

INNOVATION UNDER SECTION 2 OF THE SHERMAN ACT

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Recent complaints filed by the Department of Justice, the Federal Trade Commission, and numerous state attorneys general allege that Google and Facebook acquired and maintained monopolies in violation of the antitrust laws. The case brought by the DOJ and several states alleges that Google’s payments for default status on devices that access the internet and its agreements that require Android mobile phone licensees to install Google search and other Google services deny rivals scale to compete effectively and thwart potential innovation. The complaint alleges:

By restricting competition in general search services, Google’s conduct has harmed consumers by reducing the quality of general search services (including dimensions such as privacy, data protection, and use of consumer data), lessening choice in general search services, and impeding innovation.¹

The FTC complaint against Facebook alleges that it engaged in conduct that “deprives personal social networking users in the United States of the benefits of competition, including increased choice, quality, and innovation.”²

Google and Facebook have characteristics that set them apart from most corporate goliaths that have attracted antitrust scrutiny in the past. They operate two-sided platforms that serve both consumers and advertisers. Consumers do not pay a monetary price to query the internet using Google’s search engine or to interact with friends on Facebook. Google and Facebook are able to offer these services without monetary compensation because the services attract consumer attention and enable the collection of personal information that

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¹ Complaint ¶ 167, *United States v. Google LLC*, No. 1:20-cv-03010 (D.D.C. Oct. 20, 2020).

² First Amended Complaint ¶ 9, *FTC v. Facebook, Inc.*, No. 1:20-cv-03590 (D.D.C. Aug. 19, 2021). The initial complaint in that case used almost identical language. Complaint ¶ 27, *Facebook, Inc.*, No. 1:20-cv-03590 (D.D.C. Jan. 13, 2021).

enhances the value of the services sold by the companies to advertisers. The companies also stand out because they embody the rapid technological change, and thus innovation, in online services that has transformed business and leisure.

Although the *Google* and *Facebook* cases include allegations of price effects for advertisers, the most significant harm to consumers attributed to the alleged conduct relates to the quality and innovation of services.³ Concerns about innovation were also addressed in the report of the majority staff of the Antitrust Subcommittee of the House Judiciary Committee, which called for heightened antitrust scrutiny of “products [that] appear to be ‘free’ but are monetized through people’s attention or with their data,”⁴ and in President Biden’s recent executive order on promoting competition, which emphasized the role of antitrust in promoting “competition and innovation.”⁵

The emphasis on innovation in these documents might be just rhetoric or a nod to the tech content of these cases. It might also signal an increased role for innovation in the enforcement of Section 2 allegations in the high-technology economy. If so, that would be a welcome signal. Innovation is far more important for economic welfare than avoiding deadweight loss from monopoly prices.⁶

³ See, e.g., Howard A. Shelanski, *Information, Innovation, and Competition Policy for the Internet*, 161 U. PA. L. REV. 1663, 1692 (2013) (“[C]ompetition policy for digital platforms would benefit from further shifting its focus from conventional price and output effects to innovation effects.”); see also Tim Wu, *Taking Innovation Seriously: Antitrust Enforcement if Innovation Mattered Most*, 78 ANTITRUST L.J. 313 (2012).

⁴ SUBCOMM. ON ANTITRUST, COM. & ADMIN. L. OF THE COMM. ON THE JUDICIARY, MAJORITY STAFF REPORT AND RECOMMENDATIONS, INVESTIGATION OF COMPETITION IN DIGITAL MARKETS 51 (2020), [judiciary.house.gov/uploadedfiles/competition_in_digital_markets.pdf?utm_campaign=4493-519](https://www.judiciary.house.gov/uploadedfiles/competition_in_digital_markets.pdf?utm_campaign=4493-519).

⁵ Press Release, The White House, Executive Order on Promoting Competition in the American Economy (July 9, 2021), www.whitehouse.gov/briefing-room/presidential-actions/2021/07/09/executive-order-on-promoting-competition-in-the-american-economy/.

