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INTELLECTUAL PROPERTY AND TRANSACTIONAL CHOICE: RETHINKING THE IP/ANTITRUST DICHOTOMY

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I. INTRODUCTION

In antitrust jurisprudence and scholarship, it is common to characterize intellectual property ("IP") rights in general, and patents in particular, as a type of "monopoly."[2] Economists widely construe IP rights as sources of monopoly power that distort competitive markets.[3] A search of the Google Scholar federal case law database as of May 2022 finds 2,430 decisions that use the phrase, "patent monopoly." The "patent-as-monopoly" assumption has important implications for antitrust jurisprudence and scholarship, which often characterize patents as a special carve-out from antitrust law's commitment to competitive markets.[4] While agency guidelines and federal case law state that an IP right is not sufficient evidence of market power without supporting evidence[5], the patent-as-monopoly assumption continues to influence judicial opinions, regulatory action, and scholarship on the relationship between patents and antitrust law. Most critically, this assumption supports the conventional dichotomy drawn between antitrust law, which is committed to preserving competitive markets, and intellectual property rights, which purportedly confer monopoly entitlements to promote innovation.

Yet an inconvenient fact runs counter to this allegedly dichotomous relationship between patents and antitrust law. Following the standard assumption, it would be expected that incumbents would generally favor patents and, in particular, favor policy actions that strengthen and extend patent protection. However, real-world markets often fail to conform to this expectation. As I discuss, historical and contemporary evidence shows that larger firms in a variety of industries (outside the biopharmaceutical industry) tend to express policy positions that seek to weaken patents or, in some cases, reject them entirely. Following the patent-as-monopoly assumption, this is a curious finding since an incumbent would be expected to welcome a legal entitlement that can protect or enhance its pricing power by impeding the entry of potential competitors.

In this contribution, I address the puzzle raised by the IP policy preferences expressed by larger firms in certain technology markets and, specifically, the empirical challenge this puzzle poses for the conventional IP/antitrust dichotomy that remains an important fixture of antitrust law and scholarship.

Resolving this puzzle sheds light on a critical function played by patents in mitigating the expropriation risk that can impede a myriad of value-enhancing arrangements involving entities that have complementary assets and capacities in the innovation and commercialization process that leads to market release. Without patents, the expropriation risk to which innovators are exposed when negotiating and executing a business relationship with investors, producers, distributors or other firms (especially, sophisticated and well-resourced firms) may discourage innovators from entering into these transactions altogether. Expanding transactional choices in technology markets promotes competition by lowering entry barriers for firms that specialize in innovation but lack the capital or expertise to execute independently the commercialization process. When patents are weakened, expropriation risk re-emerges and innovation tends to concentrate in firms that can monetize R&D through a vertically integrated production and distribution infrastructure or a horizontally integrated product and service ecosystem. Contrary to the standard IP/antitrust dichotomy, weakening IP rights can result in adverse innovation and competition policy outcomes by impeding disaggregated supply chains that facilitate entry by specialized innovators and disseminate technology inputs among producers and other intermediate users. Strengthening IP rights tends to reverse these outcomes.

This contribution proceeds as follows. In Part II, I review historical and contemporary evidence on IP policy preferences among different firm and industry types. In Part III, I discuss the economic logic that can account for these differences in IP policy preferences. In Part IV, I discuss the implications that this evidence holds for conventional understandings of the relationship between IP law and antitrust law. Part V concludes.

2 On this point, see Giles S. Rich, Are Letters Patent Grants of Monopoly? 15 Western New Eng. L. Rev. 239 (1993). For further discussion, see Jonathan M. Barnett, *The "License as Tax" Fallacy*, Mich. Tech. L. Rev. (forthcoming 2022).

3 See e.g. Joseph E. Stiglitz, *Economic Foundations of Intellectual Property Rights*, 57 Duke L. J. 1698, 1700 (2008) (stating that intellectual property "creates monopoly power" and leads to "major distortions of resource allocations").

