

Patents and Competition

Commercializing Innovation in the Global Ecosystem for 5G and IoT

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I. INTRODUCTION

For many decades, the products and services provided for and from our information and communication-related industries have required an ever-increasing number of technologies, many of which are patented, often from many firms, and often across several national borders. As the fifth generation (5G) of these communication tools gets deployed, users are enjoying vastly improved performance. 5G use cases include a broad range of applications, from enhanced mobile broadband for personal and autonomous communications, data processing, and entertainment devices, as well as massive levels of inter-machine communications needed for smart factories and cities, to ultrareliable and low-latency communications needed for potentially dangerous activities like self-driving cars and remote surgery. In turn, this is leading to newer uses and more complex interactions, such as those needed to support the Internet of Things (IoT) – as when home appliances and cars are directly communicating with each other, as distinct from the internet of devices that facilitate communications among humans, like personal computers, tablets, and phones. IoT use cases include smart homes, smart cities, telemedicine and telehealth, human and cyber security, building management, agriculture and aquaculture management, green energy management, enhanced and remote monitoring, and control of vehicles and other physical assets. To achieve these applications, a vast number of interactions and interconnections must take place, which in turn require immense transacting and private ordering, including a great deal of standard-setting.

Standards are the agreed-upon conventions that users of particular technologies follow to facilitate interoperability, like driving on the right or left side of the road to improve traffic flow and safety. Some standards are set informally through various coordination mechanisms, including passive ones, while many are set formally through active engagement among many participants in standard-setting organizations or standards development organizations (SSOs or SDOs). For 5G and IoT,

standards are a significant part of the business ecosystem – such as standards for how cellular modems, Wi-Fi radios, or electronic memory operate – as well as a significant part of policy debates.

Early in the process of developing a given technology, an inventor might elect to seek patent protection instead of trade secret protection and might seek to advertise the invention or even encourage the development of standards to permit, require, or in some other way evolve to increase the value of the inventor's technology. Similarly, an implementer might, while totally unaware of a particular invention, inventor, or even standard, invest heavily in some capital expenditure, such as a multibillion dollar chip fabrication facility ("fab"), or set of commercial relationships. Concurrently, other parties may be contracting with the inventor or implementer to buy, sell, license, coinvest, codevelop, or co-deploy in any of the relevant asset markets, including the markets for technologies, employees, equipment, investment, and corporate control. Third parties are also making investment decisions along the way, often choosing to remain third parties by designing around and avoiding either the inventor or the implementer and their respective investments.

A significant amount of subsequent time after an invention is made is almost always then also involved, for two main reasons. One reason is that technological and business development are inherently time-consuming, expensive, risky endeavors with a mix of first-mover and second-mover advantages. It can take up to a decade or longer for a new technology to be brought to market in the form of, or as a component of, a particular product or service. Getting inventions put to use by consumers or even businesses often takes a large amount of subsequent development. Not many practical solutions – products or services – emerge fully developed and perfected like the mythological Athena from the head of Zeus, as if necessity alone were the instant mother of every invention and every end-use later developed for that invention.

The second reason is that nearly all modern patent systems are inherently premised on a significant government examination of the patent application to make an evaluation of the formal requirements of the patent application and a preliminary evaluation of the legal and technological substantive requirements of the patent application.¹ This process of patent prosecution by the applicant and patent examination by the patent office often takes about two years, or much longer.² The major contributor to this time delay is the effort needed to get even a rough assessment of the relevant technological field of art so that the patent law conditions of novelty, nonobviousness, and disclosure can be assessed against the benchmark of the state of this prior art.

¹ For a thorough discourse of US patent law, including the rules and procedures for obtaining, transacting over, and enforcing patents, see generally, JOHN M. GOLDEN ET AL., *PRINCIPLES OF PATENT LAW* (7th ed, 2018).

² USPTO, *Patent Pendency Data June 2022*, www.uspto.gov/dashboard/patents/pendency.html (last visited Aug. 3, 2022).

While all of that time is passing and all of these many actors are taking their own steps toward technology development, it is important to keep in mind that the patentees often will have filed their patent applications before moving too far into the marketplace or allowing too much time to lapse after inventing, in part because modern patent systems have rules that strongly encourage early filing, and in part because of what is often called the Arrow Information Paradox. Named after Nobel Prize-winning economist Kenneth Arrow,³ the gist of the paradox is that it is hard to sell new information like an invention without giving potential buyers enough of a taste for them to formulate their level of appetite for it. But if they have been shown enough of it to really understand it, they wouldn't need to pay to make use of it. Having a patent application filed helps crack the paradox by turning someone using technology that may become patented into a potential infringer unless they strike a deal with the patentee for a sale or license of the patent.

In the middle of all of this wondrous complexity, a day – or decade – in the life of a commercial enterprise trying to implement a new technology can be viewed as quite hard. The technological and business challenges are exacerbated by the legal risks flowing from the reality that each issued patent gives its patentee a right – supported by the vibrant market for litigation financing and intermediaries like patent assertion entities (PAEs), which are sometimes called “patent trolls” – to threaten or actually bring various patent infringement lawsuits. These suits may include civil litigation in district court to allege patent infringement. Those district court actions typically seek damages, and these days, in some cases, also injunctions. Meanwhile, another type of patent infringement suit can be brought asking the United States International Trade Commission (ITC) to initiate an investigation that may lead to an order excluding the relevant articles from entry into the US market. The billions of dollars and vast human capital spent building that fab and those commercial relationships may be threatened, with each lawsuit or investigation alleging patent infringement typically costing up to ten or more million dollars in legal fees and associated expenses, often lasting five to seven years or longer in the case of district court litigation. And all of that is before appeals to the US Court of Appeals for the Federal Circuit, and possible appeal from there to the US Supreme Court. Even the mere threat or the mere initiation of these types of patent infringement proceedings can cause turbulent waves in the markets, whether they be the markets for the products the implementer wants to sell, the markets for commercial collaborators, or the markets for finance and corporate control. Critics of patent enforcement express great concern about the overall disruptive impact that patent enforcement and its threat can have on large technology-implementing companies like those of Silicon Valley fame.

³ Kenneth J. Arrow, *Economic Welfare and the Allocation of Resources for Invention*, in *Rate and Direction of Inventive Activity*, in *THE RATE AND DIRECTION OF INVENTIVE ACTIVITY: ECONOMIC AND SOCIAL FACTORS* 609 (1962).