⁶ Although proper accounting for the sources of economic growth is controversial, there is general agreement that innovation accounts for a large share of total factor productivity. See, e.g., Robert M. Solow, *Technical Change and the Aggregate Production Function*, 39 REV. ECON. & STAT. 312 (1957); Robert J. Gordon, *Perspectives on the Rise and Fall of American Growth*, 106 AM. ECON. REV.: PAPERS & PROCEEDINGS 72 (2016). Moreover, because deadweight loss is a small fraction of total output, and productivity gains compound over time, a small change in the rate of productivity growth can offset a large change in deadweight loss. See, e.g., Oliver E. Williamson, *Economies as an Antitrust Defense: The Welfare Tradeoffs*, 58 AM. ECON. REV. 18 (1968); F.M. Scherer, *Antitrust, Efficiency, and Progress*, 62 N.Y.U. L. REV. 998, 1002 (1987) (“If our concern were solely allocative efficiency—the deadweight loss triangle—then antitrust could not be particularly important, since potential gains and losses are so small. . . . [I]f our concern is technological efficiency, antitrust would be important indeed.”). Others have found that the social rate of return to R&D far exceeds the private cost of capital, which suggests that greater investment in R&D would add to economic growth. See, e.g., Charles I. Jones & John C. Williams, *Measuring the Social Return to R&D*, 113 Q.J. ECON. 1119 (1998).

I. FRAMING THE ISSUE

In this article, we ask how consideration of innovation should affect the analysis of alleged monopolization under Section 2 of the Sherman Act. Our focus is on alleged suppression of innovation by a firm with monopoly power in a product market or in research and development (R&D).⁷ By suppression of innovation, we mean a reduction in effort to improve existing products or processes or to initiate development of new products or processes. In making this assessment, we recognize that a reduction in R&D expenditure is not necessarily synonymous with a reduction in innovation effort if the challenged conduct creates R&D efficiencies.

A firm that, like Facebook or Google, supplies a “free” service on a two-sided platform can profit by improving its quality or by creating new services that it offers without monetary charge if, by doing so, the firm can attract more attention on the “free” side that enables it to increase its revenues on the other side.⁸ Incentives to improve quality or develop new “free” services depend on competition on both sides of the two-sided platform and on existing services that might be displaced by new or improved services.⁹

To sharpen our inquiry, we address hypothetical versions of *United States v. Google* and *FTC v. Facebook*, in which the adverse consequences of the challenged conduct appear only on the side of the platform for which consumers do not pay a monetary price but instead compensate the platforms with their valuable attention and data. Specifically, we assume that the revenue side of our hypothetical two-sided platform is competitive.¹⁰ Improvements to the “free” or “attention” side of the platform allow our hypothetical firm to increase advertising revenues but have no significant effect on the price or total output of advertising. Moreover, our hypotheticals do not consider con-

⁷ See the definition of an R&D market in Part V *infra*, and U.S. Dep’t of Justice & Fed. Trade Comm’n, Antitrust Guidelines for the Licensing of Intellectual Property 11–12 (2017) [hereinafter Antitrust Guidelines for the Licensing of Intellectual Property], www.justice.gov/atr/IPguidelines/download.

⁸ We place “free” in quotation marks because consumers pay for the services by providing valuable data and attention to the platform for which they are not paid monetary compensation. See generally John M. Newman, *Antitrust in Attention Markets: Objections and Responses*, 59 SANTA CLARA L. REV. 743 (2020) (explaining how consumers in “attention markets” trade their attention for a platform product); Tim Wu, *Blind Spot: The Attention Economy and the Law*, 82 ANTITRUST L.J. 771 (2019) (describing “attention markets”); David S. Evans, *Attention Platforms, the Value of Content, and Public Policy*, 54 REV. INDUS. ORG. 775 (2019) (explaining how consumers exchange “attention” for content).

⁹ See, e.g., James D. Ratliff & Daniel L. Rubinfeld, *Is There a Market for Organic Search Engine Results and Can Their Manipulation Give Rise to Antitrust Liability?*, 10 J. COMPETITION L. & ECON. 517 (2014).

¹⁰ For a discussion of competition in advertising markets, see, for example, James D. Ratliff & Daniel L. Rubinfeld, *Online Advertising: Defining Relevant Markets*, 6 J. COMPETITION L. & ECON. 653 (2010).

duct on either side of the platform that might increase the price or reduce the total output of advertising.

