Antitrust, Innovation, and Uncertain Property Rights: Some Practical Considerations

DEAN V. WILLIAMSON[1]

ABSTRACT

The intersection of antitrust and intellectual property circumscribes two century-long debates. The first pertains to questions about how antitrust law and intellectual property law interact, and the second pertains to questions about how parties can exploit property rights, including intellectual property rights, to exclude competitors. This iBrief finesses these questions and turns to practical considerations about how innovation and intellectual property can impinge antitrust enforcement. This iBrief develops two propositions. First, although collaborative research and development has often been and remains unwittingly misunderstood, what is understood about it is consistent with the long-standing observation that antitrust has rarely interfered with collaborative ventures. Second, shifting focus from "intellectual property rights" to "uncertain property rights" makes it easier to understand what innovation and intellectual property imply for enforcement processes. Both intellectual property and tangible assets imply the same processes, but the boundaries of intellectual properties may be uncertain and may, in turn, allow parties to game enforcement processes in ways that would not be feasible in antitrust matters that principally feature tangible assets. Even so, uncertain property rights might not frustrate enforcement processes as the antitrust authorities may yet be able to factor parties' strategic behaviors into the design of antitrust remedies.

INTRODUCTION

> "[T]he exigencies of war have thrust into the foreground the whole topic of the function of patents in our economy. Under the pressure placed on our economic system, it has become apparent that the misuse of patents is one of the most serious and difficult problems in the field of national economic policy."[2]

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[1] Research Economist, Antitrust Division, US Department of Justice. Email: dean.williamson@usdoj.gov. The views expressed in this paper are my own and do not necessarily reflect official policy of the United States Department of Justice.

[2] Joseph Borkin, *Patent Abuses, Compulsion to License and Recent Decisions*, 43 COLUM. L. REV. 720, 720 (1943) [hereinafter Borkin, *Patent Abuses*].

¶1. With some adaptation, one might be tempted to believe that this statement characterizes the status of study and debate today, but this was Joseph Borkin, chief of the Patent and Cartel Section of the Antitrust Division of the Department of Justice in 1943.[3] At that time many observers perceived a "patent problem"—indeed, "the patent problem"—that stemmed from "[t]he power to exclude others from access to technology."[4] Borkin observed, however, that the power to exclude per se had not been "regarded as subject to attack under the antitrust laws."[5] Instead, antitrust law could be brought to bear on the patent problem through indirect means. Intellectual property law had developed a patent misuse exception to "the power to exclude."[6] Upon being drawn into a patent infringement suit, defendant entities could appeal to a misuse defense, whereby a finding of misuse would allow the antitrust authorities to march in and impose licensing or other remedies.[7]

¶2. Borkin's observations constitute epilogue to an early effort within government to investigate three pairwise interactions: interactions between (1) antitrust law and intellectual property law, (2) antitrust and innovation, and (3) intellectual property and innovation. In 1938 the Roosevelt Administration exhorted Congress to assemble the Temporary National Economic Committee.[8] The Committee was charged with studying, among other things, "the effect of existing tax, patent, and other Government policies upon competition, price levels, unemployment, profits, and consumption."[9] Once the Committee was in place, the administration interjected the Antitrust Division in a "systematic attack" on "the problems presented by the abuse of patent privileges."[10]

¶3. One can guess that much has changed since 1938. The Patent and Cartel Section has long been dissolved; from the 1940's to the 1960's, systematic attack gave way to glacial extension in the case law of the misuse defense to a range of licensing practices;[11] extension induced confusion about the relationship between misuse defenses and antitrust

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[3] *See id.*
[4] *Id.* at 720–21.
[5] *Id.* at 721.
[6] *See id.* at 720–21.
[7] Borkin observed that the Antitrust Division had been doing just that: intervening in private patent litigation. *See id.* at 721.
[8] Joseph Borkin, *Patents and the New Trust Problem*, 7 LAW & CONTEMP. PROBS. 74, 78 (1940) [hereinafter Borkin, *The New Trust Problem*].
[9] *Id.* (quoting S.J. Res. 300, 75th Cong., 52 Stat. 705 (1938) §2(a)(3)).
[10] *Id.*
[11] Richard Calkins, *Patent Law: The Impact of the 1988 Patent Misuse Reform Act and Noerr-Pennington Doctrine on Misuse Defenses and Antitrust Counterclaims*, 38 DRAKE L. REV. 175, 177 (1989); Note, *Is the Patent Misuse Doctrine Obsolete*, 110 HARV. L. REV. 1922, 1924 (1997).

defenses;[12] all along the way commentators debated the prospect of supplanting the misuse defense with an outright antitrust defense;[13] and extension gave way to glacial retreat.[14]

¶4. More striking is what has not changed. The statutory basis for antitrust enforcement may go back as far as the Sherman Act of 1890, but vigorous debate persists over how antitrust law and intellectual property law should intersect.[15] It gets worse. More than seventy years have passed, yet economists and policymakers remain unequipped to characterize how innovation policies and patent regimes affect innovation.[16] That leaves them unequipped to design patent systems and innovation policies.

¶5. In this iBrief I offer—with more than a little humility—a few observations about two of the three sets of pairwise interactions. In the first part of the paper, I offer insight into how commentators have perceived interactions between antitrust and innovation. Some of the policy action has turned on the perception that (1) much innovation may derive from collaborative research and development (R&D), (2) collaboration between competing entities may yield much of that innovation,[17] and yet (3) antitrust enforcement may frustrate

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[12] Bartholomew Diggins, *The Patent Anti-Trust Problem*, 53 MICH. L. REV. 1093 (1955); *Is the Patent Misuse Doctrine Obsolete*, *supra* note 11, at 1924.

[13] Diggins, *supra* note 12, at 1114–15; *Is the Patent Misuse Doctrine Obsolete*, *supra* note 11, at 1931–36.

[14] *Is the Patent Misuse Doctrine Obsolete*, *supra* note 11, at 1928–31.

[15] Herbert Hovenkamp, *Restraints On Innovation*, 29 CARDOZO L. REV. 247, 247–48 (2007); F. Scott Kieff & Troy A. Paredes, *The Basics Matter: At The Periphery of Intellectual Property* (Stanford Law & Econ., Olin Working Paper No. 275; Wash. Univ. Sch. of Law, Working Paper No. 04-02-03, 2004); Daniel J. Gifford, *Antitrust's Troubled Relations With Intellectual Property*, 87 MINN. L. REV. 1695 (2003); R. Hewitt Pate, *Refusals to Deal and Intellectual Property Rights*, 10 GEO. MASON L. REV. 429, 429–31 (2002).

[16] *See, e.g.*, Kenneth Flamm & Sadao Nagaoka, *The Chrysanthemum Meets the Eagle: Japanese and U.S. Innovation Policies Have Been Evolving Since the 19th Century*, 24 ISSUES IN SCI. & TECH. 70 (2007); Rudolph Peritz, *Rethinking U.S. Antitrust & Intellectual Property Rights* (N.Y. Law Sch. Pub. Law and Legal Theory, Research Paper Series 04/50 #22, 2005); Bronwyn H. Hall et al., *Prospects for Improving U.S. Patent Quality via Postgrant Opposition*, 4 INNOVATION POL'Y & ECON. 115 (2004); Louis Kaplow, *The Patent-Antitrust Law Intersection: A Reappraisal*, 97 HARV. L. REV. 1813 (1984).

