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Innovative Antitrust and the Patent System

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Gregory Day*

Innovative Antitrust and the Patent System

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I. INTRODUCTION

The scope of antitrust law has narrowed over the past forty years.¹ Today, there is a consensus that antitrust law should, as its sole purpose, promote the economic interests of consumers.² To achieve this end, modern antitrust law scrutinizes anticompetitive practices that tend to increase prices or reduce output.³ Lesser understood, however,

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1. Joshua D. Wright & Douglas H. Ginsburg, *The Goals of Antitrust: Welfare Trumps Choice*, 81 *FORDHAM L. REV.* 2405, 2405–06 (2013) (explaining how the judicial and scholarly evolution of antitrust law, which began in the 1970s, led antitrust law to adopt an exclusively economic perspective, shedding social and political goals).
 2. Barak Y. Orbach, *The Antitrust Consumer Welfare Paradox*, 7 *J. COMPETITION L. & ECON.* 133, 133–34 (2010) (“All antitrust lawyers and economists know that the stated instrumental goal of antitrust laws is ‘consumer welfare,’ which is a defined term in economics.”); Wright & Ginsburg, *supra* note 1, at 2405–06; *see also* HERBERT HOVENKAMP, *THE ANTITRUST ENTERPRISE: PRINCIPLE AND EXECUTION* 2 (2005) (asserting that since antitrust’s “counterrevolution of the 1970s and 1980s . . . [.] [t]he only articulated goal of the antitrust laws is to benefit consumers, who are best off when markets are competitive”).
 3. Richard D. Cudahy & Alan Devlin, *Anticompetitive Effect*, 95 *MINN. L. REV.* 59–60 (2010) (“[T]here is widespread agreement that monopoly, which is characterized by artificially high prices and low levels of market output, is undesirable.”); Howard A. Shelanski, *Information, Innovation, and Competition Policy for the Internet*, 161 *U. PA. L. REV.* 1663, 1669–70 (2013) [hereinafter Shelanski, *Competition Policy*] (“Conventional antitrust analysis focuses on the relationship between firms’ conduct and market performance, as measured through prices and output levels of relevant products and services.”). The view that antitrust law’s primary focuses are increased prices and reduced output remains true when studying only merger review. *See* Michael L. Katz & Howard A. Shelanski, *Mergers and Innovation*, 74 *ANTITRUST L.J.* 1, 2 (2007) (“At the heart of merger policy is antitrust law’s presumption that greater competition in the form of reduced product-market concentration brings improved market performance and increased consumer benefits in the form of lower prices, higher quality, and higher output.”). These same concerns are paramount in antitrust cases challenging exclusionary behavior. *United States v. Am. Express Co.*, 838 F.3d 179, 194 (2d Cir. 2016). Further, antitrust actions initiated by private actors must allege an “antitrust injury,” which, likewise, concerns higher prices and reduced output. *Wagner v. Magellan Health Servs., Inc.*, 121 F. Supp. 2d 673, 681 (N.D. Ill. 2000) (“The antitrust injury doctrine requires that every antitrust plaintiff show that his loss results from actions that reduce output or raise prices to consumers.”); *see also* *Laumann v. Nat’l Hockey League*, 907 F. Supp. 2d 465, 480 (S.D.N.Y. 2012)

is the manner in which innovation fits into this framework.⁴ Although few deny that innovation enhances consumer welfare, the preservation of the market's incentives to innovate did not become a serious objective of antitrust litigation until the 1990s.⁵ At the forefront of this development have been the two antitrust agencies—the Federal Trade Commission (FTC) and the Department of Justice Antitrust Division (DOJ)—which have both sought to make innovation a greater focus of competition law.⁶

The value of promoting innovation through antitrust law can hardly be understated. Economists take it as settled that innovation is one of the primary determinants of economic growth.⁷ In addition to the superior goods and methods introduced by innovation, the activity of research and development (R&D) creates “spillover effects” that include boosting human capital, investment, and employment.⁸ As a result, antitrust's ability to generate innovation may benefit society more than its conventional purpose of fostering competitive prices.⁹

Innovation, though, may struggle to flourish in uncompetitive markets, especially when a firm has accrued overly concentrated market power. This is because once an actor gains monopoly power, the motivation to innovate can dissipate. As one commentator explained, “the monopolist faces little incentive to innovate because a new innovation

(alleging defendants attempted to eliminate competition in the distribution of baseball and hockey games); John E. Lopatka & William H. Page, *Who Suffered Antitrust Injury in the Microsoft Case?*, 69 GEO. WASH. L. REV. 829, 831 (2001) (“The most reliable measure [of an antitrust injury] is the immediate effect of the practice on output and prices.”).

4. See Richard J. Gilbert & Hillary Greene, *Merging Innovation into Antitrust Agency Enforcement of the Clayton Act*, 83 GEO. WASH. L. REV. 1919, 1921 (2015) (stating that antitrust law has “struggled” to incorporate innovation into its jurisprudence); David McGowan, *Innovation, Uncertainty, and Stability in Antitrust Law*, 16 BERKELEY TECH. L.J. 729, 733 (2001) (discussing the uncertainty obscuring the relationship between antitrust law and innovation).
5. See Gilbert & Greene, *supra* note 4, at 1926 (noting that the agencies did not incorporate innovation into merger policy until 1992).
6. See, e.g., J. THOMAS ROSCH, FED. TRADE COMM'N, *ANTITRUST REGULATION OF INNOVATION MARKETS* 5–9 (2009) (discussing the emphasis that the agencies are giving to innovation and innovation markets).
7. NATHAN ROSENBERG, *INNOVATION AND ECONOMIC GROWTH* 1 (2004) (“It is taken as axiomatic that innovative activity has been the single, most important component of long-term economic growth . . .”).
8. See ORGANISATION FOR ECON. CO-OPERATION & DEV., *THE KNOWLEDGE-BASED ECONOMY* 7 (1996) (explaining the benefits of knowledge-based economic systems that emphasize science and technology, including increases in highly skilled labor).
9. Jonathan B. Baker, *Beyond Schumpeter vs. Arrow: How Antitrust Fosters Innovation*, 74 ANTITRUST L.J. 575, 576 (2007); Shelanski, *Competition Policy*, *supra* note 3, at 1674 (“Antitrust authorities and scholars have long maintained that innovation is more important to economic growth and social welfare than price competition among existing products.”).

would not increase the monopolist's market share."¹⁰ In fact, monopolists may insulate their market power by obstructing competitors from innovating technology that would compete against their product lines.¹¹ For example, with respect to corporate mergers, a firm can curtail the R&D efforts of a rival company by acquiring and dissolving that company, reducing competition and innovation.¹² Likewise, an inventor may refuse to license her patented technology to competitors whose ability to innovate depends upon, or would benefit from, using that technology.¹³ In this view, innovation is a form of competition.

Even though a lack of competition can stifle innovation, there is strong disagreement about whether antitrust offers a suitable remedy.¹⁴ The case in favor of making innovation a goal of antitrust law is that antitrust enforcement advances competition, which forces firms to innovate as a means of surviving the competition. Since the FTC and DOJ formally adopted this position, antitrust filings—by both the agencies and private parties—have increasingly asserted that diminished innovation qualifies as an antitrust violation.¹⁵ For example, in 2017, the FTC claimed that Qualcomm transgressed antitrust law by making and then breaching commitments to license certain patents to competitors, “reduc[ing] competitors’ ability and incentive to invest and innovate” along with other anticompetitive harms.¹⁶

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10. William Hubbard, *The Debilitating Effect of Exclusive Rights: Patents and Productive Inefficiency*, 66 FLA. L. REV. 2045, 2079 (2014); see also McGowan, *supra* note 4, at 733 (remarking that those with market power would prefer to protect their market power, even at the behest of innovation).
 11. SUSAN S. DESANTI ET AL., FED. TRADE COMM’N, TO PROMOTE INNOVATION: THE PROPER BALANCE OF COMPETITION AND PATENT LAW AND POLICY 13 (2003) (asserting that patent rights can cause the patentee to “obtain unwarranted market power or interfere with competition in a variety of ways”).
 12. Baker, *supra* note 9, at 592; see also *United States v. Anthem, Inc.*, No. 16-1493, 2017 WL 527923, at *2 (D.D.C. Feb. 8, 2017) (alleging that a proposed merger would eliminate competition, reducing innovation); Michael A. Carrier, *Two Puzzles Resolved: of the Schumpeter–Arrow Stalemate and Pharmaceutical Innovation Markets*, 93 IOWA L. REV. 393, 399 (2008) (“[A] merger between the only two (or two of a few) firms in R&D might increase the incentive to suppress at least one of the research paths. With no other firms ready to enter the market, the merging firms might not wish to introduce a second product that would reduce sales of the first.”).
 13. Robert Pitofsky, *Antitrust and Intellectual Property: Unresolved Issues at the Heart of the New Economy*, 16 BERKELEY TECH. L.J. 535, 549 (2001).
 14. *C.R. Bard, Inc. v. M3 Sys., Inc.*, 157 F.3d 1340, 1372 (Fed. Cir. 1998) (“[A]ntitrust jurisprudence has well understood that the enforcement of the antitrust laws is self-defeating if it chills or stifles innovation.”).
 15. See, e.g., Complaint to FTC at 3, *In re NXP Semiconductors N.V.*, No. C-4560, 2015 WL 7843250 (F.T.C. Nov. 25, 2015) (“The Acquisition would eliminate the direct competition between NXP and Freescale, which may lead to anticompetitive unilateral effects in the form of higher prices and reduced innovation.”).
 16. Complaint at 29, *FTC v. Qualcomm Inc.*, No. 5:17-CV-00220, 2017 BL 219885 (N.D. Cal. June 26, 2017) [hereinafter FTC Complaint]; see also *infra* section IV.B (presenting a case study of Qualcomm).

But on the other hand, some scholars and courts strenuously caution *against* using antitrust law to promote innovation. Part of their apprehension concerns a reality of inventing: when a lack of competition harms innovation, the cause is oftentimes the patent system.¹⁷ Indeed, the patent system stimulates innovation by granting inventors a limited right to charge monopoly prices and exclude competition without incurring antitrust liability.¹⁸ So if antitrust law were to make it harder to exclude competition and wield market power, then the patent system could lose effectiveness.¹⁹ Firms might also invest fewer resources in R&D if their exposure to antitrust liability were to increase.²⁰ And as a practical matter, the courts are probably ill-equipped to fashion rules intended to incentivize technological advancement.²¹ To this camp, antitrust enforcement is likely to render firms and markets less innovative.

Whether or not antitrust promotes innovation is a nuanced puzzle that this Article explores. Although this topic has been called “[o]ne of the most heated discussions in economic circles,”²² equally vexing legal scholars, few, if any, statistical efforts have sought to determine whether antitrust increases, decreases, or otherwise influences the rate of innovation.²³ Fortunately, antitrust is an ideal natural laboratory for empirical study; because antitrust’s intensity has fluctuated by time and presidential Administration, it offers the types of statisti-

17. DeSANTI ET AL., *supra* note 11, at 5.

18. Marina Lao, *Unilateral Refusals to Sell or License Intellectual Property and the Antitrust Duty to Deal*, 9 CORNELL J.L. & PUB. POL’Y 193, 193 (1999) (“Courts and academics alike considered intellectual property rights as exceptions to the antitrust law that must be narrowly construed.”).

19. See Bonny E. Sweeney, *An Overview of Section 2 Enforcement and Developments*, 2008 WIS. L. REV. 231, 258 (discussing the harm of § 2 enforcement on the incentives to innovate).

20. See Ron A. Bouchard et al., *The Pas De Deux of Pharmaceutical Regulation and Innovation: Who’s Leading Whom?*, 24 BERKELEY TECH. L.J. 1461, 1510 (2009) (stating that weak patent rights poorly protect innovation and thus poorly incentivize innovation).

21. Douglas H. Ginsburg et al., *Product Hopping and the Limits of Antitrust: The Danger of Micromanaging Innovation*, COMPETITION POL’Y INT’L ANTITRUST CHRON., Dec. 2015, at 3–4 (explaining the courts are ill-equipped to determine which types of innovation benefit or harm consumers).

22. Carrier, *supra* note 12, at 396; see also Herbert Hovenkamp, *Competition for Innovation*, 2012 COLUM. BUS. L. REV. 799, 801–02 (describing the importance of market structure and its effects on innovation and competition).

23. See Keith N. Hylton, *A Unified Framework for Competition Policy and Innovation Policy*, 22 TEX. INTELL. PROP. L.J. 163, 166 (2014) (“Still, there has been little effort to incorporate innovation concerns into models of antitrust enforcement.”); Ilya Segal & Michael D. Whinston, *Antitrust in Innovative Industries*, 97 AM. ECON. REV. 1703 (2007) (“Unfortunately, the effects of antitrust policy on innovation are poorly understood.”).

cal variations that tend to produce robust results.²⁴ In turn, this Article employs an original dataset, quantitative methods, and case studies to examine the effects of antitrust's numerous policy levers on the rate of innovation in the United States. The statistical models account for, among other things, changes in private antitrust enforcement, differences in merger and nonmerger actions, patent strength, time, and societal variables such as education and wealth.

Of particular note, the research treatment inquires into whether the FTC and DOJ's decision to incorporate innovation within official antitrust policy has benefited invention and scientific progress. The pessimistic view is that the government tends to undermine innovation by targeting anticompetitive behaviors in, specifically, dynamic markets.²⁵ After all, if firms perceive that an aggressive approach to innovating is likely to draw unwanted attention from government regulators, then their motivation to invent new goods and methods could wane. So even though the agencies have the expertise and resources to stimulate innovation, their efforts might actually exacerbate the problem. This Article tests the effects of different types of government actions as well as changes in agency budgets and other proxies for government antitrust intensity to determine whether the agencies' efforts have supported or impaired innovation.

In terms of contributions, the chief purpose of this Article is to provide a clearer picture of how antitrust law, the agencies, and enforcement shape the incentives to innovate. The empirical results indicate that antitrust enforcement has a powerful ability to promote innovation *sometimes*. It also finds that certain qualities of antitrust enforcement have so substantially raised the risk of liability in dynamic markets that technological advancement has suffered. Supported by behavioral-economics theory, it seems that the pervasive threat of antitrust litigation, although intended to stimulate competition and innovation, has caused inventors to become overly cautious and less innovative. This Article concludes, based upon the empirical findings, that innovation could flourish if inventors had immunity for acts commonly associated with developing, sharing, and marketing technology—activities that actually do cultivate scientific progress. For

24. See generally William E. Kovacic, *The Modern Evolution of U.S. Competition Policy Enforcement Norms*, 71 ANTITRUST L.J. 377, 382–83 (2003) (discussing the theory of how presidential Administrations have attempted to increase or decrease antitrust activity).

25. See Sweeney, *supra* note 19, at 258 (remarking that the agencies are concerned that over enforcement of antitrust law in certain cases can discourage firms from innovating); see also Alan Devlin, *Antitrust As Regulation*, 49 SAN DIEGO L. REV. 823, 844 (2012) (“If competition rules force monopolists to license their physical and intellectual infrastructure, or otherwise create conditions that are inimical to high concentration and conducive to entry and rival expansion, the result may be lower prices and higher output, but reduced rates of innovation.”).

instance, inventors should have the freedom to improve their own technology, collaborate with competitors, and license their patented art without antitrust liability. These and other proposals are discussed in greater detail later. The hope is that the following research is able to provide strategies to enhance the rate of innovation while mitigating some of the costs and burdens of antitrust enforcement.

The statistical analysis also sheds light on an important yet seldom-addressed legal issue. The courts are divided about whether individuals and corporations may fulfill antitrust's injury requirement by alleging harm to innovation.²⁶ For example, some courts have expressly ruled that "a lack of innovation is not a cognizable antitrust injury," while others have remarked decreased innovation is one of "the evils that antitrust laws are designed to prevent."²⁷ A few courts have sought to reconcile these positions, suggesting conditions and situations in which diminished innovation may establish antitrust standing.²⁸ Given these inconsistent approaches, this Article proposes a test, guided by the empirical results and conventional antitrust jurisprudence, to permit certain claims of reduced innovation to proceed.

This Article is organized into several Parts. Part II discusses antitrust's unexpected relationship with patent law in historical and theoretical contexts. Part III traces the types of antitrust actions that the FTC, DOJ, and private actors have asserted against defendants whose conduct allegedly diminished the market's incentives to innovate; this discussion emphasizes the legal questions surrounding whether individuals and companies may initiate such a claim. Part IV investigates this topic using case studies. The first two case studies illustrate the ways that exclusionary conduct discourages invention and discovery, while the third narrative presents the difficulties of predicting whether antitrust enforcement is likely to provide a suitable remedy or exacerbate the problem. Part V offers potentially the first quantitative analysis of antitrust, patent law, and innovation. In Part VI, policy suggestions are offered based upon the theoretical and empirical analyses found earlier. The Article then concludes with final thoughts.

II. THE EVOLUTION OF THE ANTITRUST-PATENT PARADOX

Traditionally, there was little expectation that antitrust law could foster scientific progress. In fact, the patent system—which is the primary body of law meant to stimulate innovation—was thought to *con-*

26. *See infra* section III.C.

27. *VBR Tours, LLC v. Nat'l R.R. Passenger Corp.*, No. 14-CV-00804, 2015 WL 225328, at *5 (N.D. Ill. Jan. 15, 2015). *But see* *Teladoc, Inc. v. Tex. Med. Bd.*, 112 F. Supp. 3d 529, 537 (W.D. Tex. 2015) (dismissing for the lack of an antitrust injury despite the plaintiffs' pleading harms to innovation); *OverEnd Techs, LLC v. Invista S.A.R.L.*, 431 F. Supp. 2d. 925, 930 (E.D. Wis. 2006).