But there is another side to the coin, with implementers on one side and patentees on the other. Disruptive too is a day – or decade – in the life of a patentee trying to commercialize a patented invention. Implementers also have their own rights around patents owned by others, which are also supported by the vibrant market for litigation financing, including to bring district court litigation seeking a declaratory judgment that the patent is invalid – which involve similar time and expense to those of infringement litigation – as well as to bring or help others bring a plethora of post-grant review procedures in the patent office to cancel some or all of the claims of an issued patent. As with the turbulent waves that implementers face from the mere threat or initiation of infringement proceedings, patentees face similar market disruption from the mere threat or initiation of invalidation or cancellation proceedings. Especially for small early-stage ventures, this can cut off the vital access to financing that they need to even keep afloat as a going concern.

A great amount and variety of coordination mechanisms must be used well for all of this to occur relatively effectively and efficiently. In all of them, timing plays an important role, because there is a great deal of path dependency at stake, for almost everyone involved. One common coordination tool used in these settings is to have the SSOs deploy various approaches to facilitate the broad licensing of any patents that may be helpful or essential (so-called standard-essential patents, or SEPs) to practice a given standard. One such approach is to require parties to disclose pending patent applications, or to suggest which patents in a potentially large population of candidates are truly most likely to be adjudicated, infringed, and not invalid in a suit against those practicing the standard. Another such approach is to encourage or require that patentees participating in the SSO must make a commitment to license their patents on reasonable and nondiscriminatory (RAND) terms or fair, reasonable, and nondiscriminatory (FRAND) terms to those practicing the standard.

It may seem that many of these complexities, coordination challenges and opportunities, or risks or rewards is new, posing new questions calling for new policy responses. But that is not the case. They have each long been studied by scholars of the history of the interface between the patent and antitrust systems, in both the empirical economic literature and the legal literature.⁴ The upshot from the

⁴ For a sampling of this work, see, for example, Giles S. Rich, *The Relation between Patent Practices and the Anti-Monopoly Laws*, 24 J. PAT. OFF. SOC'Y 85, pts. 1–5, at 85, 159, 241, 328, 422 (1942) (broad legal exploration of the patent antitrust interface from the first half of the last century by the person who became one of the principal drafters of the 1952 Patent Act, which codified key approaches to that interface that remain only strengthened in the present iteration of the statute, and who sat as a federal appellate judge interpreting that statute until the end of the century); F. Scott Kieff & Troy A. Paredes, *The Basics Matter: At the Periphery of Intellectual Property*, 73 GEO. WASH. L. REV. 174 (2004) (outlining how this approach to the patent antitrust interface facilitates commercialization and competition when applied to a range of more modern doctrinal and policy debates); F. Scott Kieff, *Quanta v. LG Electronics: Frustrating Patent Deals by Taking Contracting Options off the Table?*, 2007–2008 CATO S. CT.

empirical economics literature is that a property rights approach to patents focused on commercializing innovation facilitates competition and access. This positive effect is evidenced by large decreases in quality-adjusted prices and steady ongoing entry even into markets for information and communications technologies with large numbers of patents and standards that are the focus of the debates about 5G and IoT.⁵ The upshot from the legal literature, which is the focus of this chapter and explored in more detail later, is that such a property rights approach to the patent system gives clear guidance about which choices to make between particular versions of the detailed legal rules actually implemented across the patent system, from those governing patent validity to those governing patent transactions and patent enforcement. These different legal rules and mechanisms enable patents to

REV. 315 (2008) (showing how modern case law can frustrate these goals); F. SCOTT KIEFF & HENRY E. SMITH, *How Not to Invent a Patent Crisis*, in REACTING TO THE SPENDING SPREE: POLICY CHANGES WE CAN AFFORD 55 (Terry Anderson & Richard Sousa, eds., 2009); Richard A. Epstein et al., *The FTC, IP, and SSOs: Government Hold-Up Replacing Private Coordination*, 8 J. COMPETITION L. & ECON. 1 (2012) (same for approaches of modern antitrust enforcement agencies); F. Scott Kieff, *Private Antitrust at the U.S. International Trade Commission*, 14 J. COMPETITION L. & ECON. 46 (2018) (elucidating how ITC enforcement would operate better); Adam Mossoff, *The Rise and Fall of the First American Patent Thicket: The Sewing Machine War of the 1850s*, 53 ARIZ. L. REV. 165 (2011) (elucidating an infamous historical case); JONATHAN BARNETT, *The Great Patent Grab*, in THE BATTLE OVER PATENTS: HISTORICAL PERSPECTIVES ON CURRENT DEBATES (Stephen Haber & Naomi Lamoreaux eds., 2021) (chapter focusing on current debates in recent edited volume exploring the field); Stephen Haber & Naomi R. Lamoreaux, *The Battle over Patents, Defining Ideas*, HOOVER INST. (Nov. 3, 2021), www.hoover.org/research/battle-over-patents (short essay reviewing the topic).

- ⁵ Alexander Galetovic, Stephen Haber, & Ross Levine, *An Empirical Examination of Patent Holdup*, 11 J. COMPETITION L. & ECON. 549 (2015) (finding no evidence that SEP-reliant industries experience more stagnant quality-adjusted prices than non-SEP-reliant industries or that court decisions that reduce the excessive power of SEP holders accelerated innovation in SEP-reliant industries); Stephen Haber, *Patents and the Wealth of Nations*, 23 GEO. MASON L. REV. 811 (2016) (exploring the aggregate social value of property rights in patents); Stephen Haber & Seth Werfel, *Patent Trolls as Financial Intermediaries? Experimental Evidence*, 149 ECON. LETTERS 64, 64 (2016) (“Our results indicate that PAEs served an intermediary function for two groups in our sample: subjects who identified as inventors rather than entrepreneurs, and subjects who were relatively more sensitive to financial losses”); Alexander Galetovic & Stephen Haber, *The Fallacies of Patent Holdup Theory*, 13 J. COMPETITION L. & ECON 1 (2017) (showing serious flaws in the basic logic of patent holdup theory making it logically inconsistent and incomplete and inconsistent with economic fundamentals and evidence); 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 TELECOMM. POLICY 263 (2018) (empirical evidence that the royalty stack for patents in the mobile phone industry is about 3–6% rather than the 20–40% or higher estimated by critics of a property rights approach to patents); Alexander Galetovic, Stephen Haber, & Lew Zaretski, *Is There an Anticommons Tragedy in the World Smartphone Industry?*, 32 BERKELEY TECH. L.J. 1527 (2018) (same); Alexander Galetovic & Stephen Haber, *SEP Royalties: What Theory of Value and Distribution Should Courts Apply?*, 17 OHIO ST. TECH. L.J. 189 (2021) (showing how well it works to price patent royalties using a common method that relies on information from the market about the value of comparable assets or their rental rates).

be so helpful in facilitating the vital coordination needed for the commercialization of new technologies.