[17] A. Douglas Melamed & Ali M. Stoeppelwerth, *The CSU Case: Facts, Formalism & The Intersection of Antitrust & Intellectual Property Law*, 10 GEO. MASON L. REV. 407 (2002); Robert Pitofsky, *Challenges of the New Economy: Issues at the Intersection of Antitrust and Intellectual Property*, 68 ANTITRUST L.J. 913, 913–924 (2001) [hereinafter Pitofsky, *Challenges of the New Economy*]; U.S. DEP'T OF JUSTICE & FED. TRADE COMM'N, ANTITRUST

collaboration.[18] While researchers have much to learn about how parties organize collaborative R&D, there is empirical research consistent with the hypothesis that most collaboration has involved parties contributing complementary know-how and capabilities.[19] Many of those parties may not even have been direct competitors in any cognizable antitrust market. Even so, complementarity alone would not get parties off of the antitrust hook. As Sakakibara observes, it contrasts with theoretical research which was motivated by policy questions relating to collaboration between competing entities that contribute fungible inputs.[20] The

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GUIDELINES FOR COLLABORATIONS AMONG COMPETITORS (2000), http://www.ftc.gov/os/2000/04/ftcdojguidelines.pdf; Donald F. Turner, *Basic Principles in Framing Antitrust and Misuse Constraints on the Exploitation of Intellectual Property Rights*, 53 ANTITRUST L.J. 485 (1985); Senate Report on The National Cooperation Research Act of 1984, S. REP. NO. 98-427, *reprinted in* 1984 U.S.C.C.A.N. 3105, 3106 [hereinafter Senate Report]; Joseph Borkin, THE CRIME AND PUNISHMENT OF I.G. FARBEN (1978) [hereinafter Borkin, *Farben*].

[18] Thomas M. Jorde & David J. Teece, *Innovation and Competition: Implications for Antitrust*, 4 J. ECON. PERSP. 75 (1990).

[19] *See, e.g.*, Joanne E. Oxley & Rachelle C. Sampson, *The Scope and Governance of International R&D Alliances*, 25 STRATEGIC MGMT. J. 723 (2004); Rachelle C. Sampson, *Organizational Choice in R&D Alliances: Knowledge-Based and Transaction Cost Perspectives*, 25 MANAGERIAL DECISION ECON. 421 (2004); Suzanne E. Majewski & Dean V. Williamson, *Incomplete Contracting and the Structure of R&D Joint Venture Contracts*, *in* 15 ADVANCES IN THE STUDY OF ENTREPRENEURSHIP, INNOVATION AND ECONOMIC GROWTH: INTELLECTUAL PROPERTY AND ENTREPRENEURSHIP 201 (Gary D. Libecap ed., 2004) [hereinafter Majewski & Williamson, *Incomplete Contracting*]; Suzanne E. Majewski & Dean V. Williamson, *Endogenous Spillovers, Strategic Blocking, and the Design of Contracts in Collaborative R&D: Evidence from NCRA filings of R&D Joint Ventures* (Antitrust Div., U.S. Dep't of Justice, Econ. Analysis Group, Working Paper 02-1, 2002); Mariko Sakakibara, *Knowledge Sharing in Cooperative Research and Development*, 24 MANAGERIAL DECISION ECON. 117 (2003) [hereinafter Sakakibara, *Knowledge Sharing*]; Mariko Sakakibara, *Heterogeneity of Firm Capabilities and Cooperative Research and Development: An Empirical Examination of Motives*, 18 STRATEGIC MGMT. J. 143 (1997) [hereinafter Sakakibara, *Heterogenity*]; Lee Branstetter & Mariko Sakakibara, *Japanese Research Consortia: A Microeconometric Analysis of Industrial Policy*, 46 J. INDUS. ECON. 207 (1998) [hereinafter Branstetter & Sakakibara, *Microeconometric Analysis*]; Peter Grindley et al., *SEMATECH and Collaborative Research: Lessons in the Design of High-Technology Consortia*, 13 J. POL'Y ANALYSIS & MGMT. 723 (1994).

[20] Seminal contributions include Morton I. Kamien et al., *Research Joint Ventures and R&D Cartels*, 82 AM. ECON. REV. 1293 (1992); Claude d'Aspremont & Alexis Jacquemin, *Cooperative and Noncooperative R&D in Duopoly with Spillovers*, 78 AM. ECON. REV. 1133 (1988); Michael L. Katz, *An Analysis of Cooperative Research and Development*, 17 RAND J. ECON. 527

suggestion is that it might not be too surprising that the antitrust authorities have rarely challenged such arrangements as R&D joint ventures.[21]

¶6. In the second part of this iBrief I make a few observations about "the intersection of antitrust and intellectual property." It is a curious phrase in that one might not immediately discern how it is different from "the intersection of antitrust and *property*." Much of the action turns on tricky doctrinal questions about how two bodies of law (antitrust law and intellectual property law) interact.[22] Yet, I explore doctrinal questions and turn to *practical* considerations about how intellectual property can impinge antitrust enforcement. That is, once presented with an antitrust inquiry—a merger analysis or inquiry into vertical contracting practices, say—can it make sense to treat intellectual property differently from other types of property?

(1986); Michael Spence, *Cost Reduction, Competition, and Industry Performance*, 52 ECONOMETRICA 101 (1984).

> This literature assumes that firms are symmetrical in terms of their capabilities or knowledge, which implies that the cooperating firms belong to a single industry. Firms seek to achieve a single R&D outcome, and it is implicitly assumed that there is only one efficient way to pursue this outcome. Participating firm, therefore, benefit from this efficient, non-duplicative approach. It is also implicitly assumed that firm knowledge and technologies are close substitutes. A basis for these assumptions is the desire to obtain interesting equilibrium outcomes from the game-theoretic models. A result, however, is that this literature only address a limited of cooperative activity. In contrast, in the managerial literature, firms in alliances are often recognized to possess heterogeneous capabilities, and they may or may not be direct competitors in the product market.

Mariko Sakakibara, *The Diversity of R&D Consortia and Firm Behavior: Evidence from Japanese Data*, 49 J. INDUS. ECON. 181, 183 (2001) [hereinafter Sakakibara, *The Diversity of R&D Consortia*].

[21] Melamed & Stoeppelwerth, *supra* note 17, at 414; Robert Pitofsky, *Antitrust and Intellectual Property: Unresolved Issues at the Heart of the New Economy*, 16 BERKELEY TECH. L.J. 535, 544 (2001) [hereinafter Pitofsky, *Beyond Microsoft*]; S. REP. NO. 98-427, *reprinted in* 1984 U.S.C.C.A.N. 3105.

[22] *See, e.g.*, Michel J. Carrier, *Refusals to License Intellectual Property after Trinko*, 55 DEPAUL L. REV. 1191 (2006) [hereinafter Carrier, *Refusals to License*]; Michael J. Carrier, *Unraveling the Patent-Antitrust Paradox*, 150 U. PA. L. REV. 761 (2002); Kieff & Paredes, *supra* note 15; Gifford, *supra* note 15; Melamed & Stoeppelwerth, *supra* note 17; Frank H. Easterbrook, *Intellectual Property is Still Property*, 13 HARV. J.L. & PUB. POL'Y 108, 118 (1990); Turner, *supra* note 17; Borkin, *The New Trust Problem*, *supra* note 8; Kaplow, *supra* note 16 (contending that some of the questions are tricky, because it can be hard to bring economic analysis to bear).

