- The Patent Holdup Conjecture (p.207-225)

Summary

10. The Patent Holdup Conjecture

Barnett refers to an “accidental alliance” to describe several well-resourced market players that share an interest in weakening IP rights. Of the markets where the “accidental alliance” is vividly illustrated, the ones that rely on “standard-essential patents”¹ stand out. Standard-essential patents (SEPs) cover key technologies in wireless communication standards. This ensures interoperability across consumer electronics like phones, laptops, and printers. Typically, they are developed through standard-setting organizations (SSOs) with contributions from major industry players like chip suppliers, handset makers, and telecom carriers. These players often hold patents on their inventions that they contribute to the standard. For an invention to be included in a standard, SEP owners must commit to licensing their patent under fair, reasonable, and non-discriminatory (FRAND) terms. This FRAND commitment governs licensing agreements between SEP owners and device manufacturers or telecom providers using SEP-protected technology. Ultimately, this standard-setting process has allowed for the evolution from 2G to 5G, and thus enhancing speed and quality for audio, video, and other data transmission.

However, since the mid-2000s, regulators in the U.S., EU, and China have sought to reshape the SEP marketplace, alleging that SEP owners can demand excessive royalties. This is called the patent holdup theory. In particular, regulators and courts have restricted SEP owners’ ability to obtain injunctions and questioned SEP licensing agreements. These policy initiatives inherently depress the value of SEPs and, therefore, operate to the advantage of SEP licensees and major device manufacturers. Remarkably, there is little evidence that patent holdup occurs systematically. In fact, there is abundant evidence that SEPs have been licensed at consistently modest rates that promote the dissemination of wireless technologies.

10.1. The Structure of the Smartphone Market

Understanding antitrust and patent policy debates on SEPs requires knowing the division of labor in wireless communications. R&D-focused firms, mainly chip suppliers, differ from firms integrating technology into consumer devices. Data shows that firms that lead in R&D intensity (a firm’s R&D spending as a percentage of sales revenue) in 3G and 4G standards are also leaders in declared SEPs on those standards.

10.2. The FRAND Commitment

The FRAND commitment to which SEP owners are subject to is a loosely defined principle mediating licensing relationships between leading SEP owners and SEP licensees. In recent years, leading SEP owners included Qualcomm, Nokia, and Ericsson, while major SEP licensees included Huawei, Xiaomi, Apple, and Samsung.

While there has never been a proper definition of the FRAND principle, it has historically operated akin to a good-faith principle. The concept itself emerged in the late 1980s when the EU promoted a cross-border wireless network, challenging national telecom monopolies. Initially, the European Telecommunications Standards Institute (ETSI) sought a licensing-by-default model that barred patent owners from seeking injunctions, but Motorola and others resisted. The patent owners successfully resisted the injunction ban. Thus, the FRAND principle was created. It served as a compromise between SEP owners and net IP users, balancing licensing flexibility and fair royalty constraints. SEP owners agreed to license all device producers at negotiated rates while avoiding rigid constraints on royalty negotiations. Nonetheless, the precise meaning of the FRAND principle was left to be determined through individualized negotiations between licensors and licensees.

10.3. The Patent Holdup Conjecture

Starting approximately the mid-2000s, following allegations from some device producers, competition regulators took actions to intervene in SEP licensing in wireless technology markets. They claimed that SEP owners were purportedly engaging in an opportunistic strategy known as “patent holdup”. The patent holdup theory suggests SEP owners exploit device producers’ reliance on established standards to demand excessive

¹ Patents that cover technologies necessary to comply with a technical standard such that to comply with the standard the user must inevitably infringe such patent (this makes the patent essential to the standard = SEP).

royalties. It is argued if left unchecked, patent holdup would inflate royalty rates, which would then inflate device prices and constrain the growth of wireless communication markets. Interestingly, regulators largely accepted these concerns at face value. However, the concerns about patent holdup were mainly based on theoretical models with little real-world evidence to support them.

Commentators theorized that each SEP owner would exert pricing power when setting licensing rates for its patented component technology. This would then result in a “royalty stack” of double-digit licensing rates and exorbitant device prices for consumers. Yet, in a similar fashion, there is little empirical evidence for the theory of “royalty stacking.” Nevertheless, there were a number of unverified academic articles about patent holdup and royalty stacking that influenced policy decisions over time. Regulators and courts largely accepted these claims without rigorous empirical validation, which later proved to be a critical oversight.