28. *See infra* section III.C.

flict with antitrust enforcement. This Part examines the unexpected route that antitrust law took to become a stimulus of innovation and its continuing tension with the patent system.

The perception that patent and antitrust laws are incompatible has overshadowed their mutual ability to promote innovation. Known as the “the patent–antitrust paradox,” it is said that antitrust’s purpose is to prevent monopolies and other exclusionary practices, whereas the patent system does the opposite, granting exclusionary rights and market power in the form of patents.²⁹ This view that patent and antitrust laws have irreconcilable goals dates back to, or around, 1623 when the English Parliament enacted the Statute of Monopolies to rein in the King’s prerogative to grant patent monopolies.³⁰ Today, the United States is faithful to this approach, characterizing each patent as a limited grant of antitrust immunity which allows the patent holder to adopt exclusionary behaviors that would otherwise violate antitrust law.³¹

However, a vibrant debate that began in the mid-twentieth century, and continues today, suggests that antitrust may have the capacity to foster innovation as a complement to the patent system. At the core of this literature are seminal contributions by the economists

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29. *FTC v. Actavis, Inc.*, 133 S. Ct. 2223, 2238–39 (2013) (Roberts, C.J., dissenting) (discussing patents as an exception to antitrust law); *see, e.g.*, Michael A. Carrier, *Unraveling the Patent–Antitrust Paradox*, 150 U. PA. L. REV. 761, 762–63 (2002) (explaining the conflicting nature of patent and antitrust laws); Erik Hovenkamp & Thomas F. Cotter, *Anticompetitive Patent Injunctions*, 100 MINN. L. REV. 871, 871–72 (2016) (discussing the “deliberate tradeoff” that patents present whereby a patent pursues long-term economic growth via innovation, sacrificing short-term efficiency by issuing monopoly rights and other exclusionary privileges).
30. Adam Mossoff, *Rethinking the Development of Patents: An Intellectual History, 1550–1800*, 52 HASTINGS L.J. 1255, 1271 (2001) (“Despite King James’ verbal commitment to limitations on the royal power to grant monopolies, the de facto abuse of the royal prerogative continued unabated. . . . The result was that Parliament passed the Statute of Monopolies in 1623”); *see* John F. Duffy, *Inventing Invention: A Case Study of Legal Innovation*, 86 TEX. L. REV. 1, 26–27 (2007) (noting the Statute of Monopolies’ importance in both antitrust and patent law); Edward C. Walterscheid, *Inherent or Created Rights: Early Views on the Intellectual Property Clause*, 19 HAMLINE L. REV. 81, 82–83 (1995).
31. *Actavis*, 133 S. Ct. at 2238 (“[A patent] provides an exception to antitrust law, and the scope of the patent—i.e., the rights conferred by the patent—forms the zone within which the patent holder may operate without facing antitrust liability.”); *King Drug Co. of Florence v. Smithkline Beecham Corp.*, 791 F.3d 388, 394 (3d Cir. 2015), *cert. denied*, 137 S. Ct. 446 (2016) (“A patent . . . is an exception to the general rule against monopolies and to the right to access to a free and open market.” (quoting *Walker Process Equip., Inc. v. Food Mach. & Chem. Corp.*, 382 U.S. 172, 177 (1965)); *FTC v. Watson Pharm., Inc.*, 677 F.3d 1298, 1308–09 (11th Cir. 2012) (“[A] patent gives its holder a ‘bundle of rights,’ but any new exclusionary rights the holder buys to add to that bundle do not fall within the scope of the patent grant and [thus] do not fall within the scope of the patent’s antitrust immunity.”).

Joseph Schumpeter and Kenneth Arrow who debated whether markets animated by competition or monopoly power better incentivize innovation.³²

Schumpeter asserted that monopolies are more capable of generating innovation because monopolists have the resources to plan for the future and hedge against failed efforts.³³ Although Schumpeter avoided the topic of patent rights, his research aligns with the modern economic view of intellectual property (IP): without the monopoly rights conferred by a patent, free riders could copy and sell another's invention without paying the transaction costs of developing the invention, diminishing the incentives to innovate.³⁴ It is only when a zone of exclusivity is offered—i.e., patent rights—that actors are likely to invent.³⁵

Decades later, Kenneth Arrow rebuked Schumpeter's position, arguing that concentrated market power is more likely to frustrate invention.³⁶ He hypothesized that firms have less incentive to innovate when their products face limited competition.³⁷ To Arrow, firms are only likely to invent when rivals threaten their market power with more innovative, competitive goods.³⁸ Arrow's research has since persuaded notable scholars and policymakers that antitrust law is able to foster innovation by unsettling monopolies and proscribing anticompetitive practices.³⁹

To illustrate antitrust's potential to promote innovation, consider a corporate merger between the two dominant firms in a market: upon the merger's closing, the incentives to innovate may subside if the surviving firm can no longer increase its market power by innovating new

32. Baker, *supra* note 9, at 577–79.

33. Carrier, *supra* note 12, at 403 (summarizing JOSEPH A. SCHUMPETER, CAPITALISM, SOCIALISM, & DEMOCRACY 106 (1942)).

34. See Rebecca S. Eisenberg, *Patents and the Progress of Science: Exclusive Rights and Experimental Use*, 56 U. CHI. L. REV. 1017, 1038 (1989) (“The thesis that monopolies are conducive to innovation is generally associated with the work of Joseph Schumpeter on economic development. While Schumpeter does not focus exclusively on either technological innovations or the patent system, his analysis suggests how patent monopolies might promote technological innovation.”); see also Michael A. Carrier, *Resolving the Patent–Antitrust Paradox Through Tripartite Innovation*, 56 VAND. L. REV. 1047, 1050 (2003) (discussing the motivation to copy another's invention in the absence of patent rights).

35. Carrier, *supra* note 34, at 1050.

36. Hubbard, *supra* note 10, at 2079.

37. Kenneth J. Arrow, *Economic Welfare and the Allocation of Resources for Invention*, in THE RATE AND DIRECTION OF INVENTIVE ACTIVITY: ECONOMIC AND SOCIAL FACTORS 609 (1962); Baker, *supra* note 9, at 578 (“Arrow, a Nobel Prize-winning economist . . . explained in 1962 that a monopolist might innovate less than competitive firms because a monopolist has less to gain.”).

38. Hubbard, *supra* note 10, at 2079.

39. DE SANTI ET AL., *supra* note 11, at 2 (describing the role of competition law in promoting innovation).

goods and methods.⁴⁰ So by blocking the merger, an antitrust agency could promote both competition and innovation. For example, in 2015, Pfizer was in the process of developing an arthritis drug when it sought to acquire Hospira which, at the time, owned the leading arthritis drug on the market.⁴¹ Since the acquisition would give Pfizer monopoly power in the arthritis drug market, the concern was that Pfizer would curtail its efforts to develop a new drug.⁴² The European Union Competition Committee (the EU's antitrust agency) conditioned its approval of the merger on Pfizer selling the rights to its prospective arthritis drug to a competitor, thereby preserving competition and innovation.⁴³

To further harmonize antitrust and patent laws, the courts have established the general rule that patentees enjoy a limited immunity from antitrust law to act within the scope of their patent rights, but even with this rule, it can still be difficult to determine whether an exclusionary act exceeds one's patent grant, thereby violating antitrust law. To those favoring strong patent rights, antitrust law should take a laissez-faire approach to disputes involving innovation, whereas antitrust's proponents would more narrowly define patent rights.⁴⁴ Few cases better demonstrate the difficulties of establishing where the boundaries between patent and antitrust laws lie than *Ac-*

40. Baker, *supra* note 9, at 592; *see* Carrier, *supra* note 12; *supra* text accompanying note 12.

41. Justus Haucap & Joel Stiebale, *Research: Innovation Suffers When Drug Companies Merge*, HARV. BUS. REV. (Aug. 3, 2016), <https://hbr.org/2016/08/research-innovation-suffers-when-drug-companies-merge> [<http://perma.unl.edu/C8SH-59VS>].

42. Margrethe Vestager, European Comm'r, Competition: The Mother of Invention (Apr. 18, 2016), https://ec.europa.eu/commission/commissioners/2014-2019/vestager/announcements/competition-mother-invention_en [<http://perma.unl.edu/V3NQ-EXLP>] ("Last year, we looked at a merger between the drug company Pfizer and its rival, Hospira. We only approved the deal after Pfizer agreed to sell the European rights to an arthritis drug it was developing. One concern was that Hospira already had a competing drug on the market, and we thought Pfizer might stop work on its own drug if the deal went ahead as planned. Which would have meant less of the innovation that we depend on as patients. So protecting innovation is important in our merger policy. So important, in fact, that we're considering whether to change our rules to do it more effectively.").

43. *Id.*

44. *See, e.g.*, C. Scott Hemphill, *Paying for Delay: Pharmaceutical Patent Settlement as a Regulatory Design Problem*, 81 N.Y.U. L. REV. 1553, 1613 (2006) ("In exchange for receiving a reprieve from competition, the patentee must make a sizable payment. This payment reduces its profits and hence the incremental innovation incentive gained by arranging for the extension."); Spencer Weber Waller & Matthew Sag, *Promoting Innovation*, 100 IOWA L. REV. 2223, 2224 (2015) ("Modern businesses are well aware of the threat of disruptive outsiders and, left unchecked, will do their utmost to prevent future waves of creative destruction from threatening the status quo.").

tavis v. FTC.⁴⁵ In *Actavis*, a divided Supreme Court held that a pharmaceutical company could potentially violate antitrust law by paying a competitor to resist challenging the validity of one of its patents.⁴⁶ The majority asserted that such a payment may exceed the company's patent rights because enforcing an invalid patent would give the company rights to which it was not entitled.⁴⁷ But to the dissent, a payment to settle an infringement dispute falls squarely within the inventor's rights.⁴⁸

In light of this tension, scholars have sought to determine the optimal level of antitrust enforcement under which innovation is likely to flourish.⁴⁹ Despite the literature's strong efforts—employing case studies, formalized logic,⁵⁰ and theoretical explorations—“the consensus is that there is no clear answer.”⁵¹ Alan Devlin remarked, “Unfortunately, the specific antitrust policies that best promote technological advancement are far from clear,”⁵² and Marina Lao found that there is “neither empirical nor clear theoretical support for the hypothesis that monopolistic conditions, relative to competition, encourage more innovation.”⁵³ David McGowan summed up these efforts, stating that “we may not be confident that antitrust suits enhance innovation, but we cannot be confident that they retard it either.”⁵⁴ The caveat is that scholars do generally agree that innovation requires a mix of exclusion and competition; although patent rights are an important condition of innovation, fencing off too much competition appears to, as an externality, erode the incentives to innovate.⁵⁵ But how much antitrust is appropriate or effective remains a hotly contested debate.

45. *FTC v. Actavis, Inc.*, 133 S. Ct. 2223 (2013).

46. *Id.* at 2237.

47. *Id.* at 2233.

48. *Id.* at 2239 (Roberts, C.J. dissenting) (“Thus, under our precedent, this is a fairly straight-forward case. Solvay paid a competitor to respect its patent—conduct which did not exceed the scope of its patent.”).

49. See Carrier, *supra* note 12 (using case studies to study this issue in the pharmaceutical industry); Shelanski, *Competition Policy*, *supra* note 3 (examining exclusion and competition in industries involving the internet); Sweeney, *supra* note 19, at 258 (remarking that the agencies are concerned that over-enforcement of antitrust law in certain cases can discourage firms from innovating).

50. See, e.g., Hylton, *supra* note 23, at 167–71 (using game theory to assess the debate).

51. Carrier, *supra* note 12, at 393.

52. Devlin, *supra* note 25, at 843; see Carrier, *supra* note 12.

53. Marina Lao, *Reclaiming a Role for Intent Evidence in Monopolization Analysis*, 54 AM. U. L. REV. 151, 193 (2004).

54. See McGowan, *supra* note 4, at 733.

55. Hubbard, *supra* note 10, at 2079 (noting that exclusionary rights can have the effect of discouraging further innovation); *id.* (“[W]hat’s the point of focusing on making the product even better when the only company you can take business from is yourself?” (quoting Steve Jobs) (citation omitted)); see also Carrier, *supra* note 12, at 396 (discussing the factors producing the optimal level of competition and exclusion, attempting to resolve the Arrow and Schumpeter debate).

Having background on why antitrust is thought to cultivate innovation and its points of tension with the patent system, the next Part explores in greater detail how antitrust enforcement has been used for this purpose.

III. THE ANTITRUST AGENCIES, ENFORCEMENT, AND INNOVATION POLICY

This Part discusses the manner in which both the government and private parties have sought to litigate reduced innovation under each of the antitrust statutes: the Sherman Antitrust Act (Sherman Act), the Federal Trade Commission Act (FTC Act), and the Clayton Antitrust Act (Clayton Act). Although government efforts have tended to follow a conventional path, there are salient, unaddressed questions concerning whether, or in which situations, private parties may challenge this type of harm.

A. Merger Review and Enforcement

In 1992, the FTC and DOJ first suggested in a footnote of the agencies' joint merger guidelines that their authority to contest corporate acquisitions could promote innovation.⁵⁶ This assertion was made pursuant to their authority under section 7 of the Clayton Act, which provides the agencies may challenge business combinations that "substantially . . . lessen competition, or tend to create a monopoly."⁵⁷ Shortly thereafter, the agencies cited decreased innovation when blocking several combinations, such as Medtronic's merger with Physio-Control.⁵⁸ Then, in 2010, the agencies updated their merger guidelines to formally incorporate innovation into the review process.⁵⁹ This directive announced the agencies would consider challenging acquisitions that "encourag[e] the merged firm to curtail its innovative efforts below the level that would prevail in the absence of

56. U.S. DEP'T OF JUSTICE & FED. TRADE COMM'N, MERGER GUIDELINES 2 n.6 (1992).

57. Clayton Act § 7, 15 U.S.C. § 18 (2012); *see, e.g.*, FTC v. Staples, Inc., 190 F. Supp. 3d 100 (D.D.C. 2016).

58. Complaint at *2, *In re Medtronic, Inc.*, No. C-3879, 1998 WL 918352 (F.T.C. Dec. 21, 1998) (claiming that Medtronic's acquisition would so substantially eliminate competition in the defibrillator market that prices were likely to increase and innovation decline). The DOJ has initiated similar lawsuits. *See, e.g.*, Complaint, United States v. EchoStar Commc'n Corp., No. 1:02CV02138 (D.D.C. Oct. 31, 2002); Complaint, United States v. Manitowoc Co., No. 02-0159, 2002 U.S. Dist. LEXIS 25705 (D.D.C. July 31, 2002); United States v. Kimberly-Clark Corp., No. 3:95-CV-3055-P, 1996 WL 351145 (N.D. Tex. Apr. 4, 1996); Complaint, *In re Aspen Technology, Inc.*, No. 9310, 2003 FTC LEXIS 178 (F.T.C. Aug. 6, 2003).

59. U.S. DEP'T OF JUSTICE & FED. TRADE COMM'N, HORIZONTAL MERGER GUIDELINES 23 (2010).

the merger.”⁶⁰ Since these events, merger review has become the dominant area of antitrust enforcement used to challenge conduct that threatens to imperil innovation.

An example of the agencies’ concern for innovation is the DOJ’s challenge of a proposed merger between two prominent suppliers of semiconductors.⁶¹ In 2015, the shareholders and directors of Tokyo Electron and Applied Materials approved a nine-billion-dollar merger, prospectively naming the new corporation “Eteris.”⁶² Because the merger was unlikely to alter products or prices, commentators assumed the agencies would resist challenging the deal.⁶³ The DOJ, in a novel decision, contested the acquisition not because it harmed *current* competition but because the acquisition threatened innovation, describing it as “future competition.”⁶⁴ Indeed, regulators feared that eliminating a major competitor in the semiconductor market would re-

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60. *Id.* at 23 (“The Agencies may consider whether a merger is likely to diminish innovation competition by encouraging the merged firm to curtail its innovative efforts below the level that would prevail in the absence of the merger. That curtailment of innovation could take the form of reduced incentive to continue with an existing product-development effort or reduced incentive to initiate development of new products.”).
61. Daisuke Wakabayashi et al., *Applied Material to Acquire Tokyo Electron*, WALL STREET J. (Sept. 25, 2013), <https://www.wsj.com/articles/SB10001424052702303759604579094770528224330> (observing that the new corporation would be valued at twenty-nine billion dollars).
62. Don Clark, *Applied Materials and Tokyo Electron Pick “Eteris” for Post-Merger Name*, WALL STREET J. (July 7, 2014), <https://www.wsj.com/articles/applied-materials-and-tokyo-electron-pick-eteris-for-post-merger-name-1404781083>.
63. Reuben Miller, *Big Picture Issue, Strategic Missteps Doomed Merger for Applied Materials and Tokyo Electron*, FORBES (June 18, 2015), <https://www.forbes.com/sites/mergermarket/2015/06/18/big-picture-issue-strategic-missteps-doomed-merger-for-applied-materials-and-tokyo-electron/#2e882db94db3> [http://perma.unl.edu/UYZ7-MU9Z] (“Applied Materials and Tokyo Electron had guided investors towards smooth regulatory clearances and most merger-arbitrageurs saw little reason to worry. Even when the process had aged beyond the normal shelf life of a review, participants saw a deal that was all but done.”).
64. BERNARD A. NIGRO, JR. ET AL., FUTURE COMPETITION POSES PRESENT RISK TO DEALS 1 (2015) (“Applied Materials, Inc. abandoned its 18-month pursuit of Tokyo Electron Limited amid concerns by the Antitrust Division of the U.S. Department of Justice and foreign antitrust regulators regarding potential harm to future industry innovation.”); Andre Barlow, *Mergers that Diminish Innovation Present Deal Risk*, ANTITRUST LAW BLOG (May 7, 2015), <https://www.antitrustlawyerblog.com/2015/05/mergers-that-raise-future-competition-concerns-present-deal-risk> [http://perma.unl.edu/RL3D-XUU7] (“The Antitrust Division’s statement indicates that the transaction was blocked because the combination would have diminished innovation. In other words, the Antitrust Division was concerned about the potential loss of head to head competition in the development of future cutting-edge semiconductor products and made no allegation that the combined firm would have monopolized any existing or actual product market. The Antitrust Division’s tough stance against AMAT indicates that it is willing to scrutinize and challenge deals that raise longer-term anticompetitive concerns related to future competition even if there is no past pricing evidence

duce the surviving entities' incentive to innovate.⁶⁵ Applied Materials and Tokyo Electron were unable to satisfy the DOJ after eighteen months of trying, marking probably the first time that antitrust regulators blocked a merger on almost exclusively innovation grounds.⁶⁶

B. Nonmerger Antitrust Claims

The agencies would soon litigate reduced innovation in other areas of antitrust law, including claims stemming from §§ 1 and 2 of the Sherman Act.⁶⁷ Section 1 of the Sherman Act proscribes contracts and agreements that *unreasonably* restrain trade.⁶⁸ Section 2 forbids using exclusionary means to “monopolize or attempt to monopolize . . . any part of the trade or commerce.”⁶⁹ Although the FTC does not enforce the Sherman Act (the DOJ is the only antitrust regulator that acts pursuant to the Sherman Act), section 5 of the FTC Act proscribes “unfair methods of competition,” which encompasses the same harms

that may predict that the merger will result in higher prices regarding actual products.”).