¶7. As a matter of antitrust law, the immediate answer is "no." To the extent we can understand both rights over intangible assets and rights over physical assets as rights to exclude, then, "[e]xcept in the rarest case, we should treat intellectual and physical property identically in the law . . . ."[23] Consider, for example, bottleneck assets—assets to which a party must secure license or physical access in order to commercialize a good or service.[24] The antitrust authorities would have obvious interest in a transaction that would allow an entity or collection of entities to secure a bottleneck where no bottleneck had existed before. Once having established that a bundle of assets constitutes a bottleneck, distinctions between physical assets or intangible assets add nothing that one could not already discern about the ability of the parties controlling the bottleneck to act as a gatekeeper and exclude rivals.

¶8. As a matter of antitrust process, the intermediate answer is "yes," because intellectual property may allow parties to manipulate enforcement processes or frustrate remedies to antitrust problems in ways that would not be feasible in transactions that principally feature tangible assets. To illustrate this, first consider that delineating intellectual properties may constitute a nontrivial problem. A line in the sand might go far toward delineating the bounds of beachfront properties, and delineating properties may allow enforcement authorities to identify bottleneck assets, but property rights may be uncertain in that neither the enforcement authorities nor parties themselves may be able to distinguish fine lines between intellectual properties. One problem is that enforcement authorities might find themselves having to decide whether some bundle of intellectual properties constitutes a bottleneck. For example, parties to a merger might argue that at least one of them already maintains a bottleneck, thus inviting the antitrust authorities to conclude that the merger does not create a bottleneck that had not already existed. A determination that a merger does not create a new bottleneck would dismiss an important justification for blocking the merger, but effectively evaluating the parties' claim might be problematic. It might even prove impossible. Alternatively, parties might argue that none of them maintains a bottleneck and that the consolidation of their intellectual properties under unified control does not create a new bottleneck. Again, the antitrust authorities find themselves having to evaluate a difficult, possibly insoluble, claim.

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[23] Easterbrook, *supra* note 22, at 118.

[24] The bottleneck might comprise a telecommunications network. Verizon Commc'ns, Inc. v. Law Offices of Curtis V. Trinko, 540 U.S. 398 (2004). A bottleneck may also comprise a bundle of patents. *See* United States v. 3D Sys. Corp., No. 1:01CV01237(GK), 2001 WL 964343 (D.D.C. Aug. 16, 2001). For more on 3D Systems and DTM, see *infra* notes 86–95 and accompanying text.

¶9. Most of the above discussion here revolves around patents. That is natural, and, indeed, most discussions in this area revolve around patents. Patents are observable. They are enumerated and formally documented, but that leaves out other instruments such as trade secrets that parties use to protect their investments in R&D.[25] That, in turn, leaves out important questions about parties' decisions to patent, to not patent, to exploit other mechanisms, or to forgo investments in R&D.[26]

¶10. Finally, this overall discussion does not make more than passing contact with "know-how," including "tacit knowledge." Tacit knowledge is interesting because it is the uncodifiable information in the heads of engineers over which it is impossible for a firm to assign property rights. Indeed, it is the kind of stuff that parties might be able to transfer only by personnel transfers. Non-compete provisions in engineers' employment contracts and no-poaching provisions in R&D joint venture contracts may provide clues about when the real value in a technology is tied up in know-how and tacit knowledge.

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[25] As a matter of course, trade secrets are not intended to be observable, and yet in some industries trade secrets constitute important means of exploiting investments in technologies. Consider, for example, the importance of trade secrets to Wal-Mart Stores. Wal-Mart has made it to the top of Fortune 500 by efficiently distributing merchandise. Its growth has depended on development of its proprietary merchandising system, and it has endeavored to maintain secrecy over the design of the system. Secrets, of course, are susceptible to expropriation by various means including personnel transfers. In 1998 Wal-Mart accused Amazon.com of selectively poaching employees in order to learn about Wal-Mart's information systems. The parties settled litigation in 1999 with Amazon agreeing to reassign former Wal-Mart employees to less sensitive positions within Amazon. *See Wal-Mart Agrees to Settle Lawsuit Against Amazon*, N.Y. TIMES, April 6, 1999, at C6.

[26] *See, e.g.*, Bharat Anand & Alexander Galetovic, *Strategies That Work When Property Rights Don't*, *in* ADVANCES IN THE STUDY OF ENTREPRENEURSHIP, INNOVATION AND ECONOMIC GROWTH: INTELLECTUAL PROPERTY AND ENTREPRENEURSHIP, *supra* note 19, at 261; Bronwyn H. Hall & Rosemarie H. Ziedonis, *The Patent Paradox Revisited: An Empirical Study of Patenting in the U.S. Semiconductor Industry, 1979–1995*, 32 RAND J. ECON. 101 (2001); Wesley M. Cohen et al., *Protecting Their Intellectual Assets: Appropriability Conditions and Why U.S. Manufacturing Firms Patent (or Not)* (Nat'l Bureau of Econ. Research, Working Paper No. 7552, 2000), *available at* http://www.nber.org/papers/w7552.; Peter C. Grindley & David J. Teece, *Managing Intellectual Capital: Licensing and Cross-licensing in Semiconductors and Electronics*, 39 CAL. MGMT. REV. 8 (1997); Richard C. Levin et al., *Appropriating the Returns from Industrial Research and Development*, 18 BROOKINGS PAPERS ON ECON. ACT. 783 (1987).

I. ANTITRUST & COLLABORATIVE R&D

¶11. Interactions between antitrust and innovation have made it to the top of policymakers' agendas during at least two acute episodes of national angst. From 1933 and into 1937, the economy had climbed steadily from the nadir of depression, but by the summer of 1937 it had commenced another round of sharp contraction.[27] The Administration had to give the appearance of doing something—hence the Temporary National Economic Committee of 1938.[28] Coming into the 1980's, severe economic contraction was again an important feature of the policy environment, but this time it was matched with concerns that Japanese industry would assume preeminence in the development and production of semiconductors.[29] The government launched a number of initiatives, including the National Cooperative Research Act (NCRA) of 1984.[30] The government also took a hand in motivating and subsidizing a number of research consortia, the most prominent being the SEMATECH consortium.[31] The NCRA was designed to promote intra-industry collaboration in R&D by relieving R&D joint ventures of some of the hazards that private antitrust actions could impose.[32] In 1993 the government enacted the National Cooperative Research and Production Act (NCRPA), thus extending the protections afforded under NCRA to production joint ventures.[33] SEMATECH ("Semiconductor Manufacturing Technology") was, as the name suggests, designed to promote collaboration between competitors in the development of semiconductor manufacturing technologies.[34]

¶12. Drawing from that history, antitrust outsiders, and sometimes insiders, have made at least three kinds of claims. The first pertains to *R&D intensity*.[35] In both episodes, policymakers internalized a kind of "Schumpeterian" notion that larger agglomerations of firms or larger firms themselves would be better equipped to concentrate the resources sufficient to pursue ambitious R&D. It then becomes tempting to suggest that the antitrust authorities should count improved capacity to conduct R&D as an "efficiency" justification for collaboration between firms. The second claim pertains to the *efficiency* of R&D.[36] Some