10.4. The Regulatory Campaign against SEP Injunctions

Antitrust regulators, relying on patent holdup and royalty stacking theories, sought to prevent SEP owners from obtaining injunctions against infringers. The logic was simple: regulators argued that if SEP owners could not block device producers from using their technology by injunctions, the holdup problem would be resolved. Furthermore, courts in major jurisdictions have issued rulings on injunctive relief for SEP owners that have largely conformed to regulators policy objectives. For example, a 2012 ruling by Judge Richard Posner stated SEP owners could seek injunctions only in exceptional cases. In 2014, the European Commission ruled that SEP owners could face liability for seeking injunctions under competition law. However, subsequent rulings in the U.S., EU, and UK refined this stance, allowing injunctions only if a licensee refuses to negotiate in good faith. Since 2018, British, Dutch, and German courts have granted injunctions to SEP owners following this “unwilling licensee” exception. Yet, no U.S. court has so far granted an injunction to an SEP owner. As a consequence, the only hope for SEP owners in the U.S. to claim monetary damages are costly and lengthy litigation cases. Ultimately, this shifts bargaining power from SEP owners to licensees and distorts market pricing of technology.

However, this system also allows for “patent holdout.” This means that licensees, facing no risk of being denied access to standards, may opt to infringe and invite litigation rather than negotiate a license. In the end, this would imply a wealth transfer from R&D-driven wireless innovators to large device manufacturers. Additionally, any potential short-term consumer cost savings from lower royalties could be outweighed by long-term harm to innovation.

10.5. FTC-plus-Apple v. Qualcomm

The peak of global regulatory efforts to curb patent holdup was reached in 2017, when the FTC filed a landmark lawsuit against Qualcomm. Three days later, Apple sued Qualcomm for antitrust and patent infringement in the U.S. and later in China for alleged market abuse. The FTC-Apple coalition, supported by academics and advocacy groups, reflected a broader push for a weak-IP regime in wireless markets. At that time, it was hard to find a clearer rebuttal of the assumption that stronger patents always secure monopoly rents for incumbents. This case seemed to illustrate precisely the opposite dynamic.

Throughout these litigations, Apple put significant pressure on Qualcomm by withholding billions in licensing fees. This behavior made much sense, because in the weak IP environment, well-funded companies benefit by delaying negotiations and forcing SEP owners into lengthy litigation. Without the credible threat of injunctions, Apple could simply refuse to license without significant financial consequences. Even if Apple would lose in court, the damages were usually based on a “reasonable royalty.”

Furthermore, it was not the first time that Apple engaged in stalling behaviour. In 2012, a court found Apple attempted to use litigation to set a ceiling on royalty rates without intending to abide by the court’s decision. Likewise, in a 2013 case against Samsung (patent owner), the International Trade Commission found Apple engaged in patent holdout and refused to negotiate in good faith. Despite Samsung winning on the merits, the U.S. Trade Representative overruled the initial exclusion order and protected Apple’s infringing devices.

While Apple settled its suit with Qualcomm, the FTC initially won at trial against Qualcomm. The district court ruling would have required Qualcomm to renegotiate hundreds of existing licenses and license its technology to direct competitors. It is important to appreciate the gravity of the harm that could have been caused to the wireless technology ecosystem had this ruling prevailed. However, in 2020, the Ninth Circuit

rejected the district courts finding of antitrust liability in all respects. Ultimately, the FTC's actions, along with Apple's strategic use of litigation, nearly dismantled Qualcomm's licensing model.

10.6. Facts v. Dogma in SEP Policy

Regulatory and judicial interventions in SEP licensing markets rely on widely accepted theories that SEP-intensive markets suffer from an inherent risk of patent holdup and royalty stacking. Yet, there is one problem. Real-world markets have never experienced patent holdup and royalty stacking. Instead of showing signs of market failures, we have observed increased output, declining prices, continuous innovation, and widespread adoption. In addition, royalty rates do not seem overly burdensome, and smartphones are accessible to a broad range of income segments. Multiple empirical studies confirm this intuition. Evidence shows that royalty rates for smartphones and SEP-dependent devices fall within 3%-5% of the average retail price. From 2007 to 2016, the aggregate royalty rate for SEP owners has remained stable. These findings cast doubt on the patent holdup and royalty stacking theories and put the policy actions based on these theories into question. One reason for this is that patent holdup theory relies on a simple model that fails to align with real-world market behaviour, particularly in wireless device markets.

In actual markets, customer-facing device producers capture the largest portion of revenues, not R&D-intensive chip suppliers. Modifying the assumptions behind the patent holdup model explains why real-world markets do not follow theoretical expectations. For example, upstream firms that invest heavily in R&D choose to offer reasonable royalty rates, because it maximizes profits over multiple licensing periods. This is because offering reasonable royalty rates encourages the adoption of new standards. Moreover, maintaining stable licensing revenues over multiple generations allows licensors to fund ongoing R&D investments for future standards. In the end, this creates a self-sustaining long-term innovation cycle. Precisely because SEP owners do not behave as single-play licensors, demanding exorbitant royalty rates is not a dominant strategy for these companies.