65. Press Release, U.S. Dep't of Justice, Applied Materials Inc. and Tokyo Electron Ltd. Abandon Merger Plans After Justice Department Rejected Their Proposed Remedy (Apr. 27, 2015), <https://www.justice.gov/opa/pr/applied-materials-inc-and-tokyo-electron-ltd-abandon-merger-plans-after-justice-department> [http://perma.unl.edu/X5TM-KEGV]; Brett Kendall & Don Clark, *Applied Material, Tokyo Electron Cancel Merger Plan*, WALL STREET J. (Apr. 27, 2015), <https://www.wsj.com/articles/applied-materials-tokyo-electron-scrap-merger-plan-1430117758?mg=id-wsj> (stating that the acquisition could “eliminate important head-to-head competition between two firms that have the skills and resources to build machinery for companies that make cutting-edge computer chips,” stifling future innovation).
66. *Antitrust Concerns Thwart Tokyo Electron, Applied Materials Merger*, NIKKEI ASIAN REV. (Apr. 30, 2015), <http://asia.nikkei.com/magazine/20150430-Vietnam-s-new-chapter/Business/Antitrust-concerns-thwart-Tokyo-Electron-Applied-Materials-merger> [http://perma.unl.edu/L7FP-WAXP] (reviewing the companies' decision to abandon the merger due to antitrust concerns).
67. 15 U.S.C. §§ 1–2 (2012).
68. The statutory language states only that “[e]very contract, combination in the form of trust or otherwise, or conspiracy, in restraint of trade or commerce among the several States, or with foreign nations, is declared to be illegal.” § 1. Added limitations that, for instance, the challenged conduct must have been “unreasonable” is the product of judicial common law. Reg'1 Multiple Listing Serv. of Minn., Inc. v. Am. Home Realty Network, Inc., 960 F. Supp. 2d 958, 979 (D. Minn. 2013) (“To establish a claim under Section 1 of the Sherman Act a plaintiff must demonstrate (1) that there was a contract, combination, or conspiracy; (2) that the agreement unreasonably restrained trade under either a per se rule of illegality or a rule of reason analysis . . .”).
69. § 2; see, e.g., *In re Adderall XR Antitrust Litig.*, 754 F.3d 128, 133 (2d. Cir. 2014) (“[An antitrust offense] requires, in addition to the possession of monopoly power in the relevant market, the willful acquisition or maintenance of that power as distinguished from growth or development as a consequence of a superior product, business acumen, or historic accident.” (quoting *Verizon Commc'ns Inc. v. Law Offices of Curtis V. Trinko, LLP*, 540 U.S. 398, 407 (2004))).

banned by the Sherman Act.⁷⁰ Consequently, the FTC has parallel authority with the DOJ to investigate and remedy anticompetitive behaviors.⁷¹

As for an earlier example of an antitrust lawsuit citing innovation as the basis for challenging an exclusionary arrangement, in 1994, the DOJ alleged that Pilkington PLC's scheme to license its patented float glass technology violated § 2.⁷² According to the government's lawsuit, Pilkington granted each of its licensees a geographical monopoly to sell the company's float glass—even after the technology's patents had expired—which discouraged the licensees from innovating their own float glass systems, potentially in violation of an antitrust law.⁷³ Soon after, in 1995, the FTC and DOJ sought to increase attention given to anticompetitive agreements involving IP, issuing guidelines about when IP-related contracts may violate antitrust law.⁷⁴ This policy was reasserted in the agencies' 2017 guidelines.⁷⁵ Although antitrust authorities have been slower to embrace innovation claims in nonmerger lawsuits, the rate of filings has increased.⁷⁶

70. Herbert Hovenkamp, *The Federal Trade Commission and the Sherman Act*, 62 FLA. L. REV. 871, 873 (2010) (“[T]he Supreme Court has held that the FTC’s power to condemn ‘unfair methods of competition’ covers everything that the Sherman Act covers and goes even further to reach a ‘penumbra’ of practices that are not covered.”).

71. See Richard J. Pierce, Jr., *The Rocky Relationship Between the Federal Trade Commission and Administrative Law*, 83 GEO. WASH. L. REV. 2026, 2033–34 (2015) (discussing the agencies’ parallel jurisdictions).

72. Complaint at 4, *United States v. Pilkington PLC*, No. 94-345, 1994 WL 750645 (D. Ariz. Dec. 22, 1994); Anne K. Bingman, Assistant Attorney Gen., U.S. Dep’t of Justice, Innovation and Antitrust Address (July 29, 1994) (stating that an express goal of filing suit against Pilkington was to stimulate innovation that was being repressed by anticompetitive conduct).

73. Complaint at 9, *Pilkington PLC*, 1994 WL 750645; Keith Bradsher, *U.S. Sues British in Antitrust Case*, N.Y. TIMES (May 27, 1994), <http://www.nytimes.com/1994/05/27/business/us-sues-british-in-antitrust-case.html>.

74. U.S. DEP’T OF JUSTICE & FED. TRADE COMM’N, ANTITRUST GUIDELINES FOR THE LICENSING OF INTELLECTUAL PROPERTY 10 (1995) (“If a licensing arrangement may adversely affect competition to develop new or improved goods or processes, the Agencies will analyze such an impact either as a separate competitive effect in relevant goods or technology markets, or as a competitive effect in a separate innovation market.”).

75. U.S. DEP’T OF JUSTICE & FED. TRADE COMM’N, ANTITRUST GUIDELINES FOR THE LICENSING OF INTELLECTUAL PROPERTY (2017) [hereinafter 2017 ANTITRUST GUIDELINES].

76. See, e.g., FTC Complaint, *supra* note 16, at 29 (“Qualcomm’s anticompetitive practices have . . . suppressed innovation.”); see also Complaint, *United States v. Nat’l Ass’n of Realtors*, No. 05C-5140, 242 F.R.D. 491 (2007); Complaint, *United States v. Microsoft Corp.*, No. 98-1232, 2001 WL 34133964 (D.D.C. Nov. 2, 2001); Complaint at 1, *In re Transitions Optical, Inc.*, No. C-4289, 2010 WL 1804580 (F.T.C. Apr. 22, 2010) (“Transitions has improperly maintained its monopoly power by engaging in exclusionary acts and practices, which include entering into exclusive dealing arrangements that foreclose its rivals from key distributional

C. Private Actors Enforcing Innovation

Following the DOJ and FTC's lead, private actors have also sought to litigate claims that a defendant's exclusionary conduct diminished innovation, though the legality of these suits is murky.⁷⁷ The root of the issue—which the literature has seldom addressed—concerns whether a private party may satisfy the antitrust injury requirement by alleging that the market has become less innovative.⁷⁸

A private party can enforce the Sherman Act so long as the lawsuit alleges a proper antitrust injury.⁷⁹ Since antitrust law “protects competition, not competitors,” the challenged act must have harmed the market as opposed to the plaintiff who brought the case.⁸⁰ Due to the lack of guidance in the antitrust statutes about the types of injuries proscribed by antitrust law, the courts have narrowed the universe of harms down to only economic injuries.⁸¹ To show an act is anticompetitive, the courts tend to require evidence that it increased prices or reduced output, though variation exists among the U.S. circuit courts.⁸²

channels. Transitions' conduct has led to higher prices, lower output, reduced innovation and diminished consumer choice.”)

77. *See, e.g.*, *Energy Conversion Devices Liquidation Tr. v. Trina Solar Ltd.*, No. 13-13241, 2014 WL 5511517 (E.D. Mich. Oct. 31, 2014).
78. *But see* Herbert Hovenkamp, *Restraint of Innovation*, 29 *CARDOZO L. REV.* 248, 258–59 (2007) (discussing the U.S. Court of Appeals for the Fourth Circuit's treatment of innovation as an alleged antitrust injury).
79. *Atl. Richfield Co. v. USA Petroleum Co.*, 495 U.S. 328, 334 (1990).
80. *Eichorn v. AT&T Corp.*, 248 F.3d 131, 140 (3d Cir. 2001) (“[A]n individual plaintiff personally aggrieved by an alleged anti-competitive agreement has not suffered an antitrust injury unless the activity has a wider impact on the competitive market.”); David Freeman Engstrom, *Harnessing the Private Attorney General: Evidence from Qui Tam Litigation*, 112 *COLUM. L. REV.* 1244, 1246–47 (2012) (discussing the role of private citizens as “private attorney generals” empowered to enforce the antitrust laws). *See generally* John C. Coffee, Jr., *Rescuing the Private Attorney General: Why the Model of the Lawyer as Bounty Hunter Is Not Working*, 42 *MD. L. REV.* 215 (1983) (discussing the private attorney general in antitrust litigation, enforcement, and policy).
81. *Wright & Ginsburg, supra* note 1, at 2405–06 (stating that *Continental T.V., Inc. v. GTE Sylvania Inc.*, 433 U.S. 36 (1977), evolved antitrust to ignore social and political goals to concern itself with only economic goals).
82. *See Procaps S.A. v. Patheon, Inc.*, 845 F.3d 1072, 1084 (11th Cir. 2016) (“Under our precedent, ‘actual anticompetitive effects include, *but are not limited to*, reduction of output, increase in price, or deterioration in quality.’” (emphasis added) (quoting *Jacobs v. Tempur-Pedic Int'l, Inc.*, 626 F.3d 1327, 1339 (11th Cir. 2010))). *But see* *Sullivan v. NFL*, 34 F.3d 1091, 1096–97 (1st Cir. 1994) (“Anticompetitive effects, more commonly referred to as ‘injury to competition’ or ‘harm to the competitive process,’ are usually measured by a *reduction in output* and an *increase in prices* in the relevant market.”); *Chi. Prof'l Sports Ltd. P'ship v. NBA*, 961 F.2d 667, 670 (7th Cir. 1992) (“The [Supreme Court's] antitrust injury doctrine . . . requires every plaintiff to show that its loss comes from acts that reduce output or raise prices to consumers.” (citations omitted)); *JamSports & Entm't, LLC v. Paradama Prods., Inc.*, 336 F. Supp. 2d 824, 834 (N.D. Ill. 2004) (“Judge

In the context of innovation, several courts have dismissed such lawsuits upon determining that innovation does not qualify as an antitrust injury.⁸³ In *VBR Tours, LLC v. National Railroad Passenger Corp.*,⁸⁴ the plaintiff alleged a predatory pricing scheme violated §§ 1 and 2 of the Sherman Act by “hampering its ability to innovate.”⁸⁵ The suit was rejected because, in the court’s view, “a lack of innovation is not a cognizable antitrust injury.”⁸⁶ Other courts have implicitly reached this same conclusion: the *Energy Conversion Devices Liquidated Trust v. Trina Solar Ltd.*⁸⁷ court held that the lawsuit failed to state an antitrust injury without addressing the plaintiff’s claim that the defendant’s price-fixing scheme reduced innovation.⁸⁸ By dismissing the lawsuit despite the allegations, the court implied that plaintiffs must assert more than a lack of innovation to establish an antitrust injury. In fact, the opinion in *Fietelson v. Google Inc.*⁸⁹ remarked as much, stating that courts have implicitly rejected harm to innovation as a standalone antitrust injury because the harm is likely too speculative.⁹⁰

To other courts, lost innovation is precisely why the antitrust laws were enacted. The court in *Free Hand Corp. v. Adobe Systems Inc.*⁹¹ referenced “decreasing innovation in the market,” among a series of anticompetitive allegations, as “the types of injuries that commonly satisfy the antitrust standing requirement.”⁹² *Hear-Wear Technologies, LLC v. Phonak, LLC*⁹³ came to the same conclusion, holding that “blocking the introduction of innovation,” in addition to other anticompetitive harms, “support[s] the existence of antitrust injury.”⁹⁴

Easterbrook’s consistent statements that antitrust injury is limited to decreased output and increased prices finds support in the Supreme Court’s understanding of why Congress created a private right to action in antitrust cases.”)

83. See, e.g., *VBR Tours, LLC v. Nat’l R.R. Passenger Corp. (VBR Tours II)*, No. 14-cv-00804, 2015 WL 5693735 (N.D. Ill. Sept. 28, 2015).

84. *VBR Tours, LLC v. Nat’l R.R. Passenger Corp. (VBR Tours I)*, No. 14-cv-00804, 2015 WL 225328 (N.D. Ill. Jan. 15, 2015).

85. *VBR Tours II*, 2015 WL 5693735 at * 4.

86. *VBR Tours I*, 2015 WL 225328 at *5.

87. No. 13-13241, 2014 WL 5511517 (E.D. Mich. Oct. 31, 2014).

88. *Id.* at *3.

89. 80 F. Supp. 3d 1019 (N.D. Cal. 2015).

90. *Id.* at 1027–29 (stating that other courts have implicitly rejected loss of innovation as an antitrust injury, remarking that, in this instance, its harms are too “conclusory and speculative”); see also Hovenkamp, *supra* note 78, at 259–60 (discussing how the speculative nature of innovation can frustrate private antitrust jurisprudence from considering it as an antitrust injury).

91. 852 F. Supp. 2d 1171 (N.D. Cal. 2012).

92. *Id.* at 1185.

93. No. 07-CV-0212-CVE-SAJ, 2008 WL 747086 (N.D. Okla. Mar. 18, 2008).

94. *Id.* at *7; see also *OverEnd Tech. LLC v. Invista S.À.R.L.*, 431 F. Supp. 2d 925, 930 (E.D. Wis. 2006).

Attempts have been made to reconcile these conflicting approaches. In *Collegenet, Inc. v. Common Application, Inc.*,⁹⁵ the court concluded it “does not find support for the proposition that an injury solely based on less innovation . . . is sufficient to state a claim for antitrust injury.”⁹⁶ However, the opinion’s next statement insisted that “[c]ertainly, decreased innovation . . . can be relevant to a court’s finding of antitrust injury.”⁹⁷ The court’s logic provides little guidance though; it is difficult to determine how decreased innovation is “relevant” when such a finding cannot support an action. If a court may only rely upon decreased innovation when combined with a more traditional antitrust harm, then the presence of decreased innovation seems superfluous.

*US Airways, Inc. v. Sabre Holdings Corp.*⁹⁸ took a more logical approach. The ruling noted that a claim of reduced innovation might show an antitrust injury if it constitutes, or leads to, a conventional harm such as higher priced or reduced output: “A collective decision among competitors to refuse a particular innovation could run afoul of the antitrust laws, if a plaintiff were able to show that the collective decision harmed competition, for example, by reducing output or restricting prices.”⁹⁹ But because the plaintiff failed to satisfy this burden, the court denied standing.¹⁰⁰ Dicta found in a footnote of *United States v. Visa*¹⁰¹ arrived at a similar conclusion, suggesting that less innovation could be characterized as an output reduction.¹⁰²

In sum, antitrust law has increasingly been used to remedy innovation injuries in both merger and nonmerger cases—though such attempts by private parties have created judicial confusion. The belief is that, because competition incentivizes innovation, antitrust’s ability to promote competition should also preserve the incentives to innovate. But how does this work in actuality? The case studies in the next Part explore this question.

95. 104 F. Supp. 3d 1137 (D. Or. 2015), *rev'd and remanded*, 711 F. App'x 405 (9th Cir. 2017).

96. *Id.* at 1149.

97. *Id.*

98. 105 F. Supp. 3d 265 (S.D.N.Y. 2015), *appeal filed*, No. 17-960 (2d Cir. Apr. 5, 2017).

99. *Id.* at 286.

100. *Id.* at 287 (“U.S. Airways has not argued that the refusal to implement Choice Seats reduced or limited competition in any way.”).

101. 163 F. Supp. 2d 322 (S.D.N.Y. 2001).

102. *Id.* at 406 n.28 (“The term ‘output reduction’ can mean a ‘marketwide decrease in the number of units produced.’ But it can also refer to a decline in the quality of the goods, or a decline in the rate of innovation that is committed to a particular market.” (citation omitted)).

IV. CASE STUDIES

Does the record support the agencies' contention that antitrust enforcement enhances scientific progress? The first two case studies examine antitrust lawsuits intended to remedy diminished innovation: in these narratives, a dominant firm used a merger or restraint of trade, or both, to maintain market power, causing the market's level of innovation to diminish. However, the third example adds a nuance to this narrative, explaining that, even if exclusionary behavior does harm invention and discovery, it is difficult to determine whether antitrust enforcement is likely to promote innovation or compound the problem.