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[27] *See* Ben S. Bernake, *Nonmonetary Effects of the Financial Crisis in the Propagation of the Great Depression*, 73 AM. ECON. REV. 257, 261 (1983).
[28] The committee was created by S.J. Res. 300, 75th Cong., 52 Stat. 705 (1938).
[29] *See* Flamm & Nagaoka, *supra* note 16, at 72.
[30] *Id.*; Pub. L. No. 98-462, 98 Stat. 1815 (1984).
[31] *See generally* Grindley et al., *supra* note 19.
[32] *See generally* S. REP. NO. 98-427 (1984).
[33] Pub. L. No. 103-42, 107 Stat. 117 (1993).
[34] *See* Grindley et al., *supra* note 19.
[35] *See infra* Part I.A.
[36] *See infra* Part I.B.

observers have suggested that collaboration itself, including collaboration between competing entities, would enable parties to conduct R&D more effectively—that is, collaborators should yield more innovation for each dollar they collectively invest in R&D. "Cost-sharing", for example, could promote efficiency by allowing firms to avoid duplication of costly R&D. Similarly, collaboration might allow parties to join complementary know-how and capabilities and exploit "two-heads-are-better-than-one" economies. Either way, the claim amounts to another efficiency justification for collaboration. Finally, some observers complained that antitrust analysis is poorly equipped to characterize competition in "dynamic," "fast-paced," "high-tech" industries.[37] They suggest that the antitrust authorities end up basing analyses on static snap-shots of prevailing market conditions when those authorities should do what firms do: attempt to look forward and factor into their analyses anticipated changes in market conditions.[38] Changes might even include the emergence of new markets—markets that would not come to exist but for innovation and collaboration. I make a few observations about each of these points in turn.

A. Collaboration and R&D Intensity

¶13. The initiatives of the late 1930's and those of the 1980's and 1990's appear similar in at least one respect: in both instances policymakers maintained a notion that collaborating firms would be better equipped to mobilize and focus substantial resources on ambitious R&D.[39] In the first instance, the authorities ascribed to cartels the ability to collectively concentrate resources.[40] Even so, they actively chose to

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[37] *See infra* Part I.C.; Pate, *supra* note 15; Pitofsky, *Challenges of the New Economy*, *supra* note 17; Pitofsky, *Beyond Microsoft*, *supra* note 21; Jorde & Teece, *supra* note 18.

[38] *See, e.g.*, Richard J. Gilbert & Steven C. Sunshine, *Incorporating Dynamic Efficiency concerns in Merger Analysis: The Use of Innovation Markets*, 63 ANTITRUST L.J. 569, 571 (1994).

[39] Why individual firms could not, or would not access sufficient resources from external sources remains a question. In this age of venture capital and private equity, perhaps they do.

[40] Joseph Borkin appears again in a pivotal role. In the preface to *The Crime and Punishment of I.G. Farben*, Borkin observes that in the early 1930's he and others in government became aware of the "cartelization" of munitions-related industries. One target of the "[anti-]cartel program" launched at the Antitrust Division was the German conglomerate I.G. Farben. The Division understood that I.G. Farben had aggressively exercised and policed its patent rights by entangling global competitors in a web of cross-licenses and patent pools. The various R&D projects I.G. Farben pursued included the liquefication of coal into fuel oil. The understanding is that the individual I.G. Farben companies could

ignore this intuition and instead focused on diminishing the influence of those same cartels.[41] In the latter instance, the designers of the NCRA and other programs ascribed to industry consortia the ability to concentrate resources.[42] They then proceeded to suggest that the antitrust authorities should not dismiss collaboration between competitors out of hand.

¶14. That notion has some of the flavor of one part of the "Schumpeterian hypothesis" by which greater "firm size" (if not consortium size or cartel size) should enable firms to invest more aggressively in R&D.[43] Larger agglomerations might, for example, be

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not have pursued the project independently but rather had to merge in order to concentrate sufficient financial resources under unified control. Borkin, *Farben*, *supra* note 17, at 54.

[41] Borkin described the cartel problem as follows:

> The formidable arrays of patents collected by industrial combinations for the purpose of dividing fields into non-competitive spheres, establishing quota systems of manufacture, controlling the price and use of non-patented articles and services, 'blocking off' developments and 'fencing in' licensees and competitors, can scarcely be considered an incentive to genius or a promotion of 'science and useful arts.' Instead patents have to some extent become instruments of oppression, representing economic waste through the non-utilization or restricted utilization of the resources of knowledge they embody, rather than eliminating waste by spurring increased efficiency.

Borkin, *The New Trust Problem*, *supra* note 8, at 78.

[42] The Senate Report indicates a role for pooling resources. The Report indicated that

> [a]nother and more serious problem is that much important research may never be done if firms are not able or willing to undertake such research on their own. Mr. Charles H. Herz, General Counsel of the National Science Foundation, addressed the problem of foregone collaborative research before the [Senate Judiciary] Committee: (I)n an era of accelerating technology, development, increasingly complex and costly R&D, and heightened international competition, the United States and specific U.S. industries need to be concerned about research and development that a typical corporation cannot take on alone.

S. REP. NO. 98-427, at 2 (1984). Peter McClosky, president of the Electronics Industries Association, continued: "By pooling resources, companies can afford longer-term research—the fruits of which will be employed to assure our industrial competitiveness worldwide." *Id.*

[43] Katz and Shelanski efficiently encapsulate the "Schumpeterian hypothesis":

> [Joseph] Schumpeter's argument that most technological innovation would come from large corporations with market power and organized R&D operations implied that the ideal of competition under antitrust law could have substantial social costs over time. . . . Although Schumpeter wrote [in 1942] mostly about large firms, their associated economies of scale for R&D, and their ability to attract capital and talented scientists, his critique of perfect competition and discussion of the benefits of market power suggest that his ideal innovators were not only large but dominant as well.

better equipped to attract external sources of capital or to mobilize internal sources for ambitious R&D. Even so, both the hypothesis and the generalized notion to which policymakers subscribed are problematic. Empirical research has demonstrated some correlation between firm size and R&D expenditures. A difficulty is that correlation does not imply causation, and, indeed, researchers still puzzle over the "structural" relationship between the two.[44] It is not obvious that an important causal relationship exists.[45] Yet, even if the concentration of resources within a firm, consortium, or cartel does translate into more intensive R&D, more intensive R&D itself does not count as an "efficiency" justification for agglomeration, because it says nothing about the prospect of overinvestment in R&D.

B. Collaboration and R&D Efficiency

¶15. The designers of the initiatives of the 1980's endeavored to "emulate 'Japanese style' collaboration," by which competing entities would engage in "government-sponsored cooperative R&D."[46] The designers of the NCRA, for example, understood that allowing competing firms to collaborate would allow them to share costs and thus avoid "wasteful duplication of research and development efforts."[47] Observers and industry insiders said much the same about the

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Michael L. Katz & Howard A. Shelanski, *Merger Policy and Innovation: Must Enforcement Change to Account for Technological Change?*, 5 INNOVATION POL'Y & ECON. 109, 131 (2005).

[44] *See, e.g.*, *id.* at 136; Wesley M. Cohen & Steven Klepper, *A Reprise of Size and R&D*, 106 ECON. J. 925, 926 (1996).