II. PROPERTY APPROACH TO PATENTS HAS SUPPORT ACROSS THE POLITICAL SPECTRUM

Debates about patents have long focused on the patent-antitrust interface.⁶ Especially in this context, the views offered about patents by antitrust enforcers⁷ have generally focused on the role that intellectual property (IP) in general and patents in particular can play, on the one hand, in providing beneficial incentives to create or invent, and, on the other hand, in enabling harmful concentrations of market power leading to increased prices and reduced output. Such discussions often then focus essentially on how much of the “good” is enough, how much of the “bad” is too much, and trade-offs between them.

In effect, those discussions highlight a direct tension between IP as a helpful incentive to create or invent and IP as the cause of deleterious anticompetitive monopoly effects. They then offer various approaches to legal regimes to address both sides of the tension. One set of approaches includes the use of other inducements or rewards for creation or invention in the place of, or in addition to, IP, such as regulatory exclusivity, tax credits, grants, prizes, and the like. A second set of approaches exempts particular fields of technology from eligibility for IP protection, such as those having to do with health care, software, or finance, usually with the expectation of significant, frequent, and ongoing updates to the boundaries of these exempted fields. A third set of approaches decreases the remedies available for IP infringement, including damages, injunctions, and exclusion orders. A fourth set of approaches directly addresses interactions between IP owners and IP users,

⁶ The discussion in this section is drawn from Letter from the Hon. F. Scott Kieff, Comm’r, U.S. Int’l. Tr. Comm’n, on the United States Federal Trade Commission’s and the United States Department of Justice Antitrust Division’s Joint Guidelines for the Licensing of Intellectual Property (Sept. 23, 2016), www.justice.gov/atr/file/897081/download; and F. Scott Kieff, *Pragmatism, Perspective, and Trade: AD/CVD, Patents, and Antitrust as Mostly Private Law*, 30 HARV. J.L. & TECH. 97 (2017).

⁷ Certain 3G Mobile Handsets and Components Thereof, Inv. No. 337-TA-613 (Remand), Reply Submission on the Public Interest of Federal Trade Commissioners Maureen K. Ohlhausen and Joshua D. Wright (USITC July 20, 2015); Certain 3G Mobile Handsets and Components Thereof, Inv. No. 337-TA-613 (Remand), Written Submission on the Public Interest of Federal Trade Commission Chairwoman Edith Ramirez (July 13, 2015); Correspondence from United States Federal Trade Commission Chairwoman Edith Ramirez to United States Trade Representative Michael Froman (July 15, 2013); Certain Wireless Communication Devices, Portable Music and Data Processing Devices, Computers and Components Thereof, Inv. No. 337-TA-745, Third Party United States Federal Trade Commission’s Statement on the Public Interest (USITC June 6, 2012); Certain Gaming and Entertainment Consoles, Related Software, and Components Thereof, Inv. No. 337-TA-752, Third Party United States Federal Trade Commission’s Statement on the Public Interest (USITC June 6, 2012).

including heightened antitrust scrutiny, compulsory licenses, and governmental takings of IP licenses or the entire IP rights themselves. Many other ideas are also offered.

A common theme across these approaches is to view IP more in the tradition of public law, or as regulatory entitlements, by focusing on the use of more extensive interactions between governmental bodies and private parties. The overarching goals across different perspectives in the literature are generally shared and laudatory: fostering access to creative or inventive technologies, competition, economic growth, and diverse and inclusive participation; improving both efficiency and fairness for all.

These shared goals also are championed by an intellectual approach to IP that is different than those briefly mentioned earlier. This different approach – a commercialization approach – has been embraced across the American political spectrum, including both the Carter administration and the Reagan administration,⁸ as well as by celebrated jurists of the last century coming from diverse philosophical perspectives, including Circuit Judges Learned Hand, Jerome Frank, and Giles Rich,⁹ who saw it as important to helping the economy and society.¹⁰ The roots of a

⁸ Judge Pauline Newman, *The Federal Circuit in Perspective*, 54 AM. U.L. REV. 821 (2005).

⁹ Giles S. Rich, *The Relation between Patent Practices and the Anti-Monopoly Laws (II)*, 24 J. PAT. OFF. SOC'Y 159 (1942), reprinted in 14 FED. CIR. B.J. at pages 5, 21, 37, 67, and 87 (2004–2005) (five-part series of articles); *Picard v. United Aircraft Corp.*, 128 F.2d 632, 643 (2d Cir. 1942) (Frank, J., concurring); *Reiner v. I. Leon Co.*, 285 F.2d 501, 503 (2d Cir. 1960) (Hand, J.) (noting “[t]here can be no doubt that the Act of 1952 meant to change the slow but steady drift of judicial decision that had been hostile to patents”); *Lyon v. Bausch & Lomb Optical Co.*, 224 F.2d 530, 536–37 (2d Cir. 1955) (Hand, J.) (noting “§ 103... restores the original gloss ... [A] legislature ... must be free to reinstate the courts’ initial interpretation, even though it may have been obscured by a series of later comments whose upshot is at best hazy.”).

¹⁰ Some representative examples in the literature that are consistent with the commercialization approach include the following: Stephen Haber, *Patents and the Wealth of Nations*, 23 GEO. MASON L. REV. 811 (2016); Galetovic et al., *Empirical Examination of Patent Holdup*, *supra* note 5; Daniel F. Spulber, *How Patents Provide the Foundation of the Market for Inventions*, 11 J. COMPETITION L. & ECON. 271 (2015); Pierre Larouche et al., *Settling FRAND Disputes: Is Mandatory Arbitration a Reasonable and Nondiscriminatory Alternative?*, 10 J. COMPETITION L. & ECON. 581 (2014); F. Scott Kieff & Anne Layne-Farrar, *Incentive Effects from Different Approaches to Holdup Mitigation Surrounding Patent Remedies and Standard-Setting Organizations*, 9 J. COMPETITION L. & ECON. 1091 (2013); Epstein, *supra* note 4, at 1; Mark P. Gergen et al., *The Supreme Court’s Accidental Revolution? The Test for Permanent Injunctions*, 112 COLUM. L. REV. 203 (2012); F. Scott Kieff, *An Inconvenient School of Thought*, 61 ALA. L. REV. 591 (2010); F. Scott Kieff, *On Coordinating Transactions in Intellectual Property: A Response to Smith’s Delineating Entitlements in Information*, 117 YALE L.J. POCKET PART 101 (2007); Henry E. Smith, *Intellectual Property as Property: Delineating Entitlements in Information*, 116 YALE L.J. 1742, 1745, 1751–52 (2007); Kieff & Paredes, *supra* note 4; Naomi R. Lamoreaux & Kenneth L. Sokoloff, *Intermediaries in the U.S. Market for Technology, 1870–1920*, in FINANCE, INTERMEDIARIES, AND ECONOMIC DEVELOPMENT 209 (Stanley L. Engerman et al. eds., 2003); and B. Zorina Khan & Kenneth L. Sokoloff, *History Lessons: The Early Development of Intellectual Property Institutions in the United States*, 15 J. ECON. PERSP. 233 (2001).