A. Boston Scientific's Merger and Consent Order

A notable example of the government using antitrust law to promote innovation occurred when the dominant firm in the catheter market, Boston Scientific, acquired its primary competitor, Cardiovascular Imaging Systems, Inc. (CVIS).¹⁰³ When the merger was announced, the catheter market was experiencing years of rapid technological advancement.¹⁰⁴ As one court remarked, "Competition between the two was intense, and the competition between the two was a major catalyst for catheter innovation."¹⁰⁵ Their rivalry had even spread to the courtroom in which each party had alleged the other infringed upon their patent rights.¹⁰⁶ So from the perspective of Boston Scientific, the acquisition made sense; it would allow Boston Scientific to capture CVIS's patent portfolio, quelling their intense competition and R&D arms race.¹⁰⁷

The FTC challenged the merger since eliminating one of the two major competitors in the catheter market—together they controlled ninety percent of the market—was likely to undermine the industry's rate of innovation.¹⁰⁸ According to the agencies' theory of market com-

103. *United States v. Bos. Sci. Corp. (Boston Scientific V)*, 253 F. Supp. 2d 85 (D. Mass. 2003).

104. *Id.* at 89 ("In a game of one down-manship, each competed to create smaller and smaller diameter catheters.").

105. *Id.*

106. *Id.*

107. *Id.* ("The jewel of the prospective merger, however, was CVIS. BSC wanted to obtain CVIS' intellectual property; at the time, [Boston Scientific] and CVIS were engaged in a patent infringement action over the IVUS technology. Competition between the two was intense, and the competition was a major catalyst for catheter innovation.").

108. *Id.* at 90-91; *In re Bos. Sci. Corp. (Boston Scientific D)*, No. 951-0002, 1995 WL 87948, at *20 (F.T.C. Feb. 1995) ("The effect of these acquisitions, the complaint alleges, is likely to be higher prices for IVUS catheters and diminished product innovation."); see also *Boston Scientific V*, 253 F. Supp. 2d at 99 ("[T]he elimination of competition immediately after HP left the marketplace led to a decline in

petition, the surviving firm would have little reason to develop products that would ultimately compete against the catheter technology it had just acquired.¹⁰⁹ Due to these concerns, the FTC demanded that Boston Scientific enter into a consent order as a condition of the acquisition's closing, allowing the firms to merge so long as Boston Scientific licensed certain patents on a perpetual and royalty-free basis to Hewlett-Packard (HP).¹¹⁰ By licensing patents to HP, the FTC expected competition between Boston Scientific and HP to maintain the industry's low prices and robust innovation.¹¹¹

The *Boston Scientific* case was, however, far from over. Shortly after the FTC permitted the merger to proceed, the FTC and HP alleged (in separate antitrust actions) that Boston Scientific breached the consent order by refusing to license certain patents to HP, forcing HP out of the catheter market.¹¹² For instance, HP sold an automatic pullback device that incorporated patents enumerated in the consent order; nonetheless, Boston Scientific threatened HP—and HP's customers—with infringement lawsuits if they continued to use HP's device, causing HP's sales to plummet.¹¹³ Boston Scientific's tactics, according to HP, violated the Sherman Act's prohibition of attempting to monopolize the market.¹¹⁴ The court agreed, denying Boston Scien-

catheter innovation, and resulting harm to the public. As Dr. Schumann (the FTC's expert) testified, the lack of competition eliminated BSC's incentive to invest in research and development in catheter innovation. The introduction of new and improved coronary and peripheral catheters sharply declined following BSC's acquisition of CVIS in 1995, and further diminished after HP exited from the market at the end of 1998.”)

109. *See In re Bos. Sci. Corp. (Boston Scientific II)*, 119 F.T.C. 549, 553 (1995) (“It will likely result in diminished product innovation in IVUS catheters . . .”).
110. *Boston Scientific I*, 1995 WL 87948, at *3 (providing the terms of the consent order, which includes: “Respondent shall, absolutely and in good faith, grant pursuant to [the agreement], at no minimum price and with no continuing royalties, a perpetual, non-exclusive license to IVUS Technology Portfolio, together with the right to grant exclusive sub-licenses to any part of such IVUS Technology Portfolio . . .”).
111. *Id.* (“The purpose of the license is to create an independent competitor in the development, production and sale of IVUS Catheters and to remedy the lessening of competition resulting from the CVIS Acquisition . . .”); *see also* United States v. Bos. Sci. Corp. (*Boston Scientific IV*), 167 F. Supp. 2d 424, 427 (D. Mass. 2001).
112. *Boston Scientific IV*, 167 F. Supp. 2d at 429 (“The government claims that [Boston Scientific] violated the FTC's order by failing to license the Webler patent to HP.”); *Hewlett-Packard Co. v. Bos. Sci. Corp. (Boston Scientific III)*, 77 F. Supp. 2d 189, 194 (D. Mass. 1999).
113. *Boston Scientific III*, 77 F. Supp. 2d at 194 (“BSC claimed that HP was not authorized to use the pullback patent and threatened to sue HP for patent infringement. BSC also told customers that HP's pullback device infringed on a BSC patent and threatened to sue customers who continued to use the HP automatic pullback device.”).
114. *See, e.g., id.* (“HP designed and developed a new catheter called ‘Scout’ and provided its technical specifications to BSC so that BSC could ensure that the catheter would operate with BSC consoles. BSC did not create the requested interface.

tific's motion to dismiss and remarking that Boston Scientific "injured the competitive process by engaging in predatory acts which drove HP out of the market . . . , depriving consumers of a meaningful choice of competing innovative products."¹¹⁵

By failing to comply with the consent order, the Boston Scientific–CVIS merger produced an extraordinary result. Typically, when the FTC or DOJ blocks a merger, it is difficult to determine whether the combination *would have* reduced innovation. After all, assessing whether a merger is likely to generate a negative effect requires a counterfactual scenario that rarely occurs. Here, as a consequence of breaching the consent order, the precise anticompetitive and anti-innovative results feared by the FTC had an opportunity to take place, which they did. Following the acquisition, Boston Scientific slashed its R&D budget, spending less on innovation from 1999 to 2001 than it did in 1998 alone.¹¹⁶ One court remarked that as a result of the merger and exclusionary behaviors, Boston Scientific halted development of its \$4.1 million "Cadillac" catheter, which was meant to compete against HP's device.¹¹⁷ Without HP, Boston Scientific had little reason to invest in such a capital-intensive project, stunting industry innovation.¹¹⁸ Although HP and Boston Scientific negotiated a settlement,¹¹⁹ the court presiding over the FTC action ordered Boston Scientific to pay a seven-million-dollar penalty, ruling that Boston Scientific's conduct reduced competition and innovation.¹²⁰

In sum, *Boston Scientific* illustrates how anticompetitive conduct reduces innovation: after Boston Scientific merged with its primary competitor, the company used exclusionary means to further preserve its market power. As a result, Boston Scientific and its competitors curtailed their R&D efforts, causing the overall market to become less innovative. The next case presents similar issues.

HP alleges that by not making a meaningful effort to do so, BSC sought to make the catheter commercially unsuccessful in furtherance of BSC's objective to monopolize the catheter and console markets. HP claims this refusal violated BSC's obligation [under the consent order].")

115. *Id.*; see also *United States v. Bos. Sci. Corp. (Boston Scientific V)*, 253 F. Supp. 2d 85, 99 (D. Mass. 2003) ("[T]he elimination of competition immediately after HP left the marketplace led to a decline in catheter innovation . . . [and] eliminated BSC's incentive to invest in research and development.")

116. *Boston Scientific V*, 253 F. Supp. 2d at 99.

117. *Id.* ("BSC cancelled the \$4.1 million 'Cadillac' project to design a new 3.5 French catheter—which was intended to stave off competition from [HP's] Scout—after HP decided to leave the market. No new catheters were introduced in 1999, after HP's exit, and only 1 new catheter was introduced in each of 2000 and 2001.")

118. *Id.*

119. *Id.* at 99; *United States v. Bos. Sci. Corp. (Boston Scientific IV)*, 167 F. Supp. 2d 424, 426 (D. Mass. 2001).

120. *Boston Scientific V*, 253 F. Supp. 2d at 102.

B. Qualcomm's Attempt to Dominate the Market for Cellphones and Cellphone Innovation

Qualcomm has endured over a decade's worth of allegations that its exclusionary tactics harm consumers and markets. In 2005, Broadcom Corporation (Broadcom) filed the initial antitrust lawsuit against Qualcomm, which the FTC and Apple followed with similar actions.¹²¹ Each of the lawsuits claimed that Qualcomm abused its position as the owner of standard-setting technology in the cellphone industry to suppress innovation.¹²²

Cellphones are comprised of numerous components made by a variety of companies.¹²³ For cellphones to operate properly, their parts must be compatible.¹²⁴ Standards-setting organizations (SSOs) accomplish this feat by establishing industry standards intended to coordinate manufacturers and products.¹²⁵ Oftentimes SSOs create standards that incorporate technologies developed and owned by private parties. If a selected technology is patented, then its owner could, without restrictions, demand supra-competitive prices; after all, competitors *must* license it.¹²⁶ To mitigate this problem, SSOs require patent owners as a condition of incorporation to license the relevant patents on fair, reasonable, and non-discriminatory (FRAND) terms.¹²⁷

According to Broadcom's complaint, Qualcomm induced the European Telecommunications Standards Institute (ETSI) to adopt its chipsets by promising to license the relevant patents on FRAND

121. *Broadcom Corp. v. Qualcomm Inc.*, No. 05-3350 (MLC), 2006 WL 2528545 (D.N.J. Aug. 31, 2006), *aff'd in part, rev'd in part, and remanded*, 501 F.3d 297 (3d Cir. 2007).

122. Susan Decker et al., *Apple Sues Qualcomm over Patent Royalties in Antitrust Case*, BLOOMBERG TECH. (Jan. 20, 2017), <https://www.bloomberg.com/news/articles/2017-01-20/apple-sues-qualcomm-over-patent-royalties-in-antitrust-case> [<http://perma.unl.edu/WE9U-73CW>].

123. *Broadcom*, 2006 WL 2528545, at *1.

124. *Id.* ("Various companies manufacture such chipsets, and the phones into which they are incorporated. To function properly, however, cell phones and chipsets made by different manufacturers must be capable of interfacing with each other. To ensure the interoperability of different cell phones, the wireless industry works with several standards development organizations ('SDOs') to develop wireless communication standards." (citations omitted)).

125. See Mark A. Lemley, *Intellectual Property Rights and Standard-Setting Organizations*, 90 CAL. L. REV. 1889, 1891-92 (2002) (discussing standard-setting organizations and their effects on promoting innovation).

126. See *Broadcom*, 2006 WL 2528545, at *1.

127. *Id.* ("An SDO may require a patent-holder to agree to license the patent on fair, reasonable, and non-discriminatory ('FRAND') terms before it agrees to incorporate the patent into the standard. This requirement is designed to prevent a patent-holder from acquiring an unfair advantage when a patent is incorporated into the standard.").

terms, though Qualcomm allegedly had no intention of doing so.¹²⁸ Instead, Qualcomm demanded exorbitant prices reflecting the market power that ETSI had just granted it, absconding from its promise to charge “fair” royalty rates.¹²⁹

Broadcom also claimed that Qualcomm licensed SSO technology on a discriminatory basis: Qualcomm purportedly offered cheaper rates to consumers who licensed its non-SSO products, disfavoring those who patronized its competitors.¹³⁰ Qualcomm’s tactic, the complaint asserted, eroded competition and innovation since competitors had little incentive to develop technology that consumers were unlikely to purchase, abrogating its FRAND commitments.¹³¹ It was said:

Qualcomm . . . has a 90% share in the market for CDMA-path chipsets, and by withholding favorable pricing in that market, coerced cellular telephone manufacturers to purchase only Qualcomm-manufactured UMTS-path chipsets. These actions are alleged to be part of Qualcomm’s effort to obtain a monopoly in the UMTS chipset market because it views competition in that market as a long-term threat to its existing monopolies in CDMA technology.¹³²

As a result, Qualcomm may have violated §§ 1 and 2 of the Sherman Act by using its market power to unreasonably exclude competition and preserve its dominant position.¹³³

After the U.S. District Court for the District of New Jersey initially dismissed the complaint for a failure to state a claim, the U.S. Court of Appeals for the Third Circuit held in favor of Broadcom.¹³⁴ In overruling the district court, the Third Circuit asserted that acquiring mo-

128. *Broadcom Corp. v. Qualcomm Inc.*, 501 F.3d 297, 304 (3d Cir. 2007) (“The Complaint alleged that Qualcomm induced the ETSI and other SDOs to include its proprietary technology in the UMTS standard by falsely agreeing to abide by the SDO’s policies . . . but then breached those agreements by licensing its technology on non-FRAND terms.”).

129. *Id.*

130. *Id.* at 318.

131. FTC Complaint, *supra* note 16, at 20 (“[R]educing sales and margins resulting from Qualcomm’s tax diminish[ed] competitors’ abilities and incentives to invest and innovate.”).

132. *Broadcom*, 501 F.3d at 304; *id.* at 318 (“These actions, the Complaint concluded, harmed competition and undermined innovation in the UMTS chipset market. Such factual allegations of anticompetitive conduct are sufficiently specific to satisfy the first element of an attempted monopolization claim.” (citation omitted)).

133. *Id.* at 304 (“The intentional acquisition of monopoly power through deception of an SDO, Broadcom posits, violates antitrust law.”); *id.* at 318 (“Qualcomm was charging double royalties to UMTS cell phone manufacturers who use non-Qualcomm UMTS chipsets. . . . Qualcomm was also providing discounts, incentives, and payments to cell phone manufacturers who use only Qualcomm UMTS chipsets.” (citation omitted)).

134. *Broadcom Corp. v. Qualcomm Inc.*, No. 05-3350 (MLC), 2006 WL 2528545, at *6 (D.N.J. Aug. 31, 2006) (ruling that Qualcomm’s attempted monopolization of the market was based upon utilizing the company’s patent rights which constitutes a legalized monopoly, and therefore, Qualcomm’s behavior could not violate the antitrust laws), *aff’d in part, rev’d in part and remanded*, 501 F.3d 297 (3d Cir. 2007).

nopoly power by deception of an SSO could run afoul of the Sherman Act.¹³⁵ The court determined that Qualcomm gained an unfair ability to charge prices in excess of what its patents would have ordinarily garnered.¹³⁶ This lawsuit culminated in an \$891 million settlement in Broadcom's favor.¹³⁷

Similar to *Boston Scientific*, the matter was far from over. In January of 2017, the FTC brought an antitrust lawsuit claiming that Qualcomm was continuing to violate its FRAND commitments.¹³⁸ Three days later, Apple initiated a similar action to Broadcom's and the FTC's lawsuits.¹³⁹ The gravamen of Apple's complaint was that Qualcomm violated the Sherman Act by charging royalty rates based upon the value of technology developed and owned by *others*.¹⁴⁰ For example, if Apple created groundbreaking technology that increased the demand for, and price of, the iPhone, Qualcomm—by virtue of owning standard-setting technology used in the iPhone—would raise its own royalty rates to reflect Apple's innovation.¹⁴¹ Thus, Qualcomm was misusing its position as a standard setter to “tax” the innovation of others.¹⁴² The effect of which, Apple concluded, generated supra-competitive profits for Qualcomm and suppressed innovation in violation of the Sherman Act.¹⁴³

135. *Broadcom*, 501 F.3d at 317–19.

136. *Id.* at 313 (“Misrepresentation concerning the costs of implementing a given technology may confer an unfair advantage and bias the competitive process in favor of that technology’s inclusion in the standard. . . . Although a patent confers a lawful monopoly over the claimed invention, its value is limited when alternative technologies exist. That value becomes significantly enhanced, however, after the patent is incorporated in a standard.” (citation omitted)).

137. Brooke Crothers, *Qualcomm, Broadcom Reach \$891 Million Settlement*, CNET (Apr. 27, 2009), <https://www.cnet.com/news/qualcomm-broadcom-reach-891-million-settlement> [<http://perma.unl.edu/9MAM-E83T>].

138. Brett Kendall, *Federal Trade Commission Files Antitrust Lawsuit Against Qualcomm*, WALL STREET J. (Jan. 17, 2017), <https://www.wsj.com/articles/federal-trade-commission-files-antitrust-lawsuit-against-qualcomm-1484689732>.

139. Redacted Complaint at 56, *Apple Inc. v. Qualcomm Inc.*, No. 17CV0108 GPC NLS, 2017 WL 3966944 (S.D. Cal. Jan. 20, 2017).

140. *Id.* at 1–2 (“What this means in the case of the iPhone is that when Apple engineers create a revolutionary new security feature such as touch ID, which enables breakthrough technologies like Apple Pay, Qualcomm insists on royalties for these and other innovations it had nothing to do with and royalty payments go up. When Apple spends billions redefining the concept for a smartphone camera, Qualcomm’s royalty payments go up.”).

141. *Id.* at 2–3.

142. *Id.*

143. *Id.* at 92–93 (“The anticompetitive effects of Qualcomm’s conduct include the elevation of CDMA and premium LTE chipset prices above competitive levels, the imposition on Apple of onerous, unreasonable, and costly supply terms, the suppression of innovation in the chipset market, and the elimination of Apple’s ability to choose its suppliers of chipsets in a competitive market.”).