[45] Cohan and Klepper observe that "policy-makers continue to harbour beliefs about the advantages of large firm size in R & D competition despite the apparent absence of empirical evidence that would support these beliefs." Wesley M. Cohen & Steven Klepper, *A Reprise of Size and R&D*, 106 ECON. J. 925, 925 (1996). They go on to suggest, however, that there can be some advantages that obtain to large firms in conducting R&D. Even so, Katz and Shelanski summarize the state of understanding as follows:

> The evidence overall thus suggests that, to the extent firm size has an effect on innovation, its magnitude and direction depend on associated industry-level variables and are susceptible to few general presumptions. The results suggest that especially large firms like those created by some recent mergers will have no special tendency—nor any predictable reluctance—to engage in innovation, and that small, fringe firms may play important roles over time in technologically advancing markets.

Katz & Shelanski, *supra* note 43, at 136.

[46] Sakakibara, *Heterogeneity*, *supra* note 19, at 117.

[47] S. REP. No. 98-427, pt. 1, at 2 (1984), *reprinted in* 1984 U.S.C.C.A.N. 3105, 3106.

government-sponsored SEMATECH consortium.[48] But many, many funny things happened on the way to the consortium. I will enumerate six.

1. For the most part, Japanese consortia themselves have not emulated the Japanese style of collaboration.

¶16. Sakakibara observes that the perception of a Japanese style of collaborative R&D, as well as perception of the success the Japanese style had, derived largely from case studies and anecdotal evidence.[49] In contrast, analyses of *comprehensive* data on Japanese consortia suggest that Japanese consortia have often featured more vertical structures by which firms would contribute complementary know-how and capabilities.[50]

2. Japanese consortia were more often organized as "vertical" structures rather than "horizontal" structures that would join competing entities.

¶17. Japanese consortia have comprised "vertical" structures by which participating entities would contribute complementary know-how and capabilities and would be less likely to compete directly in a given market.[51]

3. Cost-sharing has been an important feature of much collaborative R&D, but such collaborations often concentrate research efforts on a single entity rather than distributing them across several entities.

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[48] See, for example, the comments of Intel co-founder and Sematech president Robert Noyce. Robert Noyce, *Cooperation Is The Best Way to Beat Japan*, N.Y. TIMES, July 19, 1989, at F2; Kenneth S. Flamm, Letter to the Editor, N.Y. TIMES, Apr. 14, 1987, at A30.

[49] Sakakibara, *The Diversity of R&D Consortia*, *supra* note 20, at 182.

[50] *See* Lee Branstetter & Mariko Sakakibara, *When Do Research Consortia Work Well and Why? Evidence from Japanese Panel Data*, 92 AM. ECON. REV. 143, 145 (2002) ("Secondly, the government generally sought (not always successfully) to encourage complete dissemination of all research results to the participating firms. Furthermore, in selecting participants for consortia formed since the early 1980s, the government generally sought to bring together firms with complementary research assets."); Branstetter & Sakakibara, *Microeconometric Analysis*, *supra* note 19, at 214 ("While R&D managers listed a number of motivations for seeking to participate in consortia, the most highly cited reason for seeking to participate in consortia was access to complementary knowledge assets of other participants."). *See generally* Sakakibara, *Heterogenity*, *supra* note 19.

[51] Sakikibara, *The Diversity of R&D Consortia*, *supra* note 20, at 184–85.

¶18. Many Japanese consortia may have featured "vertical" structures, but cost-sharing has been the dominant feature of some consortia, including non-Japanese consortia. Roller, Siebert and Tombak, and Majewski and Williamson, observe, for example, that cost-sharing has been an important feature of many consortia that have secured the protection afforded by the NCRA.[52] Majewski and Williamson further note that such cost-sharing consortia have generally concentrated R&D efforts on a single entity.[53] That entity might be a consortium member itself, or it might be an outside entity such as a university or specialized research house.[54]

4. Formal economic theory illuminated a "free-riding" problem that could frustrate collaborative R&D.

¶19. At the same time policymakers were debating the initiatives of the early 1980's, researchers started to take up cost-sharing as an important motivation for forming research consortia.[55] They examined cost-sharing in environments in which collaboration might induce know-how to spillover between consortium members. Policymakers would perceive knowledge spillovers as a positive aspect of collaboration, but consortium participants might endeavor to frustrate spillovers. Specifically, they might endeavor to contain spillovers from themselves to other consortium members, especially if these other members were direct competitors. At the same time, consortium participants might try to absorb know-how from those other members without making significant contributions of their own. That is, individual members might "free-ride" on the efforts and contributions of others. Collectively,

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[52] Lars-Hendrik Roller et al., *Why Firms Form (or do not Form) RJVs*, 117 ECON. J. 1122, 1142 (2007); Majewski & Williamson, *Incomplete Contracting*, *supra* note 19. One may note an outstanding question about self-selection and the representativeness of the NCRA data: Have consortia featuring cost-sharing been more likely, less likely, or as likely as other consortia to make NCRA filings?

[53] Majewski & Williamson, *Incomplete Contracting*, *supra* note 19 at 218.

[54] Majewski & Williamson, *Incomplete Contracting*, *supra* note 19. The authors identify the cost-sharing phenomenon with consortia they identify as "Contract R&D" – that is, with consortia that contract the services of an outside party such as a university lab or research house. *Id.* They also identify cost-sharing with "Coordinator-led R&D". *Id.* Such consortia are distinguished by an entity that publicly posts the terms of participation and maintains open membership. *Id.* That entity might conduct the R&D itself or secure the services of a consortium member or outside party. *Id.*

[55] Again, seminal contributions include: Spence, *supra* note 20; Katz, *supra* note 20; d'Aspremont & Jacquemin, *supra* note 20, and Morton I. Kamien et al., *supra* note 20.

consortium members might end up contributing less vigorously to collaborative R&D than they would had they not individually perceived the free-rider problem.

5. The first incarnation of SEMATECH experienced free-rider problems.

¶20. Grindley, Mowery and Silverman observe that SEMATECH participants perceived the free-rider problem and ended up participating less vigorously in the consortium.[56] Several years into the program, SEMATECH adapted by taking on a more vertical structure that would encourage participants to share complementary know-how.

6. Japanese policymakers have come to model some of their own innovation policies after American policies.

¶21. Flamm and Nagaoka observe that

> [i]t is widely believed in Japan that the strong basic research capability of U.S. universities supported by a high level of federal support, close collaboration between industry and universities, and strong protection of intellectual property rights have been major contributing factors to the impressive recovery of the U.S. economy since the early 1980s . . . . Close partnerships between universities and industry have enabled basic scientific capabilities to be transformed into emergent new industries in areas such as biotechnology and information technology.[57]

They further observe that, since the mid-1990's, the Japanese have adopted policies to promote industry-university partnerships.[58]

¶22. Taken all together, it is not surprising that the antitrust authorities in the United States have rarely challenged R&D consortia.[59] Policymakers assembled programs like the NCRA to address concerns that private antitrust actions or government enforcement could frustrate procompetitive collaboration between competitors.[60] Policymakers identified "Japanese style" collaboration with the kind of collaboration they had hoped to promote.[61] Yet, with the exception of a few highly publicized, government-sponsored consortia such as SEMATECH, there is little evidence that consortia in the United States or even Japan have tended to organize themselves around the purportedly "Japanese style."