commercialization approach to patents, in particular, reach back even further into American history, including Abraham Lincoln's view that the patent system "added the fuel of interest to the fire of genius, in the discovery *and production* of new and useful things."¹¹

A commercialization approach to IP views IP more in the tradition of private law, as property rights, by focusing on the use of IP in interactions between private parties, including contracts. Centered on the relationships among private parties, this approach to IP emphasizes a different target and a different mechanism by which IP can operate. Rather than target individuals who are likely to respond to IP as incentives to create or invent in particular, this approach targets a broad, diverse set of market actors in general. This large group encompasses the creator or inventor as well as all those complementary users of a creation or an invention who can help bring it to market, such as investors (including venture capitalists), entrepreneurs, managers, marketers, developers, and owners of other key assets, tangible and intangible, including other creations or inventions. Another key difference in this approach to IP lies in the mechanism by which the IP assets and these private actors interact. This approach sees IP as a tool for facilitating coordination among these diverse private actors, in furtherance of their own private interests in commercializing the creation or invention.

This commercialization approach sees IP rights serving a role akin to "beacons in the dark," drawing to themselves potential complementary users of the IP-protected asset to interact with the IP owner and each other, exploring through the bargaining process the possibility of striking contracts with each other. Focusing on such a "beacon-and-bargain" effect can relieve the governmental side of the IP system of the need to amass the detailed information required to reasonably tailor a direct targeted incentive, such as each actor's relative interests and contributions, needs, skills, or the like. Not only is amassing all of that information hard for the government to do, but large, established market actors may be better able than smaller market entrants to wield the political influence needed to get the government to act, increasing risk of concerns about political economy, public choice, and fairness. Instead, each private party can bring its own expertise and other assets to the negotiating table while knowing – without necessarily having to reveal it to other parties or the government – enough about its own level of interest and capability when it decides whether to strike a deal or not.

Such successful coordination may help bring new business models, products, and services to market. It also can allow IP owners and their contracting parties to appropriate the returns to any of the rival inputs they invested toward developing and commercializing creations or inventions – labor, lab space, capital, and the like.

¹¹ Abraham Lincoln, Second Lecture on Discoveries and Inventions (Feb. 11, 1859), in 3 COLLECTED WORKS OF ABRAHAM LINCOLN 356, 363 (Roy P. Basler ed., 1953) (emphasis added and omitted).

At the same time, the government can avoid having to then go back to evaluate and trace the actual relative contributions that each participant brought to a creation's or an invention's successful commercialization – including, again, the cost of obtaining and using that information and the associated risks of political influence – by enforcing the terms of the contracts these parties strike with each other to allocate any value resulting from the creation's or invention's commercialization. In addition, significant economic theory and empirical evidence suggest this can all happen while the quality-adjusted prices paid by many end-users actually decline and public access is high. In keeping with this commercialization approach, patents can be important antimonopoly devices, helping a smaller “David” come to market and compete against a larger “Goliath.”¹²

A commercialization approach thereby mitigates many of the challenges raised by the tension that is the focus of the other intellectual approaches to IP, as well as by their responses to that tension. Many of the alternatives to IP that are often suggested, such as rewards or tax credits, can face significant challenges in facilitating the private-sector coordination benefits envisioned by the commercialization approach. While such approaches often are motivated by concerns about rising prices paid by consumers and direct benefits paid to creators and inventors, they may not account for the important cases in which IP rights are associated with declines in quality-adjusted prices paid by consumers and other forms of commercial benefits accrued to the entire IP production team as well as to consumers and third parties, which are emphasized in a commercialization approach. In addition, a commercialization approach can embrace many of the practical checks on the market power of an IP right that are often suggested by other approaches to IP, such as antitrust review, government takings, and compulsory licensing, while at the same time showing the importance of maintaining self-limiting principles within each such check to maintain commercialization benefits and mitigate concerns about dynamic efficiency, public choice, fairness, and the like.¹³

To be sure, a focus on commercialization does not ignore creators or inventors or creations or inventions themselves. For example, a system successful in commercializing inventions can have the collateral benefit of providing positive incentives to those who do invent through the possibility of sharing in the many rewards associated with successful commercialization. Nor does a focus on commercialization guarantee that IP rights cause more help than harm in all circumstances. Significant

¹² *Picard*, 128 F.2d at 643 (Frank, J., concurring).

¹³ While the details of the particular legal rules operating within these patent-checking legal systems of antitrust, government takings, and compulsory licensing are beyond the scope of this short overview chapter, the commercialization and property rights approach to patents that this chapter is exploring does leave ample room for those patent-checking systems to operate. For more on the commercialization approach to the details of those systems, *see, for example*, Kieff & Paredes, *supra* note 4; and Richard A. Epstein & F. Scott Kieff, *Questioning the Frequency and Wisdom of Compulsory Licensing for Pharmaceutical Patents*, 78 U. CHI. L. REV. 71 (2011).

theoretical and empirical questions remain open about how the system can be improved overall.

III. PROPERTY APPROACH IS ROOTED IN THE EARLY US PATENT SYSTEM

Governments in many countries have used patent systems since the Renaissance. The British Empire used them like special monopolistic privileges given out by the Crown to its favorites. And even the British started to rein in that approach. Our Founders knew about this history and deliberately took a different approach. They thought it was so important to give Congress the power to create a patent system that they included it in the unamended text of the original Constitution. The early American patent system was designed carefully to work differently than the British one in that it was purposely restrained by objective facts and not open to political discretion. Economic historians credit those differences to the success of the early American patent system. By the mid-1800s, Charles Dickens was describing in his short story “A Poor Man’s Tale of a Patent” how the unending bureaucracy of the British patent system not only failed to bring new inventions to market but also left inventors – as he wrote – “quite wore out, patience and pocket.”