4 See e.g. Michael A. Carrier, *Unraveling the Patent-Antitrust Paradox*, 150 U. Penn. L. Rev. 761, 796-97 (2002) (referring to the "patent-antitrust conflict" and "the costs of the patent monopoly").

5 *Illinois Tool Works, Inc. v. Independent Ink*, 126 S. Ct. 1281, 1293 (2006) (rejecting the presumption that IP rights confer market power without specific supporting evidence); U.S. Dept. of Justice & Federal Trade Commission, Antitrust Guidelines for the Licensing of Intellectual Property (Apr. 6, 1995), at § 2.2 (stating that the agencies "will not presume that a patent, copyright or trade secret necessarily confers market power upon its owner"). The 1995 guidelines were largely reaffirmed by the agencies in 2017, see U.S. Dept. of Justice & Federal Trade Commission, Antitrust Guidelines for the Licensing of Intellectual Property (Jan. 12, 2017).

II. EVIDENCE ON PATENT POLICY PREFERENCES

Both historical and contemporary evidence shows that firms in a wide range of industries tend to advocate or support policy actions that weaken patents or block the extension of patents to new technologies. Expressed preferences for weak patent protection are most consistent in the case of firms that maintain vertically or horizontally integrated structures for converting innovations into commercially viable products and services. In contrast, expressed preferences for robust patent protection are most consistent in the case of entities that specialize in innovation but lack complementary assets and capacities to convert innovations independently into commercially viable products or services.

A. Historical Evidence

Two episodes from U.S. technology history can illustrate the resistance of large firms to the strengthening or extension of patent protections.[6] These two episodes also illustrate how, contrary to the standard IP/antitrust dichotomy, weakening IP protection can impede entry and strengthening IP protection can have the opposite effect.

In the mid- to late-19th century, the railroad industry sought to secure judicial precedents to overturn the "savings doctrine," which had inflated the damages awarded to patent owners in infringement litigation, and to establish claim construction principles that would construe patent scope narrowly.[7] Using rhetoric reminiscent of the language used today to describe non-practicing patent owners, the railroads disparaged patent owners that brought infringement suits as "patent dealers" that sought to impose a tax on the industry as a whole. This characterization obscured the fact that patent owners were often individual or small-firm inventors (such as George Westinghouse, the inventor of the air brake that increased railroad safety) who designed component-level innovations and sought to extract value on those innovations through licensing or assignment transactions with the railroads. The railroads' campaign was successful, resulting in favorable Supreme Court decisions on both points in 1871 and 1878.[8] But the railroads' success in altering the trajectory of patent law may have harmed the innovative vigor of the industry as a whole. Historical evidence shows that technological innovation in the railroad industry was subsequently undertaken mostly within the railroads' technical departments and concentrated on incremental cost-reducing improvements to existing technology.[9]

In the 1960s, IBM was the largest firm by far in the national and international computing industry.[10] IBM and other hardware manufacturers generally sold integrated computing packages that bundled hardware and software components. Independent producers of software principally operated on a contractual basis, providing customized software on a client-specific basis. As a federal governmental commission considered whether Congress should provide some form of IP protection for software through patent law, copyright law, or a sui generis right, IBM and other hardware manufacturers opposed all three possibilities. Ultimately, IP protection was definitively extended to software through copyright (by statutes enacted in 1976 and 1980)[11] and patent law (by a Supreme Court decision in 1981).[12] Concurrently with these extensions of IP protection, an independent market in software developed, enabling businesses and home users to "mix and match" hardware with a rich menu of software products.

In the case of both the 19th-century railroad and the 20th-century computing industries, incumbents' behavior diverged from the IP-as-monopoly assumption and policy outcomes departed from the IP/antitrust dichotomy. In the railroad industry, incumbents sought (successfully) to reduce the strength of IP protections. The economic logic is clear. The railroads maintained horizontally integrated structures in which innovations were monetized by being embedded within a complex product and services ecosystem that was not easily amenable to replication.

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6 For a fuller account, see Barnett, *supra* note 1, at 140-45.