Some parties though were not as convinced that Qualcomm should incur antitrust liability. In January 2017, FTC Commissioner Maureen Ohlhausen dissented from the FTC's complaint, stating that the alleged harms and damages were too speculative.¹⁴⁴ Of note, the dissent remarked that the FTC's case is "based on a flawed legal theory . . . that lacks economic and evidentiary support."¹⁴⁵ Commissioner Ohlhausen is not necessarily incorrect: there is a lack of support. Not only has the FTC's complaint omitted empirical evidence that Qualcomm's conduct harmed competition or innovation, but there is almost no evidence—on a general level—that anticompetitive conduct stifles innovation or that antitrust laws are capable of remedying this injury. Indeed, Commissioner Ohlhausen's position was that the allegations are unsupported by the empirical record. The next case study and Part V's empirical analysis address Commissioner's Ohlhausen's concern.

C. The Dilemma of Creating Antitrust Liability in the Pharmaceutical Industry

This case study adds complexity to the above narrative by illustrating the difficulties of determining whether antitrust enforcement is likely to enhance or imperil an industry's rate of innovation—even if anticompetitive conduct can be established. Prior to the Hatch–Waxman Act,¹⁴⁶ two problems beleaguered the drug market. First, a brand-name company (brand company or brand) that sought to introduce a new drug, known as a "pioneer drug," was required by the Food and Drug Administration (FDA) to evaluate the drug's safety and effectiveness in a lengthy testing process known as the New Drug Application (NDA).¹⁴⁷ Because this phase typically began after a brand company received patent rights to a drug, the brands tended to have less than their patent's twenty-year term to market a pioneer drug, abridging their patent rights and incentives to innovate.¹⁴⁸ Second, since the FDA subjected generic drugs to the same NDA process as the brands, the generic companies could only avoid infringing upon the brand's patent rights by beginning the lengthy review process af-

144. MAUREEN K. OHLHAUSEN, DISSENTING STATEMENT OF COMMISSIONER MAUREEN K. OHLHAUSEN IN THE MATTER OF QUALCOMM, INC. 1 (2017), <https://www.ftc.gov/public-statements/2017/01/dissenting-statement-commissioner-maureen-k-ohlhausen-matter-qualcomm-inc> [<https://perma.unl.edu/6SBY-VYBK>].

145. *Id.*

146. Drug Price Competition and Patent Term Restoration Act of 1984, Pub. L. No. 98-417, 98 Stat. 1585, 1606 (codified as amended in scattered sections of 35 U.S.C.).

147. Michael A. Carrier, *Unsettling Drug Patent Settlements: A Framework for Presumptive Illegality*, 108 MICH. L. REV. 37, 43 (2009) (explaining that the costs of testing a drug's effectiveness and safety encroached into a drug's patent term which had the result of diminishing innovation in the pharmaceutical industry).

148. *Id.*

ter the relevant patents had expired. As a result of delaying generics from the market, the brands were able to charge monopoly prices for years after their exclusive rights had lapsed, propping up drug prices.¹⁴⁹

The Hatch–Waxman Act sought to ease these burdens by establishing a more competitive and innovative regulatory system.¹⁵⁰ As a first step, it created a route for brands to extend their patent rights up to five years beyond a patent’s standard twenty-year term to compensate for the time lost during the testing process.¹⁵¹ The second mechanism lessened the cost and time of introducing a generic drug into the market.¹⁵² Congress instituted the Abbreviated New Drug Application (ANDA), which allows a generic company to adopt the brand company’s safety and effectiveness tests so long as the pioneer and generic drugs are bioequivalents and contain the same active ingredient.¹⁵³ Once a generic drug gains regulatory approval using the ANDA process, “switching laws” allow pharmacists to swap out the pioneer drug for its generic equivalent, increasing competition and lowering prices.¹⁵⁴ So by elongating the brand’s patent rights while also reduc-

149. *Id.* at 42–43 (explaining that prior to the Hatch–Waxman Act, the research and development of patent drugs during the patent’s effective term was considered an infringing use).

150. *Warner–Lambert Co. v. Apotex Corp.*, 316 F.3d 1348, 1358 (Fed. Cir. 2003) (“The purpose of Title I of the Bill is to make available more low cost generic drugs The purpose of Title II of the Bill is to create a new incentive for increased expenditures for research and development of certain products which are subject to premarket government approval.” (alteration in original) (quoting H.R. REP. NO. 98–857(I), at 14–15 (1984), *reprinted in* 1984 U.S.C.C.A.N. 2647, 2647–48)).

151. *Allergan, Inc. v. Alcon Labs., Inc.*, 200 F. Supp. 2d 1219, 1226 (C.D. Cal. 2002) (“Section 201 of the Hatch–Waxman Act provided for an extension of patents for certain drugs for up to five years to address the problem of the distorted patent term on the front end.”), *aff’d*, 324 F.3d 1322 (Fed. Cir. 2003).

152. Michael A. Carrier & Steve D. Shadowen, *Product Hopping: A New Framework*, 92 NOTRE DAME L. REV. 167, 173 (2016) (“The drafters of the Act sought to ensure the provision of ‘low-cost, generic drugs for millions of Americans’ and recognized that generic competition would save consumers, as well as the federal government, millions of dollars each year.” (citation omitted)).

153. 21 U.S.C. § 355(j) (2012) (“[T]he rate and extent of absorption of the drug do not show a significant difference from the rate and extent of absorption of the listed drug when administered at the same molar dose . . . under similar experimental conditions”); *see also* *Schering Corp. v. FDA*, 866 F. Supp. 821, 823 (D.N.J. 1994) (“Prior to 1984, manufacturers desiring to sell generic copies of drugs approved after 1962 were required to submit full new drug applications. This involved a time consuming and expensive process which included comprehensive animal and human testing to show that the new drug is safe and effective. The 1984 Amendments free the manufacturer or distributor of a generic drug product from the clinical trial requirements as long as it could prove that the generic is bioequivalent to the already-approved pioneer drug it copies.”), *aff’d*, 51 F.3d 390 (3d Cir. 1995).

154. *Mylan Pharm. Inc. v. Warner Chilcott Pub. Ltd. Co.*, 838 F.3d 421, 428 (3d Cir. 2016) (“Every state in the United States has drug substitution laws. These state

ing the costs of gaining approval for a generic, the Hatch–Waxman Act balanced incentivizing innovation and promoting competition.¹⁵⁵

The brand companies, however, found ways to subvert the ANDA process. Right before a brand drug’s patent expires, the brand patentee may manipulate trivial qualities of the drug to eliminate bioequivalence with its generic counterpart before the generic drug reaches the market.¹⁵⁶ As examples, a brand may turn a pill into a gel cap or change its dosage from once daily to twice. This strategy, known as “product hopping,” is often accompanied by a “hard switch” whereby the brand company pulls the older version from the market, leaving only the new drug.¹⁵⁷ The results of a product hop and hard switch (1) prevent pharmacists from swapping out the pioneer drug for its generic version and (2) block generic companies from adopting the brand patentee’s safety and effectiveness tests, which raise the costs of developing a generic drug as well as extend the brand companies’ market power.¹⁵⁸ Plaintiffs filed suits, alleging that a minor innovation meant only to perpetuate the patentee’s market power violates the Sherman Act’s ban against monopolizing the market.¹⁵⁹

Interestingly, there are conflicting theories about whether exposing brand patentees to antitrust liability is likely to increase or decrease innovation. The case in favor of scrutinizing product hops was outlined in *New York ex rel. Schneiderman v. Actavis PLC*.¹⁶⁰ In that dispute, it was alleged that Actavis PLC violated the Sherman Act by slightly modifying its Alzheimer’s drug Namenda IR, creating Namenda XR, shortly before IR’s patent expired.¹⁶¹ With generic versions of IR set to become available, Actavis enticed doctors, patients, and pharmacists to switch from IR to XR by reducing XR’s price, offer-

substitution laws ‘either permit or require pharmacists to dispense a therapeutically equivalent, lower-cost generic drug in place of a brand drug absent express direction from the prescribing physician that the prescription must be dispensed as written.’” (quoting *N.Y. ex rel. Schneiderman v. Actavis PLC*, 787 F.3d 638, 645 (2d Cir. 2015))).

155. *Warner–Lambert*, 316 F.3d at 1358.

156. *Mylan Pharm.*, 838 F.3d at 426.

157. 21 C.F.R. § 314.127 (as amended 2016); see also Jacob S. Sherkow, *Administering Patent Litigation*, 90 WASH. L. REV. 205, 234 (2015) (discussing the Hatch–Waxman Act’s requirement that the FDA deny a generic’s ANDA after the brand company’s product hop).

158. See *In re Asacol Antitrust Litig.*, No. 15-CV-12730-DJC, 2016 WL 4083333 (D. Mass. July 20, 2016) (“Product hopping is the practice of tweaking a brand-name drug to prevent pharmacists from substituting a generic equivalent when presented with a prescription for the newly modified brand-name drug.”).

159. See, e.g., *Sergeants Benevolent Ass’n Health & Welfare Fund v. Acta Vis, PLC*, No. 15-CV-6549 (CM), 2016 WL 4992690, at *9 (S.D.N.Y. Sept. 13, 2016) (alleging that the defendant’s product hop violated the Sherman Act).

160. 787 F.3d 638 (2d Cir. 2015).

161. *Id.* at 647.

ing rebates, and ultimately discontinuing IR.¹⁶² The hard switch compelled pharmacists to prescribe XR instead of generic Namenda because the generic companies had sought to develop bioequivalence with IR, not XR.¹⁶³ For a generic company to compete against Namenda, it would have to wait until XR's patent expires in 2029 or undergo the lengthy NDA process to introduce a new drug, undermining the statutory benefits sought by the Hatch–Waxman Act.¹⁶⁴ The Attorney General of New York initiated an antitrust action, claiming that Actavis's product hop and hard switch violated § 1 of the Sherman Act.

The *Schneiderman* court ruled that, although innovation typically benefits consumers, here, antitrust liability is appropriate. According to the court, product hopping not only limits competition, but it also “may deter significant innovation by encouraging manufacturers to focus on switching the market to trivial or minor product reformulations rather than investing in the research and development necessary to develop riskier, but medically significant innovations.”¹⁶⁵ With this observation, the court held that obstructing generic competition in the process of extending one's patent rights may monopolize the market in violation of the Sherman Act. This language was supported by *In re Asacol Antitrust Litigation*,¹⁶⁶ which found that superfluous innovations can be considered anticompetitive.¹⁶⁷

On the other hand, some courts and scholars have persuasively argued that subjecting product hops to antitrust liability is likely to reduce innovation. For example, the court in *Mylan Pharmaceuticals, Inc. v. Warner Chilcott Public Ltd. Co.*¹⁶⁸ held that Warner Chilcott's product hop did not transgress antitrust law—even though the case was similar to *Schneiderman* and *Asacol*—opining that “[t]he prospect of costly and uncertain litigation every time a company reformulates a brand-name drug would likely increase costs and discourage manufacturers from seeking to improve existing drugs.”¹⁶⁹ Likewise, an article coauthored by Judge Douglas Ginsburg of the U.S. Court of Appeals for the District of Columbia noted that seemingly insignificant improvements can greatly enhance consumer welfare.¹⁷⁰ And because courts are improper forums to evaluate the relative merits of product innovations, they argued that exposing pharmaceutical companies to

162. *Id.* at 648.

163. *Id.* at 647.

164. *Id.* at 642.

165. *Id.* at 659.

166. No. 15-CV-12730-DJC, 2016 WL 4083333 (D. Mass. July 20, 2016).

167. *Id.* at *9.

168. No. 12–3824, 2015 WL 1736957, at *16 (E.D. Pa. Apr. 16, 2015), *aff'd*, 838 F.3d 421 (3d Cir. 2016).

169. *Id.*

170. Ginsberg et al., *supra* note 21.

liability for improving drug formulas “risks chilling future innovation that could yield significant consumer benefits.”¹⁷¹

Given the uncertainty effects that antitrust law renders on innovation, the question of whether enforcement should target innovative markets supports Commissioner Olhausen’s statement that the issue requires further study. The next Part answers the first set of questions with statistical analyses.

V. AN EMPIRICAL ANALYSIS OF ANTITRUST’S INFLUENCE ON INNOVATION

Using a new dataset and quantitative methods, this Part examines whether antitrust law promotes innovation. Helping matters, the history of antitrust is an ideal natural laboratory for empirical study. The rate of antitrust enforcement has fluctuated over time, creating the types of variations that generate strong statistical results.¹⁷² For example, the number of cases initiated by private parties steadily increased in the early 1980s at which point the aforementioned antitrust revolution generally reduced the number of private cases, spiking again during the height of the Great Recession in 2006–2008.¹⁷³ As for actions initiated by the government, since the 1960s, antitrust has generally escalated; however, there are times when it has decreased, especially during the tenure of President Ronald Reagan.¹⁷⁴ It then reemerged in subsequent Administrations.¹⁷⁵ As a result of antitrust’s varying intensity over the years, it can be statistically determined with a high level of confidence whether the rate of innovation has changed in accordance with increases and decreases of antitrust activity, controlling for other mitigating factors.

171. *Id.* at 4; *see id.* at 1 (“Competition law is not a suitable instrument for micromanaging product design and innovation . . .”).

172. Variation is essential for statistical studies. If a variable never fluctuates, it, in fact, fails to meet the definition of a variable. It can be more difficult to assess a variable that varies in a steady and consistent manner because its trajectory could actually be determined by other variables that are changing in the same manner. A more ideal variable is one that sporadically increases or decreases; this is because any measured effects are easier to attribute to that variable, producing more reliable results. *See generally* Sanford M. Litvack, *The Ebb and Flow of Antitrust Enforcement: The Reagan and Carter Administrations*, 1982 BYU L. REV. 849, 850–51 (1982).

173. Paul E. Godek, *Does the Tail Wag the Dog? Sixty Years of Government and Private Antitrust in the Federal Courts*, ANTITRUST SOURCE, Dec. 2009, at 2 tbl.2.

174. Eddie Correia, *The Reagan Assault on Antitrust*, MULTINATIONAL MONITOR (Feb. 15, 1986), <http://www.multinationalmonitor.org/hyper/issues/1986/0215/correia.html> [<http://perma.unl.edu/W8FP-7EYD>]; Robert D. Hershey, Jr., *Reagan’s Antitrust Explosion*, N.Y. TIMES (Jan. 10, 1982), <http://www.nytimes.com/1982/01/10/business/reagan-s-antitrust-explosion.html>.

175. *See, e.g.*, David A. Balto, *Antitrust Enforcement in the Clinton Administration*, 9 CORNELL J.L. & PUB. POL’Y 61, 65 (1999) (observing an increase in antitrust enforcement during the Clinton administration).

Figure 1 demonstrates the varying rate of private antitrust intensity, illustrated by the number of cases filed each year in the federal courts. Figure 2 graphs the fluctuations of government antitrust intensity using an alternative measure of agency budgets in current dollars.

Figure 1: Private Antitrust Actions Filed by Year

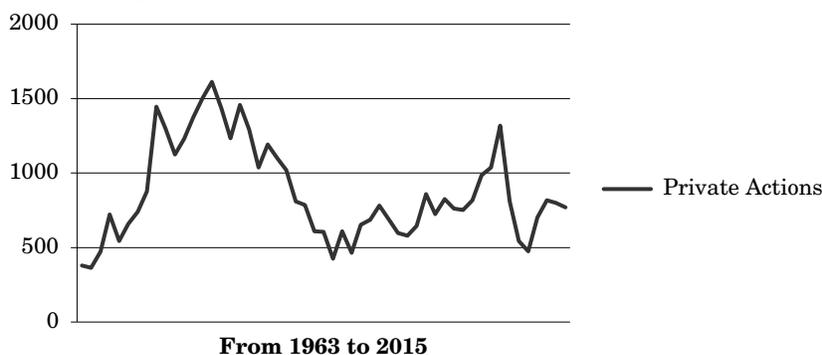
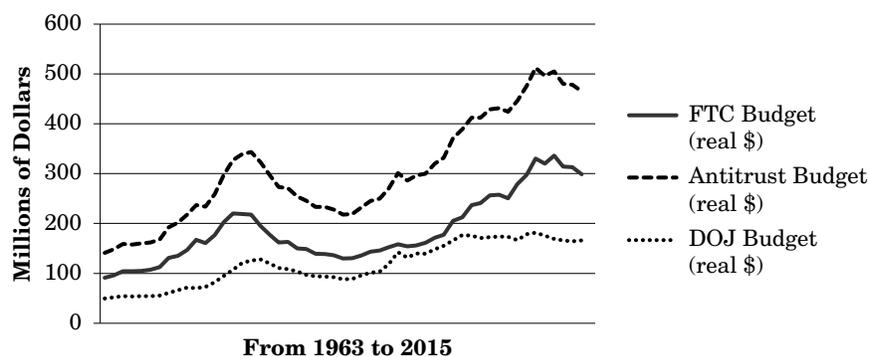
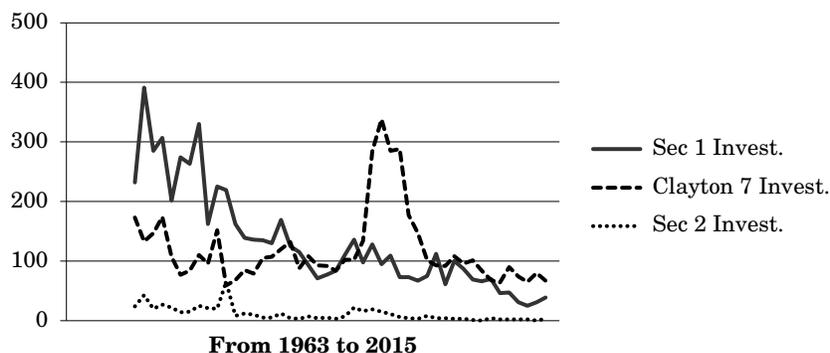


Figure 2: Antitrust Agency Budgets in Real Dollars



Creating even more variation, each type of antitrust action initiated by the government has fluctuated in a unique pattern from the other types. So while the rate of § 1 investigations has steadily declined until present day, merger enforcement—which has traditionally been less common than §§ 1 and 2 investigations—peaked in the 1990s and has since become more prominent than Sherman Act investigations. This variation provides important clues about the effects of each type of antitrust enforcement; if they had all varied in the same way, then it would be difficult to detect each action's independent influence on innovation. See Figure 3.