In contrast to the market for advertising, our hypotheticals assume that there is market or monopoly power in the search or social networking services provided without monetary compensation and possibly market or monopoly power in R&D for improvements to these services.¹¹ We offer these hypotheticals as examples to frame the discussion and not as actual descriptions of facts in the *Facebook* or *Google* cases. While we occasionally refer to privacy and the use or misuse of personal data by the platforms as aspects of product quality on the “free” side of the platforms, we do not address the separate normative issues raised by matters of privacy and the use of personal data.

Our hypotheticals assume that there is anticompetitive conduct that increases or maintains market power on the “free” side of the platform, but we do not describe the specific nature of the conduct. Instead, we assume that such conduct has occurred and explore how the antitrust laws might address actual or attempted monopolization that affects zero-price services and harms only the quality or innovation of such services.¹² Although consumers do not pay a monetary price to use Google’s search engine or to connect with friends on Facebook, they are participants in commercial transactions in which they compensate Google and Facebook by surrendering valuable personal data and attention that the platforms use to attract paying advertisers and improve their services.¹³

Competition for consumer attention and personal data is a driving force of the digital economy, and the suppression of that competition has the potential

¹¹ A two-sided platform implies that competitive effects depend on interactions between the two sides of the platform. It does not follow that the competitive effects are the same on both sides, and they will often differ. *See, e.g.,* Michael L. Katz & A. Douglas Melamed, *Competition Law as Common Law: American Express and the Evolution of Antitrust*, 168 U. PA. L. REV. 2061, 2092–93 (2020).

¹² The Sherman Act applies broadly to conduct that affects trade or commerce and encompasses both price and non-price harms to quality and innovation. *See generally* John M. Newman, *Antitrust in Zero-Price Markets: Foundations*, 164 U. PA. L. REV. 149, 159–60 (2015). Some early cases indicated skepticism that the antitrust laws apply to competition in the provision of free services, *e.g.,* *KinderStart.com, LLC v. Google, Inc.*, No. C 06-2507, 2007 WL 831806 (N.D. Cal. Mar. 16, 2007), but they failed to recognize the non-monetary compensation for such services and are inconsistent with well-established concerns of the antitrust laws about product quality and innovation.

¹³ Newman, *supra* note 12, at 167. *See generally* Newman, *supra* note 8; Wu, *supra* note 8; Evans, *supra* note 8; Michal S. Gal & Daniel L. Rubinfeld, *The Hidden Costs of Free Goods: Implications for Antitrust Enforcement*, 80 ANTITRUST L.J. 521, 522 (2016); Maria Wasatjerna, *European Union Competitive Policy for the Twenty-First Century Digital Economy*, 24 COLUM. J. EUR. L. 527, 529 n.12 (2018) (consumers “pay for the service with their data”).

to create consumer harm.¹⁴ The fact that consumers do not pay a monetary price for a service does not imply that consumers cannot be harmed by conduct that degrades the quality of the service.

The last major monopolization case brought by the government, *United States v. Microsoft*, raised innovation concerns with regard to a two-sided platform for operating systems and applications, and the principal conduct at issue there involved restraints in a market in which browser applications were provided to users at a zero monetary price.¹⁵ But unlike in our hypothetical cases, the monopoly product in that case—operating systems for Intel-compatible personal computers—was sold at a positive price.

While the Sherman Act does not exempt innovation from antitrust liability, judicial decisions and enforcement agency guidelines have historically emphasized price effects and methodologies based on price and price-related data in the analysis of antitrust issues.¹⁶ The Merger Guidelines published by the DOJ and FTC reflect the antitrust agencies' focus on prices. The Guidelines published in 1968 mention innovation only in the context of a possible vertical supply or price squeeze from a new product.¹⁷ Innovation does not appear in the 1982 revision of the Guidelines, although those Guidelines note that acquisition of a disruptive firm can have anticompetitive price effects.¹⁸ The suppression of innovation as a separate anticompetitive effect from a merger did not appear in the Guidelines until the 1992 revision, and then only in a footnote.¹⁹ It was not until their most recent revision in 2010 that the Guidelines more specifically addressed the potential for harm to innovation from a merger that reduces the incentive to continue with an existing product-development effort or to initiate development of new products.²⁰

Enforcement of Section 2 of the Sherman Act also has traditionally focused on price. When innovation is discussed in judicial opinions, it is often in the

¹⁴ See, e.g., Makan Delrahim, Assistant Att'y Gen., U.S. Dep't of Justice, "Blind[ing] Me with Science": Antitrust, Data, and Digital Markets, Keynote Speech at CPI Conference on Challenges to Antitrust in a Changing Economy (Nov. 9, 2019).