7 This paragraph is informed by Steven W. Usselman, Regulating Railroad Innovation: Business, Technology and Politics in America, 1840-1920 (Cambridge Univ. Press 2002); Steven W. Usselman, *Patents, Engineering Professionals, and the Pipelines of Innovation*, in Learning by Doing in Markets, Firms, and Countries 61-102 (eds. Naomi R. Lamoreaux, Daniel M.G. Raff, and Peter Temin, Univ. Chicago Press 1999) [hereinafter Usselman 1999]; Steven W. Usselman, *Patents Purloined: Railroads, Inventors, and the Diffusion of Invention in 19th-Century America*, 32 Tech. & Culture 1047 (1991).

8 *Chicago & N.W. Railway Co. v. Sayles*, 97 U.S. 554, 556-57 (1878) (stating that courts should generally construe patent claims narrowly); *Mowry v. Whitney*, 81 U.S. (14 Wall.) 620, 650-51 (1871) (limiting infringement damages to the incremental benefits enjoyed by the infringer relative to all other non-infringing equivalent processes then available in the market).

9 See Usselman, *supra* note 7, at 186-89; Usselman 1999, *supra* note 7, at 76-80.

10 This paragraph is informed by Barnett, *supra* note 1, at 142-45.

11 Copyright Act of 1976, § 102(a), Pub. L. No. 94-553, 90 Stat. 2541 (codified at 17 U.S.C. § 102(a)) (definition of "original works of authorship"); Copyright Revision Act of 1982, § 101, Pub. L. No. 94-553, 90 Stat. 2541 (codified at 17 U.S.C. § 101 (1982)) (definition of "literary works")).

12 *Diamond v. Diehr*, 450 U.S. 175 (1981).

For the railroads, a robust patent system was unnecessary to protect internally developed innovations and increased the costs of using externally developed innovations. In the computing industry, incumbents sought (unsuccessfully) to block the extension of IP protection to software. Again, the economic logic is clear. Hardware manufacturers maintained vertically and horizontally integrated structures in which software innovations were monetized within a complex product and service package, and vertically integrated production and distribution infrastructure, that was not easily amenable to replication. As the manufacturers correctly anticipated, the extension of IP protection enhanced competitive conditions by enabling software developers to enter the market on a "stand-alone" basis without an associated hardware product.

B. Contemporary Evidence

For over two decades, there has been an intensive debate over proposed changes to weaken the patent system through legislative and judicial action. To gather data systematically on the expressed views among different firm and industry types concerning these proposed (and, in many cases, implemented) changes, I collected all amicus briefs filed in Supreme Court cases primarily relating to patent law during 2006-2016. The Table below presents some of the key findings.[13]

Table 1: Amicus Briefs in Patent-Related Supreme Court Cases (2006-2016)

Industry Type	Total Number of Briefs Filed	Favors Patentee	Favors Alleged Infringer	Favors Neither Party
All business entities	740	30%	56%	14%
Fortune 500 firms	266	21%	65%	14%
ICT	388	10%	75%	15%
ICT (platforms)	77	1%	87%	12%
ICT (semiconductors)	39	21%	72%	8%
Financial services	47	11%	81%	9%
Automotive	19	5%	84%	11%
Biopharmaceuticals	89	75%	19%	6%
Academic research (incl. technology transfer)	82	96%	1%	2%
Venture capital	26	100%	0%	0%

Source: This Table is adapted from Barnett, *supra* note 1, at 147 Table 7.2.

Notes: The percentage figures in some rows may not sum exactly to 100 percent due to rounding. "Filed" means that an entity is a signatory to a brief. An entity filing a brief is deemed to support the patent owner, alleged infringer, or neither party based on the brief's opening statement of its position. Filers are allocated to industry types based on information in each entity's annual report or website.