In modern debates about patent systems, there is really no need to speculate or invent new arguments. We’ve tried many approaches and seen many results. There’s not much reason to expect the unexpected here. The more the patent system fills up with bureaucratic steps and administrative and policy discretion, the more they favor the large politically connected people and businesses, and the more both innovation and competition suffer. But the more the patent system turns on objective facts and clear and predictable rules, the more it increases the number of new technologies brought to market, the ability for diverse consumers to access those technologies, and the diversity in sizes among the businesses in the market. That system won’t be against big business; but it won’t so favor big business that it’s against small and medium-sized businesses as well.¹⁴

So often in today’s debates about patents, people ask us to imagine the old men in wigs with the technologies of the late 1700s and tell us that we have to update our patent system to deal with the new technologies of today and tomorrow. But that’s where the genius of the American patent system comes into play. Rather than decide who gets a patent based on politics and fashion, we designed our patent system to

¹⁴ For a longer sketch of the basic ideas about the benefits in fostering economic growth and inclusion from using objective rules for a property rights system, including for patents, see, generally, Stephen H. Haber et al., *On the Importance to Economic Success of Property Rights in Finance and Innovation*, 26 WASH U.J.L. & POL’Y 215 (2008). For more on the differences between the early US patent system and the British system, see, generally, B. ZORINA KHAN, *THE DEMOCRATIZATION OF INVENTION: PATENTS AND COPYRIGHTS IN AMERICAN ECONOMIC DEVELOPMENT, 1790–1920* (Claudia Goldin ed., 2005); Khan & Sokoloff, *supra* note 10.

turn on facts about the prior art and objective questions like novelty. So we don't need to update our patent system to deal with new technologies, because the only technologies that are patentable in our patent system are the ones that are new.

A similar attempt to question the core value of patents by looking to history is by invoking Thomas Jefferson's skeptical take on patents. Not only was Jefferson a leading figure in early American government in general, as a principal drafter of the Declaration of Independence, our first Secretary of State, our second Vice President, and our third President, he also was an inventor and ran our first patent office. Yet, when it came to broader views about patents, he was quite skeptical about property rights in ideas, writing:

He who receives an idea from me, receives instruction himself without lessening mine; as he who lights his taper at mine, receives light without darkening me . . .

I know well the difficulty of drawing a line between the things which are worth to the public the embarrassment of an exclusive patent, and those which are not.¹⁵

While this certainly makes the skeptical case for having a patent system at all, once a patent system has been offered to inventors, the path dependency of their decision to abandon trade secrecy and instead seek patent protection on the expectation that patents will enjoy predictable enforcement as property rights leaves patentees especially vulnerable to holdup. Sticking with Jefferson's metaphor of a candle, it's important to bear in mind that blowing out someone else's light doesn't make yours brighter; it just darkens the scene for everyone.

IV. COMMERCIALIZATION IS HELPED BY OBJECTIVE ADJUDICATION RATHER THAN POLITICAL ADMINISTRATION

Commercialization does not merely depend on the specific legal rules operating within the substantive fields of IP and antitrust themselves. It also is meaningfully helped by objective approaches to government decision-making and analysis more generally, such as those operating within the courts and agencies implementing the patent system. The ITC is a prime example of a tribunal that can provide objective adjudication for patents; and its success in this area is neither an accident nor hard to reproduce.

Much has been written about the vital need to have government agencies, including those in both the fields of IP and antitrust, conduct careful, scientific, fact-based, analysis, and decision-making, that accounts for diverse views and perspectives.¹⁶ When the ITC celebrated its 100th

¹⁵ Letter of Thomas Jefferson to Isaac McPherson (Aug. 13, 1813).

¹⁶ Richard B. Stewart & Cass R. Sunstein, *Public Programs and Private Rights*, 95 HARV. L. REV. 1193 (1982); David A. Hyman & William E. Kovacic, *Why Who Does What Matters: Governmental Design and Agency Performance*, 82 GEO. WASH. L. REV. 1446 (2014).

anniversary,¹⁷ it had occasion to remember the difficult task our Nation's first Treasury Secretary, Alexander Hamilton, had to manage when figuring out how to finance the operation of our new central government while at the same time hopefully helping or at least mitigating the harm to our then-fledgling domestic manufacturing industry.

For the first century of its existence, the federal government was financed essentially with tariffs on imports. There was no income tax back then. It took until 1913 for the Sixteenth Amendment to our Constitution to be ratified, giving the federal government the power to raise revenue from sources internal to the country such as via a tax on income.

Tariffs on imports can raise money for a national government. But that will only work to the extent that imported goods continue to flow into the country despite rising prices paid by purchasers. Tariffs also can protect domestic industries, including the then-fledgling manufacturing sector, from foreign competition in finished manufactured goods. But that will only work so long as the tariffs don't also cover imported inputs to domestic manufacturing processes. Tariffs also can trigger reciprocal tariffs that can hamper exports. It can be tricky to figure out the net impact of these several forces that point in opposite directions.

Although sometimes seen as an attempt at protectionism, Hamilton's effort brought a scientific approach to bear on these questions, which led him to compile a "Report on the Subject of Manufactures" as a study of this dynamic system and to offer more balanced recommended policy actions informed by such as study.¹⁸ To be sure, Hamilton's report was just an initial effort; and the intense debates and problems surrounding the dynamic impact of tariffs continued for about a century until, together with slavery, they brought our country to war with itself in the Civil War.

By soon after the end of the Civil War, the confluence of two factors brought much-needed help. First was the evolution in the state of the art in economic science, including a much better understanding of how to gather data and analyze it. The second was the suggestion by Frank Taussig, Chairman of the Economics Department at Harvard, for a new approach to a government agency in this area.¹⁹ That new agency model, attempted a few times after the Civil War, eventually became the ITC. It has a few key structural characteristics that being replete with checks and balances coerce behavior that is collaborative, independent, analytical,

¹⁷ More about the ITC Centennial, including the entire freely available contents from a scholarly book on the topic, can be found online here: UNITED STATES INTERNATIONAL TRADE COMMISSION, *A CENTENNIAL HISTORY OF THE USITC* (Paul R. Baros ed., 2017), www.usitc.gov/documents/final_centennial_history_508_compliant_v2.pdf.

¹⁸ Douglas Irwin, *The Aftermath of Hamilton's Report on Manufactures*, 64 *J. ECON. HIST.* 800 (2004).

¹⁹ JOHN M. DOBSON, *TWO CENTURIES OF TARIFFS, THE BACKGROUND AND EMERGENCE OF THE UNITED STATES INTERNATIONAL TRADE COMMISSION* 86 (1976).

and professional, while punishing prerogative. While many of the Bi-Partisan-Commissions in the US government are led by an odd number of Presidentially-Nominated-and-Senate-Confirmed Commissioners (usually five), the ITC is designed for deadlock with an even number: six. While most of the other Commissions have a Chair who generally can serve until replaced by the President, the ITC Chair is required to switch person and party every two years, among the existing Commissioners. And, at the ITC, the Commissioner terms are longer than at many of the other commissions (nine years) and generally nonrenewable, thereby further reducing incentives for responsiveness to pressure from politics and intellectual fashion. This unleashes and empowers the vast talent of our several hundred staff of professional economists, industry experts, and lawyers to do the sometimes unthinkable within organizations: call the shots like they see them.