¹⁵ *United States v. Microsoft Corp.*, 253 F.3d 34 (D.C. Cir. 2001) (en banc).

¹⁶ For a discussion of antitrust enforcement policy for mergers, see, for example, Richard J. Gilbert & Hillary Greene, *Merging Innovation into Antitrust Agency Enforcement of the Clayton Act*, 83 GEO. WASH. L. REV. 1919 (2015).

¹⁷ U.S. Dep't of Justice, Horizontal Merger Guidelines 11 (1968), www.justice.gov/sites/default/files/atr/legacy/2007/07/11/11247.pdf.

¹⁸ U.S. Dep't of Justice, Horizontal Merger Guidelines 19, 28 (1982), www.justice.gov/sites/default/files/atr/legacy/2007/07/11/11248.pdf.

¹⁹ U.S. Dep't of Justice & Fed. Trade Comm'n, Horizontal Merger Guidelines § 2 n.6 (1992), www.justice.gov/sites/default/files/atr/legacy/2007/07/11/11250.pdf.

²⁰ U.S. Dep't of Justice & Fed. Trade Comm'n, Horizontal Merger Guidelines § 6.4 (2010) [hereinafter Horizontal Merger Guidelines], www.justice.gov/sites/default/files/atr/legacy/2010/08/19/hmg-2010.pdf.

context of a defense or a reason to abstain from antitrust enforcement. The court of appeals in *United States v. Microsoft* noted that dominance might be temporary in technologically dynamic markets and for support cited Joseph Schumpeter, whose writings are often cited for the propositions that monopoly power supports innovation and that economic progress is driven by “perennial gale[s] of creative destruction” by which technological advances supplant formerly dominant products or processes.²¹ A few years later, in *Verizon v. Trinko*, the Supreme Court added that “[t]he opportunity to charge monopoly prices—at least for a short period— . . . induces risk taking that produces innovation and economic growth.”²² Several economists have endorsed Schumpeterian perspectives about markets and innovation.²³

It is beyond dispute that pursuit of profits motivates investments in applied R&D and that technological change can make dominant products or processes obsolete. In the presence of creative destruction, current product market shares might indicate little about the existence of monopoly power.²⁴ Antitrust policy should, therefore, promote innovation by, among other things, permitting otherwise restrictive practices that enable firms to appropriate value from innovations if the efficiency benefits of those practices more than compensate for the anticompetitive harms caused by them. But these propositions, and Schumpeterian arguments more generally, do not justify exempting innovation-related conduct from antitrust enforcement or relaxing antitrust enforcement in general, for three basic reasons.

First, although creative destruction might ultimately topple existing monopolies, that possibility does not justify anticompetitive conduct that would re-

²¹ *United States v. Microsoft Corp.*, 253 F.3d 34, 49 (D.C. Cir. 2001) (en banc). *See also* JOSEPH A. SCHUMPETER, CAPITALISM, SOCIALISM, AND DEMOCRACY 84 (1942) [hereinafter SCHUMPETER 1942]; JOSEPH A. SCHUMPETER, BUSINESS CYCLES: A THEORETICAL, HISTORICAL, AND STATISTICAL ANALYSIS OF THE CAPITALIST PROCESS 87–102 (1939) (describing the theory of innovation, which destroys and replaces “total or marginal cost curve[s]” of products).

²² *Verizon Commc’ns Inc. v. Law Offices of Curtis V. Trinko, LLP*, 540 U.S. 398, 407 (2004).