This data supports three notable findings. First, in general, business entities tended to favor the alleged infringer and this preference increased among larger "Fortune 500" firms. Second, three industries mostly tended to favor the alleged infringer: information and communications technology ("ICT"), financial services, and automotive. Within the ICT industry, platform firms almost always tended to favor the alleged infringer while there was a significant minority of semiconductor firms that favored the patent owner. Third, three industries mostly tended to favor the patent owner: academic research (including technology transfer divisions but excluding briefs filed by individual academics), venture capital ("VC"), and biopharmaceuticals.[14]

These findings diverge from the expectations of the patent-as-monopoly assumption, which would expect that business entities, and especially larger firms, would tend to favor robust patent protections that offer pricing power by erecting entry barriers against entrants. Rather, preferences for robust patent protections prevailed only in certain industries (biopharmaceuticals) and among certain firm types irrespective of

13 For all findings, see Barnett, *supra* note 1, at 146-50.

14 While not shown in the Table, the data on amicus briefs show that the chemical and agricultural industries also favored the patentee most of the time.

industry (academic research entities and VC firms, which arguably reflect the preferences of startups funded by VC firms). Other industries, and larger firms irrespective of industry (except biopharmaceuticals), tend to express preferences for weaker patent protections.

A simple pattern appears to govern these differences in patent policy preferences across firm and industry types. As was the case in the railroad and computing industries, firms that are integrated vertically or horizontally tend to resist robust patent protections. With some exceptions, firms in the ICT, automotive, and financial services industries tend to operate under either horizontally integrated models (a large bank offers customers a range of complementary services accessible through a single institutional interface) or vertically integrated models (an automotive manufacturer typically maintains a financing, production and distribution infrastructure). By contrast, firms and other entities (such as academic research entities or VC firms and the startups backed by VC firms) that specialize primarily in the innovation segments of the technology supply chain, and typically lack production and distribution capacities, tend to express a preference for robust patent protection. As will be discussed subsequently,[15] the biopharmaceutical industry presents an exception to this pattern since all firms in the industry, irrespective of the degree of integration, tend to favor robust patent protection.

III. WHY DO INTEGRATED FIRMS USUALLY PREFER WEAK PATENTS?

Patent policy preferences expressed by a range of industries and entity types, across multiple historical periods, often diverge from expected policy preferences based on the IP/antitrust dichotomy and associated IP-as-monopoly assumption. Most notably, there appears to be an inverse relationship between patent-favorable policy preferences and a firm's degree of integration. Generally speaking, as a firm or industry type exhibits a greater degree of integration (whether vertical or horizontal), it tends to exhibit a preference for weaker patent protections, and *vice versa*. In this Part, I explore the economic logic that can account for this apparent relationship between patent policy preferences and a firm or industry's degree of integration.

A. The Economic Logic of Patent-Skeptical Preferences

Patent-skeptical entities tend to populate the ICT, financial services, and automotive industries (with an important exception in the semiconductor segment of the ICT industry, which I discuss subsequently).[16] In these industries, firms can capture value on an innovation (whether originated or imitated) by embedding it within a horizontally integrated suite of products and services that is difficult for others to replicate. Additionally, in the automotive industry, firms can capture value through a vertically integrated production, distribution, and customer-service infrastructure that is not readily amenable to replication. As a result, firms in these industries are not especially reliant on patent protection to capture returns on innovation and are implicitly advantaged by a weak-patent environment that compels entrants to monetize innovations through vertically or horizontally integrated structures that often demand significant capital and expertise to construct and maintain.

To illustrate this point, consider the competition between Microsoft and Netscape in the early years of the internet browser market. While Netscape pioneered the technology and was initially the market leader, it apparently lacked a sufficiently robust IP portfolio to deter imitation. Microsoft was able to replicate the functionalities of the browser and then monetize its R&D investment by embedding its browser in the Windows operating system, a bundled product package that Netscape could not feasibly replicate. (Note that this replicates IBM's bundling strategy in the computing market prior to the extension of IP protection to the software market.) In this weak-IP environment, Netscape rapidly lost market share and was ultimately compelled to exit the market, leaving Microsoft as virtually the only provider. In this case, the absence of IP protection precluded the originator from capturing value on its innovation and drove the market toward a winner-take-all outcome.