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[56] Grindley et al., *supra* note 19.
[57] Flamm & Nagaoka, *supra* note 16, at 73.
[58] *Id.*
[59] S. REP. NO. 98-427, *reprinted in* 1984 U.S.C.C.A.N. 3105; Turner, *supra* note 17; Pitofsky, *Challenges of the New Economy*, *supra* note 17.
[60] Senate Report, S. REP. NO. 98-427, *reprinted in* 1984 U.S.C.C.A.N. 3105.
[61] *Id.* at 3106.

The federal government has subsidized many consortia through its various programs at the Department of Defense and through the Advanced Technology Program (ATP) maintained at the Commerce Department.[62] Even so, data available through the NCRA program suggest that government-subsidized consortia as well as other consortia tend either to concentrate R&D on a single entity or to aggregate complementary know-how, capabilities, and efforts from a range of entities.[63] Similarly, evidence from the ATP program suggests that ATP-subsidized consortia tend not to feature entities that are direct market rivals.[64]

¶23. Complementarity alone would not relieve any one venture of antitrust scrutiny, but it does provide some basis for the claim that antitrust has given "wide latitude to joint research and development [even] among competitors."[65] A question remains about whether data from the ATP and NCRA are representative of all consortia. It might be the case that many consortia comprise entities that the antitrust authorities would recognize as "actual or potential competitors" in some market. The prospect of actual or potential competition invites scrutiny, and theory has illuminated the possibility that actual or potential competitors might be able to exploit collaboration in R&D to soften competition.[66] Even so, the same theory recognizes a role for avoiding the duplication of costly R&D, an effect that the antitrust authorities would count as procompetitive.

C. Dynamic Competition

¶24. Antitrust might be occupied with understanding interactions between "actual or potential competitors" in existing markets. But what of potential competition in markets that have yet to emerge? Also, consider the situation of two parties who might not presently compete in an antitrust-cognizable market. Knowledge spillovers and R&D effort might enable one to become the rival of another in an existing market. Can the antitrust authorities accommodate the realization of such potential competition? Also, should antitrust formally recognize the R&D process itself as a dimension along which firms compete?

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[62] Since 1990, the Commerce Department has subsidized individual firms and consortia through the ATP.
[63] Majewski & Williamson, *Incomplete Contracting*, *supra* note 19, at 216–18.
[64] Mariko Sakakibara & Lee Branstetter, *Measuring The Impact of U.S. Research Consortia*, 24 MANAGERIAL & DECISION ECON. 51, 65 (2003).
[65] Turner, *supra* note 17, at 486.
[66] *See, e.g.*, Katz, *supra* note 20, at 529.

¶25. These questions relate to a larger question about "dynamic competition." Parties might make investments now—in R&D, in production capacity, in brand equity, and so on—that will enable them to later commercialize goods and services in existing markets or new markets. None of that is specific to R&D, but investment in R&D is interesting because it might tend to be more "disruptive" than other types of investment. R&D might, for example, yield innovations that render rivals' production capacity obsolete, thus leading to dramatic shifts in market shares.

¶26. Jorde and Teece suggested that the antitrust authorities should recognize innovation as an important dimension of dynamic competition and should, therefore, be more circumspect about applying traditional antitrust analysis that depends on static snap-shots of market conditions.[67] The interpretation of Gilbert and Sunshine was more ambitious. They contemplated actual and potential competition in the R&D process itself,[68] and their ideas found expression in the Intellectual Property Guidelines in the language of "innovation markets."[69] The concept of innovation markets constituted a way of explicitly recognizing investment in R&D as a dimension of competition. Of course, one can imagine extending analysis of actual and potential competition to investment in general rather than limiting it to investment in R&D, but the point is that the concept of innovation markets constituted an attempt to formalize antitrust analysis of dynamic competition.

¶27. From the beginning, the concept of innovation markets had critics,[70] and operationalizing it has sometimes proven difficult.[71] Some

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[67] Jorde & Teece, *supra* note 18, at 86–89. The authors' concerns also extended to private parties. Jorde and Teece observed that parties might participate in collaborative R&D in order to situate themselves to compete in emerging or existing markets. Collaboration might, for example, allow them to tap into the complementary know-how and capabilities of other parties. *Id.* at 78. Jorde and Teece suggested, however, that rivals excluded from collaboration might be tempted to characterize collaborative agreements as anticompetitive and might thus be able to frustrate collaboration with costly antitrust litigation. *Id.*

[68] Gilbert & Sunshine, *supra* note 38, at 571.

[69] ANTITRUST GUIDELINES FOR THE LICENSING OF INTELLECTUAL PROPERTY § 3.2.3 (1995), *available at* http://www.usdoj.gov/atr/public/guidelines/0558.htm.

[70] *See, e.g.*, Robert J. Hoerner, *Innovation Markets: New Wine in Old Bottles?*, 64 ANTITRUST L.J. 49, 55 (1995) (suggesting that the concept of "innovation markets" would provide a new means of attacking "conglomerate" mergers); Richard T. Rapp, *The Misapplication of the Innovation Market Approach to Merger Analysis*, 64 ANTITRUST L.J. 19, 20 (1995) (noting that the concept constitutes little more than another way to frame "potential competition" and to invite the enforcement hazards that attend "potential competition").

observers further note that the question of how to formally operationalize antitrust analysis of competition in R&D remains open.[72] Even so, some observers suggest that certain R&D-intensive industries, such as pharmaceuticals, are more amenable to the concept of innovation markets.[73] Ironically, these industries may be more amenable to the concept, because they are static in certain ways. Specifically, these industries might be R&D-intensive, but, like pharmaceuticals, they might be less susceptible to "disruptive" changes in market structure. Industries that depend on designing molecules—pharmaceuticals, chemicals, certain lines of agri-business, and so on—fit the pattern. Further, it may be no accident that those same industries are ones in which patents have constituted the principal means of appropriating returns to R&D.[74]

¶28. I put aside questions about how to formally incorporate R&D into antitrust analysis and observe that static analysis can capture certain strategic aspects of competition involving intellectual property.[75] Specifically, when examining a merger or contractual relationship, invoking "intellectual property" amounts to claiming that at least two parties are contributing complementary inputs to the commercialization of some good or service. That, in turn, amounts to illuminating important "vertical" relationships: the owner of some intellectual property may grant to other parties' rights-of-way to commercialize a good or service, and those other parties contribute inputs to the actual commercialization.

¶29. Merely identifying vertical relationships imparts structure to antitrust analysis in at least two ways. First, it allows investigators to avoid certain types of inappropriate enforcement actions. Two firms might have the appearance of competing in a market for some good or service, yet one of those firms might maintain a bottleneck over one of the inputs. That firm might, for example, own a bundle of patents to

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[71] *See* Richard J. Gilbert & Willard K. Tom, Is *Innovation King at the Antitrust Agencies? The Intellectual Property Guidelines Five Years Later*, 69 ANTITRUST L.J. 43, 83 (2001) (noting innovation market analysis in antitrust cases has been unnecessary to reach the outcomes).

[72] *See, e.g.*, Michael A. Carrier, *Two Puzzles Resolved: Of the Schumpeter-Arrow Stalemate and Pharmaceutical Innovation Markets*, 93 IOWA L. REV. 393, 415 (2008) (suggesting a new test for analyzing innovation markets in antitrust cases).