10.7. Patent Holdup Theory Persists

Notwithstanding strong evidence to the contrary, the stylized facts² of patent holdup and royalty stacking still play a prominent role in regulators' actions. Often, regulators analyse SEP licensing competitively at a theoretical level and overlook empirical evidence. For example, the National Bureau of Economic Research (NBER) has published two papers that acknowledge patent holdup and royalty stacking without discussing conflicting empirical evidence. The papers claimed that the Internet of Things faced royalty stacking and holdup risks but ignored evidence of modest SEP royalties.

Finally, this divergence between antitrust theories and real-world evidence was acknowledged in 2017 when the DOJ Antitrust Division adjusted its policy on SEPs. In 2019, the DOJ retracted previous statements emphasizing patent holdup concerns and suggested SEP owners deserve injunctive relief. Specifically, the DOJ expressed that patent holdout by large device producers was a greater risk than patent holdup. However, the DOJ's policy shift appears to have had limited long-standing effects. A 2021 executive order from President Biden encouraged the DOJ to reconsider their position on the intersection of intellectual property and antitrust law. Later that year, a revised draft policy statement was proposed that would revert to the 2013 approach. And while this policy statement was withdrawn due to large opposition, the current U.S. policy on wireless SEP licensing is left unclear as of now. That void has now been filled by EU competition regulators, who have re-emphasized concerns about patent holdup and royalty stacking risks. In 2023, the European Commission proposed a "conciliation" process for determining FRAND royalty rates and set aggregate royalty caps for SEPs. Alarming, this proposal challenges market mechanisms for setting prices, replacing them with a costly administrative process susceptible to cooperate influence.

10.8. The Enabling Role of Patents in Wireless Markets

The treatment of SEP licensing markets by antitrust regulators in the United States and other jurisdictions has principally relied on stylized theoretical models that have yet to find compelling factual support. This is problematic because a commitment to evidence-based antitrust law would have concluded that SEP licensing

² Stylized facts refers to arguments that may be theoretically plausible, but they are supported by a very limited number of empirical proof. More often, they rely on anecdotes.

does not warrant high regulatory scrutiny. The misapplication of antitrust laws in wireless markets risks undermining incentives for innovation, technology dissemination, and competition in the wireless ecosystem.

Consider for example Qualcomm's history, which illustrates the symbiotic relationship between property rights and contracts in sustaining innovation and competition within the smartphone ecosystem. Founded in 1985, Qualcomm pioneered CDMA (code-division multiple access) technology, enabling the shift from 2G/GSM to the data transmission capabilities of 3G, 4G/LTE, and now 5G wireless standards. At the outset, Qualcomm was a small company that sought to persuade U.S. telecommunications firms to abandon the existing time-division multiple-access (TDMA) standard. To do so, it entered into an alliance with PacTel Cellular, a telecom carrier, to build a prototype system. Following the prototype's success and demonstrated superiority to the TDMA standard, Qualcomm was able to persuade major U.S. telecom carriers to adopt its technology.

Patents played a critical role in this story. Firstly, they enabled Qualcomm to disclose technology freely to its partner while avoiding expropriation risks.³ Also, patents allowed Qualcomm to monetize its R&D through a licensing-based strategy. This resulted in benefits of different types. The broad dissemination of wireless technology through a licensing enhanced innovation in WiFi communication but also increased competition in the device and production market. Most likely, the withdrawal of patent protection could have pushed firms towards vertically integrated structures, leading to industry concentration and reduced technology dissemination. While weakening SEP enforcement may have reduced input costs for manufacturers in the short term, it risked creating "walled gardens" and limiting innovation and interoperability in the long term. Ultimately, licensing and litigation-related expenses may be a small price for a market with high innovation and competitive intensity.

10.9. Closing Thoughts

Licensing transactions in standard-essential patents are crucial for wireless-enabled devices across industries like computing, communications, and automotive. Since the 1990s, mobile communication development relied on a patent-based business model. This model transfers technology from innovators to firms integrating it into devices for end-users. However, regulators and courts in the US, EU, and China have intervened in these transactions due to concerns about patent holdup and royalty stacking. Yet, these claims lack empirical evidence and threaten the efficiency of innovation dissemination and infrastructure.

³ Expropriation refers to the wrongful seizure of private property or assets by a government, authority or company, usually without fair compensation or legal justification.