Figure 3: Government Antitrust Actions Filed by Year



A. Hypotheses

The expected findings—i.e., this study’s hypotheses—are generally optimistic about antitrust’s efficacy. Greater levels of antitrust enforcement are hypothesized to foster the competitive forces needed to stimulate innovation, so when antitrust intensity is greater (as depicted by higher levels of antitrust investigations, lawsuits, budgets, and personnel), society should produce more innovation. This is expected to be true and consistent throughout the course of modern American history. That said, antitrust enforcement has likely incentivized more R&D and other creative activities since becoming a part of governmental policy. Indeed, because the antitrust agencies are now selecting cases for enforcement based upon perceived harm to innovation,¹⁷⁶ antitrust’s pursuit of innovation is likely to be more fruitful. Another hypothesis asserts that the type of antitrust enforcement producing the most innovation is merger review. This is because business combinations that overly concentrate market power can shift the R&D incentives of entire industries, whereas exclusionary conduct actions are more likely to affect discrete actors, rendering fewer systemic effects.¹⁷⁷ Remedying anticompetitive mergers may therefore generate more innovation than nonmerger violations.

176. See, e.g., Vestager, *supra* note 42 (including a statement by the European Antitrust Commission asserting that promoting innovation is a consideration in how antitrust law is initiated).

177. The goal of merger review is essentially to determine whether the combination would result in a monopoly, which would typically influence the entire market affected by the merger. While conduct cases require a level of market power, they do not necessarily have to rise to the level of market monopolization.

B. Research Design

This study uses a new dataset comprised of publicly available data as well as data received from Freedom of Information Act (FOIA) requests. The dataset spans from 1963 to 2015 with one unique entry per year. In essence, it demonstrates the effects of higher and lower levels of antitrust enforcement and intensity on society's ability to produce patents and other innovative activities, such as R&D.¹⁷⁸

1. Variables

The primary dependent variable is *patent issuances*. A dependent variable is the entity that the research intends to explain; in this case, the study analyzes how certain factors drive the U.S. level of innovation, leading to patent issuances. As is typical, the dependent variable was lagged by one year. Although *patent issuances* is not a perfect measure of innovation, it is considered by scholars to be more than adequate because a substantial sum of new inventions and processes are patent protected.¹⁷⁹ So as innovation increases so should the number of patents issued. For the sake of rigor, the study verifies the results using a secondary dependent variable of *R&D spending*. After all, the patent system is meant to incentivize actors to invest and engage in activities leading to innovation and patents, which require R&D spending.¹⁸⁰ The Patent and Trademark Office makes data for total patent issuances publicly available,¹⁸¹ while the Organization for Economic Co-Operation and Development (OECD) tracks R&D data.¹⁸²

As for the independent variables, the statistical design analyzes several ways that *antitrust intensity* might influence the U.S. level of innovation. The first independent variable measures the effect of pri-

178. See generally Robert Pitofsky, *Past, Present, and Future of Antitrust Enforcement at the Federal Trade Commission*, 72 U. CHI. L. REV. 209 (2005) (providing a good discussion about the history and trajectory of antitrust enforcement in the United States).

179. See, for example, Jeffrey L. Furman et al., *The Determinants of National Innovative Capacity*, 31 RES. POL'Y 899, 909 (2002), using patent issuances as its dependent variable and noting that patent issuances are an imperfect measure. However, the authors sought to alleviate this concern by demonstrating that the variable is statistically robust, likely constitutes the best possible measure of innovation, and reflects the industry standard for measuring innovation.

180. Michael J. Graetz & Rachael Doud, *Technological Innovation, International Competition, and the Challenges of International Taxation*, 113 COLUM. L. REV. 347, 349 (2013) (discussing the essential relationship between R&D and innovation).

181. U.S. Patent Statistics Chart: Calendar Years 1963–2015, U.S. PATENT & TRADEMARK OFFICE, https://www.uspto.gov/web/offices/ac/ido/oeip/taf/us_stat.htm [http://perma.unl.edu/A33E-GGF7].

182. *Gross Domestic Spending on R&D*, ORGANISATION FOR ECON. CO-OPERATION & DEV., <https://data.oecd.org/rd/gross-domestic-spending-on-r-d.htm> [http://perma.unl.edu/VWZ5-KG5V].

vate antitrust actions. Considering that privately initiated antitrust lawsuits are the most common type, the treatment tests how increases and decreases of the annual number of privately filed antitrust lawsuits impacts innovation. The number of *private antitrust lawsuits* per year is derived from the Annual Reports of the *Judicial Business of the United States Courts*.¹⁸³

In terms of FTC and DOJ actions, as opposed to private lawsuits, government antitrust intensity is reflected in several ways. These variables measure the types of investigations and complaints filed, including variables reflecting specific areas of antitrust enforcement. The DOJ provides publicly available data for the number of antitrust investigations conducted by the agency for (1) merger investigations (section 7 of the Clayton Act), (2) restraint of trade investigations (§ 1 of the Sherman Act), and (3) (attempted) monopolization claims (§ 2 of the Sherman Act).¹⁸⁴ In addition to investigations, data were also obtained for the number of section 7, § 1, and § 2 cases filed by the DOJ through FOIA requests.

Another variable, *governmental enforcement*, is a dummy variable reflecting whether the observed enforcement occurred before or after the agencies sought to incorporate innovation into their organizational missions. If this variable proves statistically significant and positive, it would suggest that crafting a targeted campaign to remedy diminished innovation is efficacious. Otherwise, the study may show that antitrust bolsters innovation but as an unintended yet positive externality. (Of course, there could be no statistically significant relationship between antitrust and innovation.)

This research also analyzes the intensity of the government's antitrust presence. It does so by measuring the size of antitrust's "administrative state," using variables such as the FTC's and DOJ's annual budgets, the number of lawyers, and number of other personnel employed. Although none of these variables perfectly captures the presence of government regulators in a certain year, the proxy measures are reasonable depictions of intensity when taken as a whole. This data was gathered from a number of sources: the FTC's and DOJ's websites,¹⁸⁵ FOIA requests, and third-party research.¹⁸⁶

183. Various issues of the reports were used. See *Judicial Business of the United States*, U.S. COURTS, <http://www.uscourts.gov/Statistics/JudicialBusiness.aspx> (last visited Jan. 11, 2018) (select the link to each report to access yearly data).

184. See *Division Operations*, DEP'T OF JUSTICE, <https://www.justice.gov/atr/division-operations> (last visited Jan 11, 2018) (select the link to each decade of workload statistics to access ten-year data).

185. Data for the FTC's annual budget and full-time employees from 1979 to 2016 are available on the agency's website. See *FTC Appropriation and Full-Time Equivalent (FTE) History*, FED. TRADE COMM'N, <https://www.ftc.gov/about-ftc/bureaus-offices/office-executive-director/financial-management-office/ftc-appropriation> [<http://perma.unl.edu/NU8T-C63J>]. Data on the FTC's employment history

To accurately test these relationships, a number of control variables were incorporated.¹⁸⁷ In this case, the control variables known to affect innovation and patent issuances are *gross domestic product per capita*, *education level*, *time*, and *economic openness*.¹⁸⁸ The degree to which a country is integrated into the global economy is considered a factor leading towards increased innovation.¹⁸⁹ More economically open societies tend to have more established relationships with other countries and multinational firms, increasing the likelihood that foreign firms will choose to innovate in that country and foreign workers in the R&D sector will relocate to that country.¹⁹⁰ *Economic openness* is measured as a proxy by the U.S. level of international trade, which is available along with *GDP per capita* from the World Bank's *World Development Indicators*.¹⁹¹ *GDP per capita* is important because

was found using a freedom of information request and supplemented by the agency's Annual Competition Reports, which also included data on budgets. See *Annual Competition Reports*, FED. TRADE COMM'N, <https://www.ftc.gov/policy/reports/policy-reports/annual-competition-reports> (last visited Jan. 11, 2018) (select the link to each report to access yearly data). Figures for the DOJ's Antitrust Division's annual appropriations are available from 1903 to present. *Appropriation Figures for the Antitrust Division*, DEP'T OF JUSTICE, <https://www.justice.gov/atr/appropriation-figures-antitrust-division> [<http://perma.unl.edu/2XD2-REEK>].

186. See, e.g., Kenneth G. Dau-Schmidt et al., *Department of Justice Antitrust Enforcement, 1955–1997: An Empirical Study*, 17 REV. INDUS. ORG. 75, 78–79 (2000) (providing data regarding the number of antitrust cases initiated by the DOJ occurring each year).
187. Empirical research can fail to properly capture a relationship by omitting control variables that actually affect the dependent variable. If an independent variable proves to be statistically significant after the study controls for variables that have been shown or are likely to affect the dependent variable, then the study may conclude that the independent variable causally influences the dependent variable.
188. Furman et al., *supra* note 179, at 912 (regressing innovation with GDP, R&D, economic openness, and scientific capacity as measured by science and technology journals); Eric C. Wang, *Determinants of R&D Investment: The Extreme-Bounds-Analysis Approach Applied to 26 OECD Countries*, 39 RES. POL'Y 103, 107 (2010) (testing R&D expenditures against GDP and human capital stock as measured by education levels); see, e.g., Jonathan P. Doh et al., *Foreign Research and Development and Host Country Environment: An Empirical Examination of U.S. International R&D*, 45 MGMT. INT'L REV. 121, 139–40 (2005) (regressing R&D levels with education and wealth).
189. Razeem Sally, *Why Openness to Trade Matters*, WORLD ECON. F. (Sept. 30, 2015), <https://www.weforum.org/agenda/2015/09/why-openness-to-trade-matters> [<http://perma.unl.edu/P2UL-MLX7>] (“Trade and investment . . . drive[] productivity and innovation by exposing firms to international competition, expertise and technology.”).
190. *Id.*
191. See *DataBank World Development Indicators*, WORLD BANK, <http://databank.worldbank.org/data/reports.aspx?source=world-development-indicators> (last visited Jan. 11, 2018).

wealth is thought to attract and generate innovation.¹⁹² Perhaps the most important factor causing innovation and R&D is human capital.¹⁹³ Human capital entails the capacity of a country's personnel to perform knowledge-based work; this variable can take many forms but typically refers to a country's education level or people employed in the science and technology sectors.¹⁹⁴ Here, human capital is represented by *education level*, measured by the percentage of Americans who have obtained a college education. The Census Bureau collects and provides education data.¹⁹⁵ *Time* is a control variable that increases by one per year. The rationale is that the U.S. economy has increasingly moved towards the service sector—which embraces R&D and innovation—producing, all things considered, more *patent issuances*.¹⁹⁶

The study also controls for *patent strength*. Doing so is imperative because, over the course of the studied period, U.S. patent law has changed.¹⁹⁷ Certain iterations of the Patent Act might have more effectively stimulated innovation, R&D, and patents than others. To account for this spoiler, a control variable is used to reflect the strength of U.S. patent law in a given year. The variable is a composite index developed by Park, which is the industry standard of patent strength.¹⁹⁸

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192. See Furman et al., *supra* note 179, at 908 (controlling for GPD per capita because it reflects a country's technical sophistication).
193. Sam Youl Lee et al., *Innovation, Human Capital, and Creativity*, 14 INT'L REV. PUB. ADMIN. 13, 14 (discussing the essential role of human capital in generating innovation).
194. See Per Davidson & Benson Honig, *The Role of Social and Human Capital Among Nascent Entrepreneurs*, 18 J. BUS. VENTURING 301, 305 (2003) (explaining the theoretical foundation for human capital producing innovation and economic development).
195. *Educational Attainment*, U.S. CENSUS BUREAU, <https://www.census.gov/topics/education/educational-attainment/data/tables.2017.html> (last visited Jan. 11, 2018) (select each year to access tables of annual data).
196. For instance, the number of patents applied for and issued by the USPTO has uniformly increased almost every year. See *supra* note 181.
197. For instance, in 2011, Congress enacted the Leahy-Smith America Invents Act, which substantially altered the patent system by turning the Patent Act from a "first to invent" system into a "first to file" system. Pub. L. No. 112-29, 125 Stat. 284 (2011) (codified as amended in scattered sections of 35 U.S.C.). The Act had several other important consequences as well. See, e.g., David O. Taylor, *Patent Misjoinder*, 88 N.Y.U. L. REV. 652, 654 (2013) (discussing how the Act sought to prevent parties from joining certain unrelated and inconvenient patent litigation suits).
198. Walter G. Park, *International Patent Protection: 1960–2005*, 37 RES. POL'Y 761 (2008).

2. *Statistical Methods*

The statistical methods used by this analysis include poisson analyses and ordinary-least-squares (OLS) regressions. A poisson treatment is appropriate when the dependent variable is count data. Count data is a type of variable that is positive and increases by one after each observed action.¹⁹⁹ Here, each patent issued is an independent occurrence that increases the dependent variable, *patent issuances*, by one. Although the first method is likely the more appropriate statistical test, OLS has been the prominent statistical method used by studies that have tested the production of innovation and R&D.²⁰⁰

To understand how this Article interprets the data, in each of the following models, a positive coefficient indicates that as an independent variable increases, so too does the dependent variable. A negative coefficient demonstrates an inverse relationship, meaning as the independent variable rises, the dependent variable decreases (or vice versa). The bolding of certain coefficients reflects that a coefficient is statistically significant. The number of asterisks following the bolded coefficient represents the variable's level of statistical significance. If, for instance, a coefficient has three asterisks, this indicates that the variables' correlation is more than ninety-nine percent likely to be better than random chance. In important part, the poisson analyses and OLS regressions produce substantially the same results, increasing the confidence that can be had in the findings.

C. **Deductions, Conclusions, and Implications**

The results of the models are consistent, strong, and quite unexpected. First, antitrust lawsuits by private parties—which are the most common type of antitrust actions—impede innovation. The number of *private antitrust lawsuits* filed in federal courts has a strong negative relationship with the rate of *patent issuances*. This is true whether testing the relationship using a poisson or OLS analysis. It also remains consistent when switching the dependent variable from *patent issuances* to *R&D spending*. See Table 1 for the results. Although one could argue that this relationship is over inflated since antitrust lawsuits tend to peak during economic-crisis years, it must be noted that economic variables were included to control for such influences. Instead, each relevant model produced strong results that antitrust litigation initiated by the private sector quells innovation.

199. Take, for example, the number of cars that travel down a street in an hour. Each car counts as one, and the passing of each car is a unique event from the other cars.

200. See, e.g., Doh et al., *supra* note 188, at 130–31 (using regression analysis to gauge the determinants of R&D spending over time); Polavarapu M. Rao et al., *R&D Offshoring in Multinational Enterprises: Relevance of Transaction Cost and Internalization Theories*, 22 COMPETITIVENESS REV. 376, 386 (2012).

Table 1: Results of Models 1 and 2

	Poisson	OLS
	<u>Model 1</u>	<u>Model 2</u>
<i>Patent Issuances</i>		
Private Lawsuits	-.0002704*** (0.0000017)	-30.90216*** (10.23471)
Time	-.0314872*** (.0004535)	3044.577 (2370.494)
Patent Strength	-.604127*** (.0035647)	-93169.43*** (17801.99)
College Education	.0000152*** (0.00000043)	13.42605*** (2.847128)
GDP Per Capita	0.0000023*** (0.000000336)	-5.506797** (2.35196)
Trade	-.0116686*** (.0002754)	127.4241 (1759.433)
Constant	15.11408*** (191642.8)	176622.1 (194023.7)
R-Squared		0.9649***
Pseudo R-Squared	0.9533***	
Observations	51	51

*p<0.10, **p<0.05, ***p<0.01

Second, the research provides interesting insights into the government's efforts: different types of antitrust actions are shown to render profoundly different effects on the rate of innovation. Challenges under the Clayton Act (merger reviews) promote innovation while Sherman Act lawsuits (restraint-of-trade and monopolization claims, and in the case of the FTC, the counterpart FTC Act suits) tend to cause innovative markets to retract. In Models 4 and 7, *merger enforcement* is shown to have a strong and positive relationship with innovation. The variable is statistically significant at the .01 level, meaning that an increase of merger enforcement is very likely to boost innovation.²⁰¹ To further validate this finding, the *merger enforcement* variable was swapped out: instead of measuring this variable with merger *investigations*, an unreported model used the annual number of merger *cases actually filed* by the DOJ. The results were the same, as *merger enforcement* was positive and statistically significant at the .01 level.²⁰²

201. The coefficient for *Clayton 7* intensity was statistically insignificant when regressed against *R&D spending*, which is likely due to the low number of observations (33) in that model.

202. Please contact the author for the complete results to this model. The coefficient for *Clayton 7* actions filed when regressed against patent issuances was 1725.558 and significant. *Sherman 1* investigations continue to be statistically insignificant.