B. The Economic Logic of Patent-Favorable Preferences

The inverse relationship between the degree of integration and patent policy preferences can explain why three industries consistently favor robust patent protection: academic research, venture capital, and biopharmaceuticals. To appreciate the commonality among these entities, consider the following three hypothetical entities: (1) the technology transfer division of a research university that specializes in the development of influenza vaccines, (2) a biotech start-up that specializes in the same area, and (3) a VC firm that funds startups in the same area. All three entities have a policy preference for robust patent protection, which facilitates relationships between an innovator and suppliers of the testing, production, and distribution services without which a biopharmaceutical product cannot achieve market release.

15 See *infra* Part III.C.

16 See *infra* note 23.

This example is not entirely hypothetical. Rather, it approximately describes the path to market followed by BioNTech, the scientists-founded startup behind the COVID-19 vaccine that it developed, produced, and distributed in partnership with Pfizer, a large pharmaceutical firm. The ability of BioNTech to protect its vaccine technology through a portfolio of patents and patent applications in multiple jurisdictions[17] enabled it to initially secure VC funding[18] and subsequently to negotiate, structure, and execute a complex global partnership with Pfizer. Contrary to the IP/antitrust dichotomy, the availability of patent protection did not promote investment in vaccine development at the expense of market competition. Rather, the patent system enabled entry by a startup by providing it with a tool to protect against expropriation risk when entering into transactions with sophisticated and well-resourced suppliers of the financing, production, and distributing inputs that were necessary to achieve market release on a global scale. The result was a "win-win" outcome as a matter of both innovation and competition policy.

C. The Biopharmaceutical "Exception"

The transactional function of patents in facilitating information-exchange transactions prior to market release does not mean that patents no longer play the conventional function of deterring imitators following market release. In the biopharmaceutical market, this post-release function is critical because the costs of drug development are exceptionally high both in absolute terms (estimates exceed $3 billion, taking into account the costs of failed projects)[19] and relative terms compared to the imitation costs incurred by generic producers. These cost considerations, compounded by the high risk of project failure, explain why even large vertically integrated firms in the pharmaceutical industry support robust patent protection, unlike large integrated firms in most other industries. Post-release imitation risks may also explain why even large integrated firms in a broader range of industries may favor weak, rather than no, patent protection as a supplement to non-patent mechanisms to capture value on innovation.

IV. POLICY IMPLICATIONS: EVIDENCE FROM THE SEMICONDUCTOR INDUSTRY

Evidence on the patent policy preferences of different industries and firm types challenges the standard IP/antitrust dichotomy and the underlying characterization of patents as a monopoly entitlement that necessarily detracts from competitive conditions. In a broad range of industries and historical periods (which I discuss in greater detail in a book-length publication),[20] patents promote both innovation and competition by facilitating entry by entities that specialize in innovation and rely on contractual relationships to secure the financing, production, and distribution inputs required to reach market.

Robust patent protections can benefit not only innovation specialists in particular but the innovation ecosystem in general. This is for two reasons. First, as demonstrated by historical and empirical evidence, smaller "maverick" firms are often the most fertile sources of breakthrough innovations that challenge, rather than merely refine, existing technological paradigms.[21] Second, patents can facilitate the dissemination of technology inputs throughout the innovation ecosystem by reducing expropriation risk and consequently enabling licensing and similar information-exchange relationships among innovators, producers and other users. This can have a favorable impact on competitive conditions by expanding access to the "upstream" technology inputs that are necessary to achieve entry in the "downstream" segments of the supply chain.

The competition-enhancing effects of patents can be illustrated by studying the impact of increased patent usage on the organization of innovation and commercialization activities in the semiconductor industry.[22] In the industry's early decades following World War II, firms principally relied on a vertically integrated model in which chip design, production, and other supply-chain functions were undertaken within the same entity. During this period, semiconductor firms did not rely extensively on the patent system, as indicated by relatively modest patent application, litigation, and licensing activity. Following the establishment of the Court of Appeals for the Federal Circuit and the consequent strengthening of patent protections in the 1980s, however, patenting rates for semiconductor innovations increased and, in the 1990s and 2000s, accelerated significantly. Concurrently, some firms broke from industry norms that had discouraged patent litigation and licensing.