[73] *Id.*

[74] *See, e.g.*, Ashish Arora, *Patents, Licensing, and Market Structure in the Chemical Industry*, 26 RES. POL'Y 391, 401 (1997); Cohen et al., *supra* note 26, at 2; JOSEPH BORKIN & CHARLES A. WELSH, GERMANY'S MASTER PLAN (1943).

[75] The brief discussion here parallels the more extensive discussion in Part 3 of the Intellectual Property Guidelines on "Technology Markets" and "Horizontal and Vertical Relationships."

which any other firm would have to secure a license. Granting a license may thus give the appearance of competition in the goods market. A merger of the two firms would, in turn, give the appearance of a reduction of competition in the goods market, but that competition is something of a fiction to begin with because it depends on the patent holder exercising its option to grant rights-of-way to other parties.[76] Accordingly, it would be inappropriate to conduct analysis of such a merger without accounting for the vertical relationship between licensor and licensee.

¶30. Second, identifying important vertical relationships allows investigators to identify certain concerns that would otherwise be missed. Consider, for example, an environment in which two firms maintain distinct patent positions that situate them to separately grant rights-of-way to commercialize goods in a particular goods market. Suppose, further, that no other party is situated to grant rights-of-way. A merger of the two patent-holding firms would allow the merged entity to secure a bottleneck where no bottleneck had existed before. (It is not obvious that such a situation often arises, but I will present an example below.) The merging parties might not even produce goods themselves, in which case, the merger would give the appearance of no concentration in the goods market, but that would mask the reality of merger to monopoly in the technologies to which parties must secure license to produce goods at all. The merged entity would then be in a position to impose licensing terms that would allow it to secure monopolistic returns.

II. ANTITRUST AND UNCERTAIN PROPERTY RIGHTS

¶31. The intersection of antitrust and intellectual property circumscribes two century-long debates. The first pertains to the question of how antitrust law and intellectual property law interact. Observers will know, however, that decisions like *CSU*[77] and *Trinko*,[78] in 2000 and 2004 respectively, precipitated another cycle of vigorous debate within antitrust about how parties can exploit property rights, including intellectual property rights, to exclude rivals. Indeed, if one views intellectual property through an antitrust lens, then one stumbles into the hundred-years debate about "refusals to deal," "exclusionary

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[76] What if the patent holder exercised its option to deny rights-of-way? Failing to grant a license or withdrawing a license gets into controversial antitrust questions about "refusals to deal." For further explanation, see *infra* Part II.

[77] CSU v. Xerox Corp., 203 F.3d 1322 (3d Cir. 2000).

[78] Verizon Commc'ns Inc. v. Law Offices of Curtis V. Trinko, LLP, 540 U.S. 398 (2004).

conduct," and "monopolization."[79] It becomes natural, for example, to consider how a patent holder might condition patent licenses or selectively refuse licenses to frustrate or "exclude" rivals. But, as Hovenkamp observes, "Notwithstanding a century of litigation, the scope and meaning of exclusionary conduct under the Sherman Act remain poorly defined. No generalized formulation of unilateral or multilateral exclusionary conduct enjoys anything approaching universal acceptance."[80]

¶32. A problem with intellectual property rights is that they may also be poorly defined. At first sight, there is nothing distinctive about intellectual property rights, in that, like any property rights, they invite process—formal process to which parties may appeal to sort out property rights violations. A difficulty is that "the boundaries of intellectual property rights are often uncertain and difficult to define, so that neither the intellectual property holder nor competitors know the precise extent of protection afforded by the intellectual property right without a decision from a court or binding arbiter."[81] That is not the end of it. That court or binding arbiter will be no better situated than litigants themselves to delineate intellectual properties, and yet process may impose on a court or an arbiter the obligation to impose a decision. Nor would enforcement authorities be better situated, and yet, antitrust enforcement may also impose an obligation on the authorities to distinguish fine lines between intellectual properties.

¶33. The problem of delineating property rights imposes some practical difficulties on antitrust enforcement. I outline just one: uncertain property rights can impose constraints on the design of remedies to merger transactions. A candidate remedy to a problematic

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[79] *See, e.g.*, Emanuela Arezzo, *Intellectual Property Rights at the Crossroad between Monopolization and Abuse of Dominant Position: American and European Approaches Compared*, 24 J. MARSHALL J. COMPUTER INFO. L. 455 (2007); Carrier, *Refusals to License*, *supra* note 22; Herbert Hovenkamp, *Exclusion and the Sherman Act*, 72 U. CHI. L. REV. 147 (2005) [hereinafter Hovenkamp, *Exclusion and the Sherman Act*]; Douglas A. Melamed, *Exclusionary Conduct Under the Antitrust Laws: Balancing, Sacrifice, and Refusals to Deal*, 20 BERKELEY TECH. L.J. 1247 (2005); Eleanor M. Fox, *Is There Life in Aspen after Trinko? The Silent Revolution of Section 2 of the Sherman Act*, 73 ANTITRUST L.J. 153 (2005); Gifford, *supra* note 15; Melamed & Stoeppelwerth, *supra* note 17; Pate, *supra* note 15; Pitofsky, *Beyond Microsoft*, *supra* note 21.

[80] Hovenkamp, *Exclusion and the Sherman Act*, *supra* note 79, at 147–48 (citation omitted).

[81] *See* U.S. DEP'T OF JUSTICE & FED. TRADE COMM'N., ANTITRUST ENFORCEMENT AND INTELLECTUAL PROPERTY RIGHTS: PROMOTING INNOVATION AND COMPETITION 4 (2007), *available at* http://www.usdoj.gov/atr/public/hearings/ip/222655.htm.

merger transaction may, for example, take the form of a divestiture by which the merging parties spin off a bundle of assets to a third party. When property rights are uncertain, it may not be obvious what rights-to-exclude attend any one divested asset. At the same time, however, it may yet be understood that a certain bundle of assets comprises rights-to-exclude that are extensive enough such that the bundle would constitute a bottleneck if secured under unified control.[82] Consider, then, a merger transaction that would allow the merged entity to secure the bottleneck. One candidate remedy might feature the spin-off of some subset of assets in that bundle. One might, for example, look for a divestiture package that (1) breaks the bottleneck by yielding to third party rights-of-way to commercialize a good or service while (2) simultaneously preserving the rights-of-way of the merged entity. Securing such a result amounts to saying that the bottleneck actually encompassed two bundles of assets, each of which separately affords rights-of-way.[83] Such a divestiture package might exist, but consider the alternative. Given the uncertainty of property rights, it may not be obvious that a divestiture package yields rights-of-way to any one party without denying rights-of-way to another. In such a case, one might relieve concerns about the merger transaction by crafting a remedy that yields access to the bottleneck to third parties by long-term contract. A contract is less severe than an outright

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[82] The fact pattern might seem contrived, but consider the patent thicket phenomenon articulated by Gilbert and Newbery, and Carl Shapiro. Richard J. Gilbert & David M.G. Newbery, *Preemptive Patenting and the Persistence of Monopoly*, 72 AM. ECON. REV. 514, 514 (1982); Carl Shapiro, *Navigating the Patent Thicket: Cross Licenses, Patent Pools, and Standard Setting*, INNOVATION POL'Y & ECON. 119, 119 (2001). In some environments, an individual patent might not vest the patent holder with the capacity to block others from commercializing a technology. In contrast, control of a portfolio of individually weak patents might constitute a bottleneck.