Table 2: Results of Models 3 and 4

	OLS	OLS
	Model 3	Model 4
<i>Patent Issuances</i>		
Antitrust Intensity	-.0001596** (.0000723)	
Clayton 7		178.9424*** (45.17095)
Time	5140.651** (2372.508)	6245.128 (4162.936)
Patent Strength	-89621.63*** (19006.59)	-76017.9*** (20071.23)
College Education	16.3219*** (3.126481)	18.62245*** (3.331331)
GDP Per Capita	-5.632674** (2.505176)	-7.790338*** (2.714722)
Trade	-135.9304 (1876.075)	-1252.605 (1633.828)
Constant	36509.85 (191642.8)	-127844 (288787.8)
R-Squared	0.9458***	0.9569***
Observations	51	45

*p<0.10, **p<0.05, ***p<0.01

Table 3: Results of Models 5 and 6

	Poisson	Poisson
	<u>Model 5</u>	<u>Model 6</u>
<i>Patent Issuances</i>		
Antitrust Intensity	-.0000000051*** (.00000000019)	
Clayton 7		.0012866*** (.00000723)
Time	-.024736*** (.000449)	-.034065*** (.000768)
Patent Strength	-.64111*** (.0038096)	-.586448*** (.0040026)
College Education	.0000398*** (.00000423)	.000044*** (.000000532)
GDP Per Capita	-.00000518*** (.000000337)	-.0000236*** (.000000395)
Trade	-.0170235*** (.0002705)	-.0228795*** (.0002688)
Constant	14.77881*** (.0379938)	14.57367*** (.0540246)
Pseudo R-Squared	0.9599***	0.9700***
Observations	51	45

*p<0.10, **p<0.05, ***p<0.01

Even more interesting, this effect becomes stronger after the anti-trust agencies explicitly made promoting innovation a part of their joint policy. When including the dummy variable *government enforcement*—representing whether enforcement occurred before or after the antitrust agencies sought to increase the rate of invention—the Clayton Act appears more effective. Model 7 demonstrates that *Clayton 7* investigations remain positive and statistically significant and so too does *government enforcement*. Because this relationship grew stronger after the FTC and DOJ expressly sought to challenge mergers adversely affecting innovation, the statistical inference is that merger enforcement fosters innovation, but even more so as a function of DOJ and FTC policy.

Table 4: Results of Models 7 and 8

	OLS	OLS
	<u>Model 7</u>	<u>Model 8</u>
<i>Patent Issuances</i>		
Gov't Enforcement	57668.67*** (12006.24)	-31812.83** (15347.87)
Clayton 7	155.544*** (36.25557)	
Sherman 1		-44.72643 (92.10625)
Time	1324.743 (3465.848)	8451.466 (5593.295)
Patent Strength	-61774.4*** (16236.78)	-65172.45** (27688.7)
College Education	7.956483** (3.457061)	18.529*** (4.392406)
GDP Per Capita	-1.022394 (2.578249)	-7.267724** (3.186053)
Trade	-3302.265** (1367.74)	-1073.819 (1914.975)
Constant	170320.3 (237928.5)	-233739.9 (385719.4)
R-Squared	0.9735***	0.9454***
Observations	45	45

*p<0.10, **p<0.05, ***p<0.01

However, efforts by the agencies to stimulate invention and discovery by remedying restraint-of-trade and (attempted) monopolization claims have been less successful. Although these lawsuits have not generally harmed innovation, they appear statistically unrelated to *patent issuances* or *R&D spending*. In Model 10, investigations under § 1—i.e., restrain-trade actions—are statistically insignificant to *patent issuances*. In terms of § 2 investigation, the models render the same insignificant results. Moreover, *government enforcement* becomes negative when the model tests *Sherman 1* investigations (Model 8). However, when the dependent variable is *R&D spending* instead of *patent issuances*, § 2 actions produce a negative relationship with innovation.²⁰³ At best, attempts to foster innovation using the Sherman Act are ineffective but potentially deleterious.

203. Please contact the author for the complete results to this model. The coefficient for *Sherman 2* investigations when regressed against *R&D spending* is -.0120566 and significant. *Sherman 1* investigations continue to be statistically insignificant.

Table 5: Results of Models 9 and 10

	OLS	OLS
	Model 9	Model 10
<i>Patent Issuances</i>		
Sherman 2	373.1717 (322.3127)	
Sherman 1		6.868857 (92.44538)
Time	1335.426 (4694.81)	1783.328 (4769.912)
Patent Strength	-79661.7*** (23429.91)	-79879.39*** (27900.92)
College Education	13.04308*** (3.523769)	13.0771*** (3.66724)
GDP Per Capita	-5.522506* (3.096953)	-5.508856** (3.201407)
Trade	-2280.192 (1955.013)	-1734.307 (1968.477)
Constant	188108.4 (325375.1)	168627.7 (347469)
R-Squared	0.9412***	0.9391***
Observations	51	45

*p<0.10, **p<0.05, ***p<0.01

To understand these results, it appears that the contrasting theories proffered by antitrust's advocates and detractors *both* have merit. On one hand, antitrust fosters incentives to innovate when it preserves the number of firms competing within a market via merger reviews; however, innovation diminishes when antitrust enforcement scrutinizes *how* firms compete via conduct cases. This makes sense. Commentators note that the Sherman Act is suspicious of many activities in which innovative firms typically engage, as an inventor may draw the ire of antitrust enforcers by either excluding competitors from using her invention²⁰⁴ or, on the other hand, entering into contracts and agreements with competitors to license or develop technology.²⁰⁵ The antitrust agencies have, in fact, an entire set of guidelines

204. Although inventors do generally have fairly strong rights to exclude, they may suffer liability under certain conditions, such as the case study *supra* section IV.B.

205. Antitrust law proscribes certain anticompetitive behaviors to exclude competition. However, the opposite behavior of working with competitors can also draw antitrust scrutiny. U.S. DEP'T OF JUSTICE & FED. TRADE COMM'N, ANTITRUST GUIDELINES FOR THE COLLABORATION AMONG COMPETITORS (2000) (explaining the situations in which agreements and joint ventures among competitors violate antitrust).

dedicated to regulating licensing agreements of IP.²⁰⁶ Because anti-trust law may expose even good faith inventors to liability, it explains why enforcing the Sherman Act diminishes innovation. As a result, antitrust appears to promote innovation when it maintains competition by preserving the number of firms competing within a market, but it retards innovation when it limits how exactly those firms compete against each other.

Third, the analysis supports concerns that the FTC's and DOJ's mere presence in dynamic markets can systemically chill incentives to innovate. As the administrative state of antitrust increases—measured by budgets, investigations, actions, and personnel—the innovative intensity of private industry retracts. The first model (Models 3 and 5), which uses joint annual budgets of the agencies adjusted into current dollars as a proxy for *antitrust intensity*, finds that the variable reduces *patent issuances*. This same result was found when the dependent variable was switched from *patent issuances* to *R&D spending*.²⁰⁷ In case representing antitrust intensity with the agencies' joint budget is an inaccurate measure, other proxies were used as well. Replacing the agencies' joint budget with the number of lawyers employed by the DOJ's Antitrust Division produced the same negative and statistically significant result.²⁰⁸ To offer an analogy, when a police officer is visibly present by the highway, cars passing down the highway become more likely to drive *below* the speed limit, adopting overly conservative behaviors. In the innovation context, a similar effect appears to be true: although stationing antitrust regulators in innovative markets makes some firms abide by the law, others may become overly conservative, reducing innovation below a rational level. Part VI briefly explains this phenomenon in greater detail using behavioral economics theory.

Fourth, the results provide a telling story about market structure, indicating that restrictions on market behavior tend to interfere with innovation. Not only does the analysis demonstrate that most antitrust variables diminish innovation, but interestingly, so do stronger patent rights. Despite its facially unintuitive nature, this finding is consistent with research arguing that patent strength can traverse beyond an optimal level, limiting downstream innovation.²⁰⁹ So as *pat-*

206. 2017 ANTITRUST GUIDELINES, *supra* note 75.

207. For the sake of space, not all models are reproduced in the Article. Please contact the author with questions about results of models not found in this Article. The coefficient for *antitrust intensity* as measured by the agencies' combined budget was -1.25 and statistically significant when regressed against *R&D spending*.

208. The DOJ lawyers variable was statistically significant at .01 and negative at -158.8073. Please contact the author for complete results of this model.

209. See Gregory N. Mandel, *Proxy Signals: Capturing Private Information for Public Benefit*, 90 WASH. U. L. REV. 1, 14 (2012) (remarking that there is an optimal level of patent protection that scholars have sought to find).

ent strength and *antitrust intensity* increase, both variables expose firms to greater levels of risk and costs which can make the activity of innovation less profitable and, thus, less likely.²¹⁰ Given these effects, this finding contributes to the market-structure debate by finding that the best predictor of innovation is not necessarily competition or exclusion but perhaps *freedom*. The question, then, is the optimal balance.

The control variables had semi-predicted effects on innovation. For instance, as the U.S. rate of *college education* increases, so too does innovative output. The *time* variable, though, was generally insignificant.²¹¹ The only unexpected result from the control variables was that GDP was generally negatively related to innovation, though GDP is a blunt measure which correlates with numerous other variables.

It should also be noted that this was not a “large-*n*” study, meaning that the results are based upon fewer observations than is typically desirable. (Statistically, the more observations, the stronger the results.) That said, American antitrust enforcement exists in a bounded reality, limiting the number of observations that can be studied. Also, any concerns about this study’s accuracy should be alleviated by the strength, consistency, and robustness of the results. The measures generally present a surprisingly high level of statistical certainty, suggesting that the models reflect reality. Although this statistical treatment was originally intended to serve as an entry point for future research, the strength of the results contributes to the patent and antitrust literatures. Future analyses on this subject are especially encouraged in light of these findings.

D. Conclusion

The analysis produces several findings. The agencies’ authority to review anticompetitive mergers is the primary area in which antitrust law has promoted innovation. This effect is even stronger since the agencies made innovation their express policy. However, lawsuits targeting how firms interact and conduct business—whether initiated by the government or private parties—tend to lessen innovation. Scientific progress is also harmed as the agencies increase in size, presence, and intensity. Considering that stronger patent rights have a

210. See Courtney C. Scala, *Making the Jump from Gene Pools to Patent Pools: How Patent Pools Can Facilitate the Development of Pharmacogenomics*, 41 CONN. L. REV. 1631, 1641 (2009) (discussing how the proliferation of patents can create an “anticommons” which can discourage innovation and R&D).

211. See *R&D and Innovation in Services*, ORGANISATION FOR ECON. CO-OPERATION & DEV. (Mar. 2012), <http://www.oecd.org/sti/inno/knownoinnoservprojectrdandinovationservicessecondexpertmeetingagenda.htm> [https://perma.unl.edu/XGR2-QSAK] (noting that in recent years some countries with a large service sector receive more than seventy percent of their GDP from R&D).

similar negative effect, the analysis indicates that raising the level of risk and cost in dynamic markets—even if such regulatory regimes are meant to cultivate innovation—have the opposite effect. Indeed, firms appear to be the most innovative when they are the least exposed to liability.

VI. POLICY, LEGAL, AND THEORETICAL IMPLICATIONS AND PROPOSALS

The results of this study have powerful implications for the policy, law, and theory of antitrust law, which the following proposals explore. Of particular note, this Part addresses the law of litigating innovation as an antitrust violation, the joint policies of the DOJ and FTC, the role of market structure as a predictor of innovation, and evidence suggesting that unobstructed markets may generate the most innovation. Each suggestion is ideally intended to increase technological advancement and scientific discovery.

A. Increasing Innovation by Eliminating Liability for Cooperative Agreements to Use IP

The empirical analysis contributes to the debate about how market structure shapes the incentives to innovate by finding a novel and important relationship: markets are the most innovative when they are less burdened by regulation. Innovation was shown to decline as patent strength expands, the number of private antitrust lawsuits increases, antitrust regulators become more prominent, and the agencies undertake additional investigations and cases. These findings, though, are quite logical: as each factor increases in number or magnitude, so does the exposure of firms to liability. In light of this, how should the regulatory system be reformed to lessen the costs of invention?

Borrowing from economics and behavioral-economics theory, the FTC and DOJ should take a cautious or passive approach to regulating innovative markets. Economic theory indicates, simply put, rational actors are less likely to engage in an activity as its cost increases. Contributing psychological research to this framework, behavioral economics suggests that the human brain is, in certain situations, hardwired to make *irrational* decisions (e.g., overvaluing certain qualities, underestimating costs, engaging in risky behaviors that the odds do not support).²¹² One of the most important contributions of

212. See, e.g., Stephen J. Choi & A.C. Pritchard, *Behavioral Economics and the SEC*, 56 STAN. L. REV. 1, 2 (2003) (“Not all investors are rational.”); Frederick C. Dunbar & Dana Heller, *Fraud on the Market Meets Behavioral Finance*, 31 DEL. J. CORP. L. 455, 471–72 (2006) (discussing the emergence of behavioral economics to counter the traditional view of rational investors).

behavioral economics is prospect theory, which explains that actors are “loss averse,” meaning they prefer options framed in terms of benefits as opposed to losses even if both options are equal. This is because, according to Tversky and Kahneman’s seminal research, a loss engenders a disproportionately greater emotional reaction.²¹³ Here, as the DOJ’s and FTC’s attention to dynamic markets sharpens, firms can be expected to dial back their efforts to innovate beyond what is necessary. After all, the potential risk of antitrust scrutiny is likely to create a reaction greater than the actual magnitude of the liability. So despite the best intentions of the FTC and DOJ, their presence may make firms irrationally temper their rate of innovation.

In terms of reforms, simple changes can be made to the FTC’s and DOJ’s policies governing IP licensing agreements—i.e., the Antitrust Guidelines for the Licensing of Intellectual Property (the Guidelines), which should enhance the willingness of firms to create, and profit from, innovation.²¹⁴ As a starting point, the most striking issue is that patent holders have a clearer right to exclude competition than to deal with competitors.²¹⁵ This is problematic because the licensing of patents stimulates innovation on two fronts: (1) it promotes the sharing of technology, leading to downstream innovation, and (2) it makes inventing more profitable since patent holders can derive revenue from the licensing itself.²¹⁶ But despite the overwhelming benefits of licensing, the agencies’ skepticism of certain licensing agreements has created a mosaic of liability. Examples of conduct that may draw the ire of regulators include IP contracts among competitors, exclusive-dealing arrangements, and other licensing deals that raise prices or reduce output.²¹⁷

The first desirable reform is to eliminate the agencies’ suspicion of licensing agreements among competitors. The problem is that firms can more safely refuse to license their IP—a conduct that actually does impede innovation—than monetize their art via a licensing agreement.²¹⁸ In many instances, firms might choose to avoid making deals that would aid the proliferation of technology out of fear of draw-

213. Daniel Kahneman & Amos Tversky, *Prospect Theory: An Analysis of Decision Under Risk*, 47 *ECONOMETRICA* 263 (1979).

214. 2017 ANTITRUST GUIDELINES, *supra* note 75, at 3.

215. *See, e.g.*, *United States v. Studiengesellschaft Kohle, m.b.h.*, 670 F.2d 1122, 1127 (D.C. Cir. 1981) (“A patentee has the right to exclude others from profiting from the patented invention. This includes the right to suppress the invention while continuing to prevent all others from using it, to license others, or to refuse to license” (citations omitted)).

216. 2017 ANTITRUST GUIDELINES, *supra* note 75, at 5.

217. *Id.* at 8 (“Licensing arrangements raise concerns under the antitrust laws if they are likely to affect adversely the prices, quantities, or varieties of goods and services either currently or potentially available.” (citations omitted)).

218. *Id.* at 15 (“The existence of a horizontal relationship between a licensor and its licensees does not, in itself, indicate that the arrangement is anticompetitive.

ing antitrust review. In fact, in markets with few firms, a competitor may be one of the few parties that can plausibly license the technology. By casting suspicion on these agreements, the agencies not only reduce the potential profitability of inventing but also expand the scope of liability, chilling the incentives to innovate. And since the empirical results cast doubt on whether such actions promote innovation, allowing competitors to freely license technology should aid the spread of technology, incentivize downstream innovation, and increase R&D investment.

Second, the agencies are skeptical of joint research ventures among competitors. According to agency guidelines, the agencies' protocol is to determine whether sufficient competition exists to counter the group's collaboration to help gauge its appropriateness under antitrust law.²¹⁹ As a starting point, since it is unlikely that firms would collaborate on a research project to produce inferior innovation, innovation arising out of collaboration can be expected to benefit consumers. And since competition is not a public good that arises only with the aid of antitrust law, competitors would likely be able to defeat the collaboration if it rendered inferior products. Due to this logic, judging R&D joint ventures under antitrust law is likely to generate the opposite effect of diminishing technological advancement; after all, the current guidelines have created a perverse situation that firms might have to defend an antitrust claim based upon their joint ability to generate desirable innovation. The argument made here is that so long as firms retain independence without forming a cartel to fix prices, their efforts to share ideas, research, and technology should carry the strong presumption of benefiting consumers.

Third, the agencies should avoid litigating restrictive terms in IP licensing agreements. In attempting to monetize and protect one's patented technology, licensing deals that impose terms that limit competition or potentially raise prices should avoid exposure to antitrust liability. For example, currently, the FTC and DOJ are suspicious of

Identification of such relationships is merely an aid in determining whether there may be anticompetitive effects arising from a licensing arrangement.”).

219. *Id.* at 13. (“The Agency would consider the degree of concentration in the relevant research and development market and the market shares of the parties to the joint venture. If, in addition to the parties to the joint venture (taken collectively), there are at least four other independently controlled entities that possess comparable capabilities and incentives to undertake research and development of biodegradable plastics, or other products that would be close substitutes for such new plastics, the joint venture ordinarily would be unlikely to adversely affect competition in the relevant research and development market. If there are fewer than four other independently controlled entities with similar capabilities and incentives, the Agency would consider whether the joint venture would give the parties to the joint venture an incentive and ability collectively to reduce investment in, or otherwise to retard the pace or scope of, research and development efforts.”).

contract terms that grant the licensor the right to use any improvements or items that the licensee devised from the licensed technology, known as a “grantback” provision.²²⁰ Their concern is that the licensee may be less likely to innovate if the licensee must license any new inventions back to the licensor.²²¹ The problem is that the agencies’ policy creates liability for firms that are willing to grant each other open licenses to use, and benefit from, their technologies. Although certain grantbacks may have the effect of discouraging an isolated inventor from innovating, their overall effect is such a net positive that prospective liability has likely generated far more harm from deterring licensing agreements than any countervailing benefits.