17 For information on BioNTech's patent portfolio, see BioNTech Group, Form 20-F, filed with the U.S. Securities and Exchange Commission (Mar. 30, 2021), at 157-58.

18 *Early backers of vaccine maker BioNTech in $719 million payday*, Reuters, Feb. 4, 2021, https://www.reuters.com/article/us-health-coronavirus-biontech-investors-idUSKBN2A424F.

19 Joseph DiMasi, Henry G. Grabowski, and Ronald W. Hansen, *Innovation in the pharmaceutical industry: New estimates of R&D costs*, 47 J. Health Econ. 20 (2016).

20 See Barnett, *supra* note 1.

21 *Id.* at 54-56.

22 This discussion is informed by Barnett, *supra* note 1, at 125-28; Jonathan M. Barnett, *Intellectual Property as a Law of Organization*, 84 S. Calif. L. Rev. 785, 838-853 (2011).

Following standard expectations, sharply increasing patent usage would raise both innovation concerns due to higher transaction costs and competition policy concerns due to higher entry barriers. While the transaction costs associated with litigation and licensing activity may have increased, there was no adverse impact on entry conditions. To the contrary. Together with concurrent technological developments, increased use of the patent system facilitated the emergence of a "fabless" business model in which a firm specializes in chip design and outsources the costly and complex process of chip production (or "fabrication") to specialized outside producers (or "foundries"). Just as in the case of partnerships between startups and large pharmaceutical firms in the biotech industry, patents enabled chip-design firms and foundries to engage in information exchange with reduced risk of knowledge leakage. (This may account for the significant minority of semiconductor firms that filed amicus briefs favoring the patentee in the data presented previously).[23]

Patent-enabled cooperative relationships had two favorable effects on competitive conditions. First, the ability to outsource chip production dramatically lowered entry barriers by relieving entrants from incurring the billions of dollars in expenditures required to construct and maintain an independent fabrication facility. This result is a transactionally diverse market that is now populated by a mix of integrated and non-integrated firms: as of 2020, fabless firms represented almost 33 percent of global integrated-circuit sales, compared to almost 28 percent in 2012 and 13 percent in 2002.[24] Second, patents enabled the market to achieve specialization efficiencies by allocating supply-chain functions to the most efficient provider, bringing total costs to the technologically feasible minimum. Hence even integrated firms in the semiconductor industry now outsource certain tasks to foundries and other external providers. Contrary to the IP/antitrust dichotomy, increased use of the patent system not only promoted innovation but enhanced competitive conditions and facilitated specialization in the industry as a whole. By implication, policy actions to weaken patent protections would have impeded this favorable outcome, potentially resulting in a market characterized by higher entry barriers, excessive integration, and increased concentration, and consequently, higher prices for end-users of semiconductor-enabled products.

V. CONCLUSION

Scholars, courts, and regulators have extensively addressed the relationship between IP and antitrust law. It has generally been assumed that these bodies of law pursue divergent policy objectives that require an inevitable tradeoff between encouraging innovation through IP rights and promoting competition through antitrust law. Evidence on the patent policy preferences of different firm and industry types, complemented by evidence on the impact of patents on entry conditions and market structure, suggest that conventional wisdom fails to anticipate policy outcomes in a wide range of industries. Specifically, patents can often promote both innovation and competition by enabling transactional mechanisms that facilitate entry by firms that can "out-innovate" incumbents but fall short in executing the commercialization functions necessary to achieve market release. In those circumstances, IP and antitrust law do not stand at odds; rather, they work together in pursuit of the complementary objectives of enhancing innovative and competitive intensity.

23 See *supra* Table 1.

24 *Fabless Company Share of IC Sales to Set New Record in 2020 at 32.9%*, IC Insights, Dec. 29, 2020, https://www.icinsights.com/news/bulletins/Fabless-Company-Share-of-IC-Sales-To-Set-Record-In-2020-At-329-/#.