[83] The experiences of Procter & Gamble (P&G) and Kimberly-Clark (KC) in the "Diaper Wars" are illustrative. On October 11, 1985, P&G and KC separately filed applications for patents pertaining disposable diapers with elasticized legs. Kimberly-Clark Corp. v. Procter & Gamble Distrib. 973 F.2d 911, 912–13 (1992). In 1989 KC sued P&G for infringement, and the parties pursued the matter all the way to a judgment, thus forcing the judge to sift through decades of patent claims and delineate the boundaries between the two parties' portfolios of claims. *Id.* The judgment amounted to partitioning the claims into two channels for commercializing two variants of diapers with elasticized legs. *Id.* The judgment also assigned one channel to KC and the other to P&G. *Id.* Licensees seeking to commercialize either variant thus ended up having to secure a license from either KC or P&G. *Id.* Both P&D and KC subsequently pursued separate and successful patent infringement litigation against other parties.

divestiture and has the advantage of preserving the access to the bottleneck of more than one competing entity.

¶34. In the context of patents, the long-term contract would amount to a licensing agreement. But at least one more complication remains: to determine what patents to include in a license. Antitrust authorities often find themselves having to choose patents from a portfolio of patents, a situation where hazards are abound. A divestiture package may enumerate some number of patents, but that leaves open the prospect that, post-merger, the merged entity pulls some other bundle of patents out of its hat—patents that may yet support infringement claims against licensors. The capacity to assert infringement matters, because it may allow the merged entity to frustrate the ability of licensors to compete, thus, defeating the purpose of the licensing remedy.[84] There are, of course, alternatives to enumerating patents. The principal alternative is to do what firms do when facing the same hazards: finesse the enumeration of patents and the hazards that enumeration invites by granting rights-of-way to commercialize goods or services encompassed within a "field-of-use."[85]

A. Example of a field-of-use licensing remedy: The acquisition of DTM by 3D Systems

¶35. In 2001, the Department of Justice challenged the proposed acquisition of DTM Corporation (DTM) by 3D Systems Corporation (3D).[86] Both 3D and DTM developed and manufactured "rapid prototyping" (RP) equipment, and both firms maintained extensive patent portfolios relating to two different RP technologies.[87] 3D's patent position allowed it to secure rights-of-way in the United States to commercialize an RP technology known as "stereolithography," and 3D

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[84] *See* Jean O. Lanjouw & Mark Schankerman, *Characteristics of Patent Litigation: A Window on Competition*, 32 RAND J. ECON. 129, 147 (2001) (examining the types of patents most frequently litigated). *See generally* Jean O. Lanjouw & Josh Lerner, *Tilting the Table? The Use of Preliminary Injunctions*, 44 J.L. & ECON. 573 (2001) (arguing that preliminary injunctions are misused in patent litigation to limit competition).

[85] *See, e.g.*, Grindley & Teece, *supra* note 26, at 9 (discussing fields-of-use in the licensing of intellectual property relating to electronics and semiconductors).

[86] United States v. 3D Sys. Corp., No. 1:01CV01237(GK), 2001 WL 964343 (D.D.C. Aug. 16, 2001).

[87] *See* Competitive Impact Statement at 1, United States v. 3D Sys. Corp., Civ. No. 1:01CV01237(GK) (D.D.C. September 4, 2001), *available at* http://www.justice.gov/atr/cases/f9000/9019.pdf.

had successfully used its position to deny rights-of-way to other parties to commercialize stereolithographic systems in the United States.[88] Similarly, DTM's patent position allowed it to secure rights-of-way to commercialize an RP technology known as "laser sintering," and it had managed to frustrate the efforts of other parties to commercialize laser sintering systems in the United States.[89] Other firms commercialized different RP technologies in the United States, but importantly, the government distinguished high-end "industrial rapid prototyping systems" from lower-end systems.[90] The Department's complaint alleged that the proposed acquisition would "substantially lessen competition in the development, production and sale of industrial RP systems sold in the United States . . . ."[91]

¶36. The parties subsequently reached a settlement with the government by which the merged entity would yield rights-of-way to a third party to commercialize an industrial RP system in the United States.[92] The third party would secure rights-of-way by means of a license from 3D Systems to commercialize RP systems in either of two fields-of-use indicated as "SL Technology" (stereolithography) and "LS Technology" (laser sintering).[93] Further, the government restricted candidate licensors to firms that had already commercialized industrial RP systems in stereolithography or laser sintering.[94] Among the candidates were firms that had commercialized stereolithography and laser sintering systems in Europe and Asia.[95]

¶37. The formulation of the license in terms of a field-of-use relieved the government of having to indicate specific patents that might otherwise have been included in a more traditional patent license. Affirmatively specifying patents in a license would have opened up the prospect that, post-acquisition, 3D could exploit patents excluded from the license to assert infringement against the licensor. Drawing the licensee into patent infringement litigation could frustrate the licensee's efforts to commercialize an industrial RP system in the United States.

CONCLUSION

¶38. Antitrust enforcement and innovation policy may make for an odd, strangely compatible couple, if not *the* odd couple, in that the one

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[88] *Id*. at 7.
[89] *Id*. at 4–5.
[90] *Id*. at 1–2.
[91] *Id*. at 6.
[92] *Id*. at 2.
[93] *Id*. at 4.
[94] *Id*. at 1–2.
[95] *Id*. at 5.

(innovation policy) has been worried about interference from the other (antitrust) while the other has been blithely getting on with its business. Policymakers have, for example, long appreciated that collaboration, including collaboration between competitors, could promote innovation. Never mind that collaborative R&D remains poorly understood. The expectation had been that collaboration would promote the efficiency of R&D by allowing parties to avoid duplicative R&D and to join complementary know-how and capabilities. Yet policymakers worried that the prospect of antitrust scrutiny could frustrate that same collaboration. The antitrust authorities, of course, are interested in the consequences of collaboration for competition, but even before enactment of the wave of innovation-minded initiatives in the 1980's and 1990's, there was little evidence that antitrust was getting in the way of collaborative R&D. Since then, researchers have gathered some evidence which suggests that most of the action in collaborative R&D has involved collaboration between parties who are not direct competitors in existing goods markets. Perhaps it is not surprising, then, that parties who are not actual competitors tend to contribute complementary inputs to collaborative R&D. There is even evidence that parties factor the potential for future competition into their decisions to join (or not join) collaborative R&D efforts. In all of this, there are no obvious justifications for the antitrust authorities to mount challenges against collaborative R&D.

¶39. What does innovation imply for antitrust enforcement? Investment in R&D—the stuff that yields innovation—depends importantly on the efforts of parties to police their intellectual properties. Shifting the focus from "intellectual property rights" to "uncertain property rights" makes it easier to understand what innovation and intellectual property really imply. They imply the same enforcement processes, but they do complicate those processes. The antitrust authorities may find themselves facing the prospect of delineating intellectual properties. Yet unlike judges in a patent infringement case, the antitrust authorities may have alternatives. Like private parties, they may be able to finesse the problem by appealing to concepts such as fields-of-use rather than delineating intellectual properties. Also, many observers will know that uncertain property rights do not preclude the possibility of identifying bundles of assets that would constitute bottlenecks if concentrated under unified control. That may allow the authorities to conduct their analyses without extra complication.