Similar to grantbacks, an exclusivity term should be considered *per se* legal. Licensing agreements that prevent the licensee from using any other party’s technology—in effect, bonding the licensee to only the licensor’s technology—are currently susceptible to invalidation.²²² The patent’s very utility, though, is exclusivity. Although an exclusivity agreement may appear anticompetitive, it actually expands the class of users who may use the patented technology beyond just the patent holder. Whether the term unreasonably limits the licensee from pursuing other products is a decision best left to the licensee. And given the countervailing harm of initiating Sherman Act claims against licensees, compared to the benefits of such agreements, the agencies should avoid subjecting restrictive terms to scrutiny even if they appear to have anticompetitive effects.

B. Innovation Should Be *Per Se* Legal

A firm can incur antitrust liability for inventing technology that the courts or agencies deem to be anticompetitive.²²³ The general rule is that an innovation or product design that lessens competition without a substantive pro-competitive justification offends antitrust law.²²⁴ For instance, an inventor may design two products to work best, or exclusively, with each other to increase the demand of both

220. *Id.* at 33 (“A grantback is an arrangement under which a licensee agrees to extend to the licensor of intellectual property the right to use the licensee’s improvements to the licensed technology.”).

221. *Id.* (“If the Agencies determine that a particular grantback provision is likely to reduce significant licensees’ incentives to invest in improving the licensed technology, the Agencies will consider the extent to which the grantback provision has offsetting precompetitive benefits . . .”).

222. *Id.* at 29.

223. See generally Stacey Dogan, *The Role of Design Choice in Intellectual Property and Antitrust Law*, 15 COLO. TECH. L.J. 101, 101 (2016) (“When is it appropriate for courts to second-guess decisions of private actors in shaping their business models . . . ?”).

224. See *United States v. Microsoft Corp.*, 253 F.3d 34, 75 (D.C. Cir. 2001) (stating that an innovation can violate antitrust if there are no precompetitive benefits to offset excluding competition).

products beyond a competitive level.²²⁵ Similar to this, the debate in the third case study concerned whether a superficial innovation of a drug meant to extend one's market power could violate the Sherman Act; the concern was that consumers are more harmed by the loss of generic competition than benefitted from minor drug reformations.²²⁶

But despite the seemingly anticompetitive nature of certain innovations, scholars have argued that antitrust should defer to the inventor or risk deterring innovation.²²⁷ With respect to product hopping, the court in *Warner Chilcott* cautioned that such litigation threatens to chill innovation because now firms must consider whether an innovation that improves an existing product, but perhaps not overwhelmingly so, can be attacked on antitrust grounds.²²⁸ In support of this position, consider the risk of liability that arose from a product improvement in *C.R. Bard, Inc. v. M3 Systems, Inc.*²²⁹ The court in *C.R. Bard* noted that, although the defendant may have improved the manner in which its medical device loads hypodermic needles, the defendant's "real reason" for modifying the device was to raise the costs on competitors who supplied replacement needles.²³⁰ The court held that the jury could have reasonably determined the defendant's product improvement was "restrictive or exclusionary."²³¹

The effect of this antitrust standard explained in *C.R. Bard*, however, distorts and increases the costs of innovation by forcing inventors to consider and accommodate their competitors' preferences when developing or improving technology. Further, based upon the empirical results, this Article agrees with the language in *Warner Chilcott* that attaching liability to product improvements is unlikely to incentivize innovation but instead may create burdensome liability in dynamic markets. Because innovation is thought to generate more consumer benefit than preserving competitive prices, the courts must avoid diminishing the incentives to innovate by giving technological advancements the presumption of legality. This Article argues that the sole quality a court should test is whether the innovation rendered an improvement. If the innovation provides such a consumer benefit, then this should establish an absolute defense to liability—after all,

225. John M. Newman, *Anticompetitive Product Design in the New Economy*, 39 FLA. ST. U. L. REV. 681, 683 (2012) ("The archetypical design-conduct challenge alleges that a firm, dominant in one product market, designed a new version of that product so as to maximize interoperability with its own complementary product(s), essentially requiring customers to buy the two together.").

226. See *supra* section IV.C.

227. See *supra* notes 168–71 and accompanying text.

228. Mylan Pharm. Inc. v. Warner Chilcott, No. 12–3824, 2015 WL 1736957, at *16 (E.D. Pa. Apr. 16, 2015), *aff'd*, 838 F.3d 421 (3d Cir. 2016).

229. 157 F.3d 1340 (Fed. Cir. 1998).

230. *Id.* at 1382 (Mayer, J., concurring in part and dissenting in part).

231. *Id.*

the imposition of liability is likely to diminish innovation more than it promotes competition.

C. Reforming the FTC and DOJ's Joint Antitrust Policy

Another concern is that selecting a case for enforcement when anti-trust is poorly equipped to provide a remedy risks the harm of over-enforcement. This discussion proposes ways to enhance the agencies' pursuit of innovation based upon the empirical findings of Part V. As a starting point, the empirical analysis finds that the agencies' mandate to challenge anticompetitive mergers under the Clayton Act generates significant innovation, justifying the public costs of enforcement. Notably, section 7 lawsuits increase the rate of innovation even when the primary objective is to remedy a traditional anticompetitive effect. This indicates that the agencies' merger policy should continue without adjustment.

But since the same cannot be said of exclusionary conduct lawsuits—which were statistically unrelated to R&D spending and patent issuances—a policy change may be appropriate. The most effective reform would likely entail how the agencies identify and select restraint-of-trade cases to litigate.

First, the agencies should limit promoting innovation to markets in which the costs and barriers of innovation are significant. This is usually the situation in industries animated by higher levels of patent issuances and other R&D-related activities. The agencies have instead asserted claims alleging that a restraint of trade diminished innovation in markets *unknown* for R&D and technological progress such as the real estate brokerage market in Columbia, SC.²³² The problem with using antitrust enforcement to preserve innovation in industries with low barriers to innovation is that, without IP protection, opportunities and incentives remain for competitors to develop new or substitute products. In contrast, industries saturated with patent thickets force companies to spend substantial resources innovating around established patented technologies.²³³ In these markets, the nature of innovation is competition. So when a dominant firm uses a restraint of

232. Complaint at 12, *United States v. Consol. Multiple Listing Serv., Inc.*, No.: 3:08-CV-01786-SB, 2009 WL 3150388 (D.S.C. Aug. 27, 2009) (alleging that an organization of real estate brokers that denies membership to applicants who might want to compete for listings using innovative methods have the effect of “suppressing innovation”).

233. See Brian J. Love, *Interring the Pioneer Invention Doctrine*, 90 N.C. L. REV. 379, 415–16 (2012) (“A patent thicket arises when multiple patents with overlapping scope cover the same product. Similarly, an anticommons exists when inputs to, or steps in the manufacture of, a final product were individually patented by multiple inventors. In both situations, the fragmented nature of patent rights impedes innovation because a company hoping to sell a product must negotiate licenses with multiple patent owners or risk suit for patent infringement.”).

trade to further increase its rivals' costs of R&D, a competitor might choose to either forbear from investing in R&D or spend excessive resources navigating around the patent thicket, taking resources away from other projects—or the firm could abandon the market entirely.²³⁴

Second, innovation-antitrust lawsuits should target industries with a small number of participants. A restraint of trade has a greater chance of rendering systemic effects reducing innovation when the challenged act stems from one of the few competitors in the market. This is because the transaction costs borne to creating a new stream of R&D tend to be substantial. When numerous actors exist, chances are greater that a rival could use or adopt current R&D operations to compete against those involved in an anticompetitive practice.²³⁵ The corollary is that a restraint of trade between two parties in a three-competitor market is more likely to systemically harm innovation since fewer actors will be positioned to compete against the arrangement.²³⁶ Although antitrust regulators should still challenge anticompetitive arrangements in markets with numerous participants, the agencies should base this decision upon remedying traditional antitrust injuries such as increased prices.

D. The Uncertain Law of Innovation in Antitrust Enforcement

As mentioned, private antitrust lawsuits must allege an antitrust injury. Although numerous antitrust suits have pled harms to innovation, all private suits surviving the summary judgment stage have, so far, also alleged a conventional harm to competition.²³⁷ The consequence is that formidable barriers prevent antitrust lawsuits from promoting innovation—that is, unless the law is clarified or amended.

234. *Id.*

235. See *supra* section IV.A, which discusses the concerns of the FTC when the two competitors in catheter market sought to merge. After their merger, the vacuum of competition generated disincentives for the surviving firm to invest in R&D. In fact, the company began curtailing its efforts, resulting in actual diminished innovation. See *supra* section IV.A.

236. See *supra* section IV.A. Without transaction costs, this would be substantially less of a problem. After all, when a competition void exists, one could expect competitors to arise. However, when substantial transaction costs exist to enter a market, they may either dissuade third parties from entering the market, preserving the dominant firm's monopoly or, even if additional firms do enter, it may take many years until they are able to produce a competitive product.

237. *CollegeNET, Inc. v. Common Application, Inc.*, 104 F. Supp. 3d 1137, 1149 (D. Or. 2015) (stating that the court has found no record of a plaintiff being able to bring an antitrust lawsuit based exclusively upon a lack of innovation and that all lawsuits pleading decreased innovation have incorporated traditional antitrust injuries as well), *rev'd and remanded*, 711 F. App'x 405 (9th Cir. 2017).

Whether innovation alone can, or should be able to, support an antitrust lawsuit is a critical inquiry. There are numerous instances in which a plaintiff may struggle to prove a challenged act has caused prices to increase or output to diminish but could, however, present evidence that innovation was harmed. A classic example is the predatory pricing scheme. In a predatory pricing scheme, the defendant sets a good's price at an unsustainably low level meant to cannibalize the market share of competing goods; once the predation phase drives competitors from the market, the good's price is then raised to a level reflecting the predator's newfound monopoly power.²³⁸ In this situation, courts have typically failed to find an antitrust violation because predatory pricing renders, at least initially, *lower* prices, which benefit consumers.²³⁹ For example, in *Energy Conversion Devices Liquidation Trust*,²⁴⁰ the court dismissed a complaint alleging the defendant perpetrated a predatory pricing scheme because "unreasonably low and/or below-cost pricing does not harm competition and, thereby, confer antitrust standing by itself," giving no attention to the plaintiff's claim of reduced innovation.²⁴¹ In light of this, by formally incorporating innovation concerns into antitrust jurisprudence, the law could, perhaps, preserve competition when the challenged activity has a tenuous connection with prices and output.

The problem is that the empirical analysis casts tremendous doubts on whether private antitrust lawsuits have any ability to promote innovation. Not only do greater levels of private litigation cause markets to become less innovative, but the research suggests that Sherman Act lawsuits also have a deleterious effect. A fair inference is that the courts should refuse to grant antitrust standing to plaintiffs whose exclusive injury is reduced innovation. After all, the research suggests that the opposite effect of imperiling innovation is the more likely outcome.

238. See generally Christopher R. Leslie, *Predatory Pricing and Recoupment*, 113 COLUM. L. REV. 1695, 1697 (2013) ("In its most basic form, predatory pricing is a two-step strategy for securing monopoly profits. During the predation phase, the firm charges a price below its costs in the hopes that its competitors will be unwilling or unable to sustain the losses they would incur if they matched the below-cost price and will exit the market. After the rivals are vanquished, the post-predation phase begins. With the market to itself, the dominant firm charges a monopoly price with the goal of recouping the losses it sustained during the predation phase and then earning a steady stream of excess profits into the future.").

239. *TI Inv. Servs., LLC v. Microsoft Corp.*, 23 F. Supp. 3d 451, 463 (D.N.J. 2014) (noting that over-enforcement of predatory pricing claims could have a "chilling effect" on producers who may otherwise want to cut prices, an effect that enhances consumer welfare).

240. *Energy Conversion Devices Liquidation Tr. v. Trina Solar Ltd.*, No. 13-14241, 2014 WL 5511517 (E.D. Mich. Oct. 31, 2014).

241. *Id.* at *3.

Possibly, though, the law has only created the *appearance* that private lawsuits have failed to influence the rate of innovation because alleging such an injury has heretofore been insufficient to initiate an action. This has likely discouraged plaintiffs from pursuing innovation under antitrust law. If one were able to allege innovation as their exclusive claim, then plaintiffs may be more likely to initiate meritorious lawsuits, increasing innovation. Considering this potential, plaintiffs should have a route to do so.

The following proposal is a two-route test to determine whether a private lawsuit may establish antitrust standing based upon a claim of reduced innovation. Because the analysis produced such a pessimistic view of the relationship between innovation and private antitrust lawsuits, the test is designed to allow a very limited number of claims to proceed. A private party should be able to litigate innovation, as will be explained, if the plaintiff can demonstrate that reduced innovation comports to a conventional antitrust injury of either diminished output or higher prices.

First, a plaintiff should be allowed to plead diminished innovation if the plaintiff can show that the relevant market is not overly saturated with products. If introducing an innovative good into the market would effectively supplant existing products, then innovation may have a tenuous effect upon supply and variety. But to the degree that the relevant market can support additional items, the very nature of innovation is likely to increase output.²⁴² A plaintiff may thus show that a restraint of trade has stifled innovation in such an unsaturated market that output would increase, establishing standing.

Second, a plaintiff should be allowed to proceed with a restraint-of-trade lawsuit based upon harm to innovation if the plaintiff can demonstrate the restrained innovation would have produced a *cheaper* good than what currently exists. This is often not the case. Because innovative goods are generally superior to preexisting products, the nature of innovation tends to introduce more expensive products to the market.²⁴³ As more innovative technologies enter the market, the prices of older products do not necessarily have to decline; in some situations, the older products exit the market and, in other instances, their prices remain constant, serving as a cheaper alternative to the innovative item. In either circumstance, innovation can *increase* the aggregate price of goods. However, on occasion, a good's innovation is

242. *United States v. Visa U.S.A. Inc.*, 163 F. Supp. 2d 322, 406 (S.D.N.Y. 2001) (explaining that a decrease in innovation could probably be considered an output restriction, which would create standing under antitrust law).

243. *See, e.g.*, Mark Sullivan, *Here's Why Apple's 10th Anniversary iPhone Will Likely Cost More than \$1,000*, FAST COMPANY (Feb. 8, 2017), <https://www.fastcompany.com/3068004/heres-why-apples-10th-anniversary-iphone-will-likely-cost-more-than-1000> [http://perma.unl.edu/Q6EB-FBCR].

its more efficient manufacturing process, rendering essentially a cheaper version of the same or substitute item.²⁴⁴ In turn, if a plaintiff demonstrates that the restrained innovation would have generated a cheaper alternative, then anticompetitive behavior has effectively raised prices. Thus, a restraint of trade that blocks cheaper goods creates the effect of artificially maintaining higher prices, establishing a conventional antitrust harm under the FTC and Sherman Acts.

VII. CONCLUSION

This Article contributes one of the first empirical assessments of antitrust's recent application to innovation policy. The greatest threat posed to firms possessing market power tends to come from more innovative products. Given this, dominant firms have sought to prevent innovation in order to preserve their position. For instance, some firms have merged with rival innovators in order to consume the innovative firm's R&D operations. Others have used restraints of trade to limit the marketability of innovative products. In either situation, innovation can be considered competition that entrenched firms would like to prevent; consequently, antitrust law's capacity to promote competition can preserve these incentives to innovate.

The foregoing research empirically tests the relationship between antitrust and patent laws, finding first that the government's enforcement of section 7 of the Clayton Act has a statistically significant capacity to drive innovation. The strength of this relationship over a sixty-year period provides resounding evidence. Even more important is that the variable indicating the government's purposeful efforts to stimulate innovation is also statistically significant. Exclusionary conduct cases tried under the Sherman Act (and FTC Act) by the agencies and private parties have been significantly less successful. Although such actions may not uniformly harm innovation, they do not foster it either. Adding to this story, as the administrative state of government antitrust increases, patent issuances and R&D spending retracts.

Based upon these findings, the major conclusion is that antitrust's most powerful means of promoting invention and scientific progress is by preserving the number of firms competing in a market. That said, innovation is harmed whenever antitrust lawsuits target the activities of firms in dynamic markets. Supplemented with behavioral-economics theory, firms appear loss-averse to the degree that they avoid aggressively innovating if antitrust liability is the potential penalty.

244. See Rachel Schramm, *Oracle Seeks to Streamline Datacenter, Foster Innovation and Lower Prices*, SILICON ANGLE (Jan. 28, 2015), <http://siliconangle.com/blog/2015/01/28/oracle-seeks-to-streamline-datacenter-foster-innovation-lower-prices> [<http://perma.unl.edu/95XL-63NE>] (demonstrating how companies can seek to be more efficient and sell goods in greater scale, reducing prices).

This contributes to the market-structure debate by demonstrating the importance of market freedom to incentivizing invention.

This Article argues that antitrust could better promote innovation if it reduced the risk of liability for conduct that tends to proliferate innovation, even if the conduct embodies some exclusionary elements. The imposition of liability seems to create more harm by chilling the incentives to innovate than the benefits provided by remedying an isolated exclusionary practice. As such, inventors should have greater freedom to collaborate with competitors in joint research ventures, innovate improvements to their technology, and license patented technology to competitors.

The conclusions found herein will hopefully influence future scholarly research on the nexus between innovation, antitrust, and the patent system. It should also provide guidance to practitioners who can use these findings to evolve antitrust law and policy. Furthermore, the author hopes that this Article's data and results can aid future research efforts.