While the ITC is, like the federal courts, deliberately structured to be removed from the political influence of only one political party, the Department of Commerce's Patent Office, which operates the post-grant cancellation procedures for patents, as well as the Department of Justice's Antitrust Division (DoJ), are ordinary Executive Branch agencies directly responsive to the political leadership of the President. Similarly, the Federal Trade Commission, which also conducts antitrust enforcement like the DoJ, is only somewhat less directly responsive to political influence, because it is structured as a five-member agency with a Chair appointable and removable by the President, backed up by a majority in the President's party.

In addition to important differences in how these tribunals are structured internally, there also are important differences in how their basic substantive jurisdictional limits exacerbate the incentives for party advocates to engage in hyperbolic arguments. While the ITC and the federal courts have substantive power to simultaneously address issues relating to patent validity, patent infringement, remedy, and antitrust, the Patent Office, like the DoJ and FTC, do not. The Patent Office can only assess patent validity; and the DoJ and the FTC can only assess antitrust. When all four topics are in dispute within a single tribunal, each side of the case has powerful self-disciplining effect to make arguments more grounded in the record. The patentee has the selfish incentive when arguing about infringement and remedy to argue that the patent claims are broad (thereby sweeping in more infringements), but it also has the countervailing selfish incentive when arguing about validity and antitrust to assert that the patent claims are narrow (thereby avoiding the prior art and avoiding excessive market power). At the same time, the opposing party has the exact opposite set of mutually countervailing incentives. As a result, each side engages in self-restraint, providing the tribunal with a much more elaborate and thoughtfully presented (less hyperbolic) set of evidence and arguments.

The combined effects of more internal independence and less hyperbolic arguments from advocates help courts and the ITC reach more reasoned determinations

that are more transparently grounded in the record. Simply put, they enjoy the greater opportunity to be more informed by more diverse opinions and perspectives, and they face more discipline to ground their opinions in the public factual record.

One example of this politically diverse and independent approach of the ITC acting at the IP-antitrust interface is the several views that emerged engaging the specific factual record of the actual negotiating and litigation behavior of actual parties to an IP dispute in the *Amkor v. Carsem* “encapsulated integrated circuits” case involving the standard-setting organization called “JEDEC.” In that case, four of the six Commissioners provided additional views exploring various procedural safeguards akin to waiver and estoppel to maximize fairness and the ways that specific conduct of both the IP owner and the IP user can give rise to symmetrical concerns about holdup and reverse holdup.²⁰ Similar symmetrical concern for such procedural and substantive nuances is elaborated in the European Court of Justice’s (ECJ) *Huawei v. ZTE* decision, which may suggest the emergence of an international norm, at least for those parts of a government designed to operate more removed from the direct influence of only one political party.²¹

V. INTELLECTUAL PROPERTY IS NOT THAT DIFFERENT FROM TANGIBLE PROPERTY

With tangible property like land, a car, or a cell phone, the property right includes a right for the owner to use the thing covered by the property right. If you own land, a car, or a cell phone, you can basically use it without needing permission from other people. The government likely will regulate your use in many ways; but if the government so restricts your use that you can’t use it at all, then you probably have a claim against the government for just compensation due from their taking.

With intangible property like IP, the main and basically only right that the owner gets is the right to exclude other private people or businesses from infringing. That means that if the IP owner can’t actually enforce that right to exclude, there’s not much incentive for infringers to avoid infringement or to negotiate for a license or purchase of the IP. That’s why the right to exclude is so important for IP.

With tangible property like land, a car, or a cell phone, everyone can easily tell if someone is using it, because you can see them on the land, in the car, or holding the phone. With intangible property like a mortgage, a share of stock, a bond, or a patent, we have to read the detailed written words to know what the thing is, what its

²⁰ Certain Encapsulated Integrated Circuit Devices and Products Containing Same, USITC Inv. No. 337-TA-501, Commission Opinion (USITC Apr. 28, 2014), www.essentialpatentblog.com/wp-content/uploads/sites/64/2014/05/2014.04.28-Encapsulated-Integrated-Circuits-...-ITC-337-TA-501-sm.pdf. (with additional views of Aranoff, Broadbent, Kieff, and Pinkert).

²¹ *Huawei Technologies Co. Limited v. ZTE Corp.*, Case C-170/13, Judgment of the Court (Fifth Chamber, July 16, 2015), <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A62013CA0170>.

boundaries are, and who is using it. The right to exclude is the only way IP owners can easily keep track of who is using their IP and at the same time easily interact with those users so that everyone can make informed choices about whether to infringe, negotiate for a license or sale of the IP, or design around the IP to avoid infringement.

For many forms of both tangible and intangible property, we can look to a government registry to tell who owns it. Those registries are not perfect, and it can take real time to comb through them to find what you might be looking to target or avoid. But much of that work gets done by owners of those assets when they knock on your door or write you a letter and tell you why you should consider taking a license under their patent or buying their patent. You surely won't take their word for it that you should, but you also know now what your lawyers should read and consider before you decide to invest billions of dollars in a new product line that might infringe some of those patents.

Users of patented technologies complain they are too often surprised to learn they are infringers because patents can be hard to interpret. While some legal instruments are harder to interpret than others, the legal rules for each kind of instrument set the standard. In many of the patent cases that have made headlines over recent years – like *eBay v. MercExchange*, *TiVO v. Echostar*, and *i4i v. Microsoft*,²² the patents were adjudicated to have fully met each of patent law's disclosure requirements – including enablement, written description, and definiteness. While we should always consider the pluses and minuses of making objective disclosure rules like these somehow more demanding on the patentee, there will always be a zone of uncertainty between what a patent does and does not cover.

But however uncertain things may be in some settings, we shouldn't forget that in *eBay*, *TiVO*, and *i4i*, the patent infringements were adjudicated to have been willful. That means the infringer knew or should have known its conduct was wrong. It stretches the definition of surprise to reach a case where a lawyer's legal advice would have told – or did tell – the user of the patented technology that its use would be adjudicated to be infringement.