²³ *See, e.g.*, J. Gregory Sidak & David J. Teece, *Dynamic Competition in Antitrust Law*, 5 J. COMPETITION L. & ECON. 581 (2009) (discussing how scholars and practitioners need to take a more dynamic approach to competition in the spirit of Joseph Schumpeter); Richard Schmalensee, *Antitrust Issues in Schumpeterian Industries*, 90 AM. ECON. REV.: PAPERS & PROCEEDINGS 192, 193 (2000) (“Category leaders are not generally threatened by ‘me too’ products competing on price, but as in Schumpeter’s vision, they risk being obliterated by the superior products that regularly emerge from intense dynamic competition.”); Geoffrey A. Manne & Joshua D. Wright, *Innovation and the Limits of Antitrust*, 6 J. COMPETITION L. & ECON. 153 (2010) (concluding that the economy moves too fast for antitrust remedies to be fully effective); Nicolas Petit & David J. Teece, *Innovating Big Tech Firms and Competition Policy: Favoring Dynamic over Static Competition* (July 20, 2021), ssrn.com/abstract=3229180 (proposing a dynamic competition paradigm based on Schumpeter’s perspective on innovation-driven competition).

²⁴ *See, e.g.*, Michael L. Katz & Howard A. Shelanski, “Schumpeterian” Competition and Antitrust Policy in High-Tech Markets, 14 J. COMPETITION 47 (2005).

duce the likelihood or delay the onset of innovation competition or dilute its effect. Moreover, there is little evidence to support the notion that creative destruction plays a greater role in today's economy than it has in the past. The average duration of firms in the Standard & Poor's (S&P) 500 Index, which includes many high-tech firms, has been increasing since 2000.²⁵ High entry barriers and network effects can insulate firms in today's high-tech economy from competition for decades.

Second, there is no evidence to support Schumpeterian propositions that large firms with market power generally accelerate the rate of innovation by attracting capital for R&D or enabling a more stable platform for investment in R&D. Innovations often come from small firms or new entrants, and today's capital markets provide ample opportunities for start-ups to attract financial support for promising ideas. Regarding monopoly profits to fund R&D, Herbert Hovenkamp has remarked that "one can always argue that a firm will use monopoly profits to innovate more, and that the gains from the resulting innovation might possibly far exceed the losses from short-run consumer injuries. But this argument proves too much and justifies monopoly no matter how created or maintained."²⁶ It also overlooks the likelihood that prudent innovation projects will be able to obtain funding from other sources.

Having a larger share of the market in which an improved product or process would be employed can enable a firm to appropriate more value from an innovation under some circumstances, and a large market share might in those circumstances provide an added incentive for innovation. But monopolies, if protected from competition, are unlikely to be vigorous innovators. Sir John Hicks famously observed that "[the] best of all monopoly profits is a quiet life."²⁷ Andy Grove, former chief executive officer of Intel Corporation, expressed this theme in his book *Only the Paranoid Survive*,²⁸ as did former Apple CEO Steve Jobs, who rhetorically asked "[W]hat's the point of focusing on making the product even better when the only company you can take business from is yourself?"²⁹ When innovators can profit from their inventions because the inventions are protected by intellectual property rights or the in-

²⁵ See, e.g., Justin Fox, *The Fall, Rise and Fall of Creative Destruction*, BLOOMBERG (Sept. 26, 2017), www.bloomberg.com/opinion/articles/2017-09-26/the-fall-rise-and-fall-of-creative-destruction.

²⁶ Herbert Hovenkamp, *Schumpeterian Competition and Antitrust*, 4 COMPETITION POL'Y INT'L, 273, 277 (2008).

²⁷ J.R. Hicks, *Annual Survey of Economic Theory: The Theory of Monopoly*, 3 ECONOMETRICA 1, 8 (1935).

²⁸ ANDREW S. GROVE, *ONLY THE PARANOID SURVIVE: HOW TO EXPLOIT THE CRISIS POINTS THAT CHALLENGE EVERY COMPANY* (1996).