The intangible nature of patent rights is not a reason to allow parties willfully to ignore those rights. Quite the opposite: It is the very reason society has predictable rules and reliable and transparent procedures for the enforcement of those rights. Imagine you own an electronics shop and come in one morning to find a broken window and some items strewn across the floor, but it's hard to tell exactly what has been stolen. At least with tangible property like phones or chips or any physical goods in a shop you can count your inventory and see what was stolen. But, even with a theft like this of physical goods, your insurance company will still require a report by the police investigators verifying what's been taken before they cut a check

²² *Microsoft Corp. v. i4i Ltd.* 564 U.S. 91 (2011); *eBay, Inc. v. MercExchange, LLC*, 547 U.S. 388 (2006); *NTP, Inc. v. Research in Motion, Ltd.*, 418 F.3d 1282 (Fed. Cir. 2005).

to cover the loss. With intangible property like a patent, you also need a process to sort out the facts, and perhaps even more so, because you might only imperfectly know exactly what a thief has taken. Patent infringement suits help everyone in the market figure how many of each specific type of inventory has been taken, whether the USPTO somehow made an error, and what remedies are appropriate. That's why patentees often go both to the court and the ITC at the same time. The court has the full panoply of remedies in its tool belt, but takes much longer, usually several years, to reach a judgment. The ITC has many fewer remedy tools in its tool belt, but goes faster, and carries out at least as full and fair an adjudication that helps everyone in the market get a full and crisp picture of what actually has happened. It also happens to be the only venue in the US patent system today where a patentee who wins an adjudication of patent infringement has a reasonable likelihood of securing an injunction-like remedy, which at the ITC would be either an exclusion order to keep particular goods from being imported into the country or a cease and desist order preventing particular parties from taking particular actions.

Several long-standing doctrines of tangible property offer important lessons about how property rights in patents can accommodate the real apprehensions that implementers of patented technologies may be truly surprised to learn they are infringers. Property law doctrines that govern cases of a mistaken improver of another's personal property or a mistaken building encroachment on another's real property operate to protect both the interest of the mistaken infringer and the interests we all share in protecting property – including the interests of non-mistaken owners, second parties who may have invested in transacting with the owners, and non-mistaken third parties who may have invested in avoiding the property, such as by designing around the patented technology. These property doctrines go far in vindicating the accidental infringer's holdup or hassle costs due mostly to path dependency (why tear down the big building built an inch over the property line?). They also go far in vindicating the autonomy interests (and emotional interests in expressing exasperation) of the property owner, second parties who elected to transact with that owner, and third parties who paid to get better surveys and design around that owner's lot. The way property law meets those dual goals is not by making the property interest invalid or unenforceable, merely because of "innocent" infringement or evidence of "spite" in the suit. After all, aren't we all allowed to reveal emotional pique when our autonomy and financial interests are aroused due to the unilateral acts of an infringer, however "innocent" or "accidental" the infringement? The way we meet those dual goals when it comes to building encroachments and mistaken improvements is that we tailor the remedy.²³ And, of course, the tailoring of the remedy to account for

²³ *Wetherbee v. Green*, 22 Mich. 311 (1871) (on showing that good faith innocent mistake was made in taking raw wood belonging to another and working it into parts for barrels, the mistaken improver was allowed to keep the property and pay damages to the true owner).

“spite” would include all of the usual tools our legal system uses to police bad faith litigation, including Rule 11 of the Federal Rules of Civil Procedure, that even the pro-patent Federal Circuit showed it would use against bad faith patentees who brought baseless litigation suits as in cases like *Judin v. US*, which was decided at a time when critics of a property rights approach to patents saw the court as being too property rights oriented.²⁴

Other long-standing legal doctrines set a very different backdrop than suggested by patent critics concerned about implementers surprised to learn they are infringers. Implementers may very well be surprised by a patent if they did not copy the patent or derive from it. But whether an implementer has copied or derived from a patent is not relevant to the basic question of patent infringement, because the infringement doctrine of the patent system is deliberately different than the infringement doctrine in the copyright system. Infringement determinations in the patent system focus on the scope of the written claim in the patent, while infringement determinations in the copyright system focus on copying of or deriving from an earlier work of creative expression. Implementers similarly may have excellent legal title to the physical goods they use when infringing a patent, whether by bona fide gift or good faith purchase. But legal title to physical assets is no bar to infringement under any of the intellectual property regimes, just as it is no bar to enforcement of the many regulatory regimes. Implementers may also be surprised about infringement if they thought some third party had a better claim to the patent’s title than the patentee. But our property law systems have since Roman law rejected the doctrine known as the *jus-tertii* defense that otherwise would stave off a property enforcement action brought by an owner due to the possibility of some third party with a potentially better claim to ownership.

At the same time, shifting the balance back toward patent enforcement from antitrust enforcement doesn’t eliminate antitrust enforcement. There remains plenty of room for ordinary antitrust enforcement where there is actual other evidence – other than the mere presence of a patent – of actual market power. There also remains plenty of room for antitrust action where the patent was procured with knowing fraud as in *Walker Process*, or when the patent enforcement is “a mere sham to cover what is actually nothing more than an attempt to interfere directly with the business relationships of a competitor” as in

²⁴ *Judin v. United States*, 110 F.3d 780, 781 (Fed. Cir. 1997). For more on how fee-shifting in both directions, for bad faith litigation, can work better than post-grant review procedures in furthering the combined goals of both sides of the patentee-implementer debate, see, generally, F. Scott Kieff, *The Case for Preferring Patent Validity Litigation over Second Window Review and Gold Plated Patents: When One Size Doesn’t Fit All, How Could Two Do the Trick?*, 157 U. PA. L. REV. 1937 (2009); Kieff & Layne-Farrar, *supra* note 10; F. Scott Kieff & James E. Daily, *Benefits of Patent Jury Trials for Commercializing Innovation*, 21 GEO. MASON L. REV. 865 (2014).

Handguards and is both objectively baseless and subjectively motivated to cause harm to the market as in *PRE*.²⁵

VI. RECENT US PATENT SYSTEM INNOVATIONS HARM MORE THAN HELP INNOVATION

The major changes to the patent system over the past two decades, some through Congress and some through the courts, have harmed innovation, competition, and national security. They have all operated to do basically two things. One is to drastically shift many of the specific legal rules about patent validity, patent infringement, and patent transactions from generally turning on objective facts applicable the same way to everyone to generally turning on subjective discretion finely tailored to each different user. The second is to drastically add to the number and strength of administrative and bureaucratic procedures available to keep a patent from being enforced in court or at the ITC.²⁶ It's as if we read Dickens's story "A Poor Man's Tale of a Patent" and decided that the tragic caricature of a broken patent system that he was telling everyone to avoid was something we should actually seek out and put into place.

Whenever a commercial law system is so finely adapted to policy preferences of politically motivated government actors and subjectively tailored by them to each different use and user, the only kinds of businesses that can engage that system are the huge politically powerful ones. Property rights are at their worst when they are created and changed and erased at the discretion of the government, and when private actors have to include the government in every decision about whether to bundle, divide, or license or sell the property rights. That kind of system forces market actors to constantly deal with the government, and that always favors big players with more political power. That just concentrates wealth and power.

When a property rights system is working well, the rules of the game are predictable, applicable to everyone, and private actors are generally given broad flexibility to bundle or divide and license and sell the property rights among themselves. That kind of system forces market actors to constantly deal with each other. That drives competition, innovation, economic growth, and jobs.

So, what are some principal reasons that large companies might like a patent system chocked full of weak patents? The big picture is that large firms have other

²⁵ *Pro. Real Estate Inv'ts, Inc. v. Columbia Pictures Indus., Inc.*, 508 U.S. 49, 60 (1993); *Walker Process Equip. v. Food Mach. & Chem.*, 382 U.S. 172, 177 (1965); *Handguards v. Ethicon*, 601 F.2d 986, 996 (9th Cir. 1979).

²⁶ For more on changes to the patent system through case law, *see, for example*, F. Scott Kieff, *Removing Property from Intellectual Property: (Intended?) Pernicious Impacts on Innovation and Competition*, 19 SUP. CT. ECON. REV. 25 (2011). The major statutory change in this direction was the 2001 America Invents Act, which created the extensive post-grant review procedures inside the patent office.

ways to earn rents than relying on strong patents and many ways to earn rents that rely on weak patents. The BigCos can use weak patents to extract a range of significant economic benefits from various market regulators. For example, regulators focused on antitrust, consumer safety, the environment, or food and drug administration may see a BigCo's portfolio of weak patents as sufficient evidence of innovation to justify more regulatory relief or leeway over pricing. Similarly, regulators focused on tax treatment of inter-business and international transfer pricing may see a BigCo's portfolio of weak patents as appropriate offsets against sources of income that otherwise would be taxed at higher rates. Importantly, these BigCo benefits from portfolios of weak patents often can be extracted even if the patents are very weak, because unlike any of these regulatory or tax authorities, alleged infringers have strong incentives, expert access to technological facts, and expert ability to evaluate the host of issues that ordinarily arise in the context of a possible or actual patent infringement litigation in district court or at the ITC. But little firms have a vital need for strong patents and little use for weak patents, and the little firms face significant costs from the BigCos raising all available arguments against even the strongest of patents. Hence BigCos love a patent system full of lots of weak patents. The Goliaths can then be sure no Davids will show up with a fatal slingshot.

It is so tempting to think that IP is just about money and that money damages, or maybe even tax credits or other direct targeted incentives are all that is needed. Why gum up the works of the market with so many injunctions?

The better question is to ask why it's best to have the government figure out everyone's relative contribution, or merit, and trace it all the way through a complex commercialization process, and then pay each person her due, which presumably is just enough to entice them away from their other options to do each specific step, and no more and nothing else.

This ardent search for scientific evidence of the true value of an infringed patent is what unfortunately led even the distinguished Judge Posner to strike the economics experts of both sides of a patent case from offering damages testimony, because he viewed them as insufficiently grounded in scientific evidence or historical fact.²⁷ But where an infringer has decided to infringe rather than buy title or license to the patent, we also know the search for historical or scientific evidence of what price would have met the needs of both a willing buyer and a willing seller is entirely fictional. It will always be a frustrating search for scientific and historical fact when the specific topic has already been demonstrated to be a figment of imagination.

Commercializing innovative, creative, and distinctive goods and services requires a ton of coordination among a ton of private actors spread out across the marketplace. We are talking about much more than inventing or creating. We are talking about bringing it all the way to market. That takes a complex dance among inventors or creators, entrepreneurs, venture capitalists, managers, manufacturers, marketers,

²⁷ *Apple v. Motorola*, 869 F. Supp. 2d 901 (N.D. Ill. 2012).

distributors, and owners of other key assets, tangible and intangible, including other creations or inventions.

When IP is governed by a predictably enforced set of rules and backed up by a right to exclude rather than a mere right to some payment, it stands like a beacon in the dark, drawing to itself all of those many different actors in the commercialization process. They can decide on their own to strike whatever deals with each other that they like, or not, and to practice the IP subject matter or design around. The government then needs to merely enforce whatever deals they strike. No player needs to reveal to any other player or to the government what outside options it is considering, or what internal economics it faces. That keeps the government far away from the need to do any fine-grained analysis of the specific merit and incentives that may have been best tailored to each step in the long and complex process of commercialization. The government doesn't need to trace contributions or allocate values. All the government has to do is enforce any valid IP rights to exclude, and any contractual rights to payment negotiated by the parties on their own terms.

Justice Thomas is correct that a public right like a public franchise to build a toll bridge is something that requires intense scrutiny.²⁸ He's also correct that the patent system that has evolved over the past 20 years has gone way too far in that same direction. But, of course, that's just one more reason to steer course back to the patent system we had in the 1980s and 1990s. That was a patent system that brought us a massive increase in the number of new pharmaceuticals and new medical devices brought to market, while at the same time supporting both large pharmaceutical companies as well as a large pool of small and medium-sized biotechnology companies.

Notice also that the US patent system of the 1980s and 1990s was the product of both political parties in the United States. It also was unique to the United States. While many of the people and inventions and companies were located in Europe or Japan, only the patent system in the United States was operating so strongly at that time and that strong US patent system supported commercialization and competition for the world. It even supported the lesser-developed countries of the world. As those countries started to enforce these biopharma patents the same way as in the United States, distribution into areas of high poverty actually increased immensely while prices in those poverty-stricken areas did not increase beyond the small amounts associated with local regulation and distribution.²⁹

²⁸ *Oil States Energy Servs. v. Greene's Energy Grp.*, 584 U.S. 1365, 1375 (2018) (a case focusing on the administrative tribunals inside the USPTO).

²⁹ US International Trade Commission, *Economics Impact of Trade Agreements Implemented under Trade Authorities Procedures*, 2016 Report at 80, (Publication Number: 4614, Investigation Number: 332-555, June 2016), www.usitc.gov/publications/332/pub4614.pdf (citing Mark Duggan et al., *The Market Impacts of Pharmaceutical Product Patents in Developing Countries: Evidence from India*, 106 AM. ECON. REV. 99 (2016)) ("2005 implementation of patent protection for pharmaceutical products in India increased average prices only slightly, and also had little impact on quantities").

VII. CONCLUSION

Today's technology and business professionals working to bring to market all the great promise of 5G and IoT are making an amazing contribution to our society today and tomorrow. Today's legal and policy professionals wrestling on all sides of the debates about the patent-antitrust interface raise great questions, in good faith, with the shared goal of fostering a better and more diverse and more inclusive society for us all, today and tomorrow, fostered by innovation and competition. While the debates are of the moment, they are also echoes of those long waged at least across the past century and a half. A prudent policymaker of today can save a great deal of time, effort, and unintended consequences for all, by bearing in mind the ideas explored here, that are extracted from those historical debates and that have enjoyed great support from leaders across our domestic political spectrum.