²⁹ *Voices of Innovation: Steve Jobs*, BLOOMBERG BUSINESSWEEK (Oct. 11, 2004).

novators have other means to appropriate value, competition is more likely than a protected monopoly to drive organizations to be innovative.³⁰

Third, there is evidence from both economic theory and empirical studies that dominant firms can have the ability and incentive to suppress innovation. As Herbert Hovenkamp explains:

[T]here are good reasons for believing that market-dominating firms or joint ventures with a significant investment in their technology are more likely to use exclusionary practices to restrain the innovations of rivals or potential rivals than to develop or promote their own innovations. For the most part, the technology and markets of dominant firms are well established and they tend to profit from stable growth. By contrast, the small firm seeking entry must shake up the pot.³¹

The welfare costs of suppressing innovation can be substantial. “An important corollary of the premise that innovation contributes much more to economic growth than does price competition and short run efficiency is that a *restraint* on innovation can do much more harm.”³² Yet innovation and other non-price issues have received much less attention in antitrust cases than price effects, and tools used to analyze price effects are often not well suited to the analysis of non-price matters. Our purpose in this article is to describe the challenges in evaluating anticompetitive conduct that affects quality or innovation and to consider how Section 2 law should deal with issues regarding quality and innovation.

Part II of this article describes generally how courts have addressed the offense of monopolization under the Sherman Act. Part III identifies conditions under which innovation is relevant to antitrust liability for monopolization. Allegations of harm to innovation are not necessary to establish Section 2 liability if a plaintiff can demonstrate that the defendant has increased or maintained market power over price in a product market by anticompetitive means. Nonetheless, innovation can be relevant even in those instances to support an allegation that conduct has violated the antitrust laws or as an affirmative defense. And innovation can be central to Section 2 liability if allegedly anticompetitive conduct does not and is not likely to affect price or cannot be analyzed with respect to its effect on quality-adjusted prices.

Part IV briefly reviews what economics teaches us about the effects of monopoly on innovation. We distinguish between coincident and non-coincident innovation. Coincident innovation refers to innovations that are likely to be

³⁰ See, e.g., Katz & Shelanski, *supra* note 24; RICHARD GILBERT, INNOVATION MATTERS: COMPETITION POLICY FOR THE HIGH-TECHNOLOGY ECONOMY (2020) [hereinafter GILBERT, INNOVATION MATTERS].

³¹ Hovenkamp, *supra* note 26, at 277.

³² *Id.* at 279.

commercialized in a product market in which the potential innovator or its customer or licensee for the innovation has profits at risk from the innovation. Market power in a coincident product market can deter investment in coincident market innovation because it implies profits from existing technologies that would be jeopardized by innovation.

The law regarding how innovation might figure into the analysis of an anti-trust allegation is undeveloped, and what little case law exists does not provide a template to evaluate innovation concerns. Part V discusses how courts should address allegations of anticompetitive conduct that suppresses or is likely to suppress innovation and what must be proven to establish a violation of Section 2 of the Sherman Act or to establish innovation benefits as a defense of otherwise anticompetitive conduct.

II. MONOPOLIZATION UNDER SECTION 2 OF THE SHERMAN ACT

The general definition of monopolization set forth by the Supreme Court in *United States v. Grinnell* applies to all industries:

The offense of monopoly under § 2 of the Sherman Act has two elements: (1) the possession of monopoly power in the relevant market and (2) 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.³³

In contemporary parlance, this has come to mean that unlawful monopolization requires (1) an increase in monopoly power (compared to the but-for world absent the challenged conduct) (2) as a result of anticompetitive conduct.

A. THE MARKET POWER ELEMENT

Market power is the ability profitably to harm consumers or trading partners by, for example, charging supracompetitive prices or suppressing innovation below levels that would be likely in a competitive market. The requisite increase in market power is compared to the but-for world absent the challenged conduct, not to the status quo ante. A monopolization case requires an amount of market power sufficient to be deemed to be monopoly power. The courts often define monopoly power as “the power to control prices or exclude competition.”³⁴ A parallel definition for innovation is the power to control innovation or exclude competition to create or develop new or improved products or methods of production. The offense of monopoly maintenance is

³³ *United States v. Grinnell Corp.*, 384 U.S. 563, 570–71 (1966).

³⁴ *United States v. E.I. du Pont de Nemours & Co.*, 351 U.S. 377, 391 (1956).

about preserving monopoly power and thus increasing it compared to the but-for world in which the market power might have been reduced.³⁵

Increased market power is, for antitrust purposes, a material weakening of the competitive constraint imposed by actual or potential rivals. Weakening of other constraints by, for example, avoidance of regulatory or contractual restrictions, is not regarded as increasing market power for antitrust purposes.³⁶ Increased market power for antitrust purposes thus implies harm to the competitive process because it is derived from a weakening of constraints imposed by rivals.

Proof of monopoly power that is increased or maintained by the allegedly anticompetitive conduct is sufficient for the market power, or injury to competition, element of the offense. Actual harm to consumers or other trading partners in the past need not be proven, for two reasons. First, antitrust intervention is often appropriate before a transaction has been consummated or the effects of a course of conduct are able to be observed. In those cases, antitrust intervention must be based on predicted effects. Second, a firm that has the ability profitably to increase prices can be presumed to have the incentive to do so because doing so will increase its profits. Increased market power is thus presumed to harm consumers (or suppliers).³⁷

Whether anticompetitive conduct violates the antitrust laws does not depend upon how consumers might be harmed by the resulting monopoly power. Consumers could be harmed by price increases, output restrictions,

³⁵ We do not specifically address how tools to define relevant markets and estimate market power should be adapted for zero-price markets. That said, concepts such as the Hypothetical Monopolist Test (Horizontal Merger Guidelines, *supra* note 20, § 4.1.1) or critical loss (Horizontal Merger Guidelines, *supra* note 20, § 4.1.3) can be modified to consider how consumers would respond to reductions in quality in zero-price markets. *See, e.g.,* Wu, *supra* note 8, at 797–98. For two-sided platforms that offer zero-price services, this evaluation would have to consider the extent to which the revenue side of the platform disciplines incentives to degrade quality on the “free” side of the market. *See, e.g.,* Ratliff & Rubinfeld, *supra* note 9. These could be incentives to reduce costs in ways that degrade product quality or incentives to reduce quality on the free side of the platform (e.g., by changing privacy policies) in order to generate increased revenues on the other side of the platform (e.g., by using additional data to increase the value of advertising on the platform). These effects can be taken into account without necessarily defining a single market that encompasses both sides of the platform. *See, e.g.,* Katz & Melamed, *supra* note 11. We discuss market definition for R&D in Part V *infra*.

³⁶ *See, e.g.,* Rambus Inc. v. FTC, 522 F.3d 456, 466–68 (D.C. Cir. 2008).

³⁷ *See, e.g.,* Standard Oil Co. v. United States, 337 U.S. 293, 309–10 (1949) (rejecting argument that “inference” of harm must be supported by “evidence as to what would have happened but for” the anticompetitive conduct); Am. Tobacco Co. v. United States, 328 U.S. 781, 810 (1946) (characterizing monopoly power as a “menace . . . regardless of the use made of it”); Fashion Originators’ Guild of Am., Inc. v. FTC, 312 U.S. 457, 467 (1941) (noting that violation of Sherman or Clayton Acts may exist “even though a combination may temporarily or even permanently reduce the price of the articles manufactured or sold”); United States v. Terminal R.R. Ass’n of St. Louis, 224 U.S. 383 (1912) (condemning consolidations that created monopoly power even though the power had not yet been used to foreclose competitors or increase prices).

quality decreases (e.g., adverse changes in product characteristics or privacy policies), or reduced or distorted innovation or other consequences of reduced incentives to compete for customers or suppliers.³⁸ Increased market or monopoly power is presumed to cause some such harm, although the particular form of the harm is likely to differ from case to case.³⁹

There is a parallel for antitrust enforcement between market power over price and market power over innovation, but there is also an important difference. A firm that controls the inputs required to innovate has the ability to suppress innovation and can be said for that reason to have market power over innovation. It is less clear, however, whether such a firm will have an incentive to suppress innovation. We discuss below why this is so and whether, and under what circumstances, harm from suppression of innovation should be presumed if ability to suppress innovation is proven.

While evidence that a firm has exercised market power over price in the past is immaterial, it is not irrelevant. Evidence that a firm has exercised market power to the detriment of consumers or suppliers in the past can help prove that the firm really did have or gain such power. Similarly, evidence that a firm has exercised market power by suppressing innovation in the past is relevant to whether the firm has the ability and incentive to suppress innovation in the future. Also, the absence of such proof for a long period after the alleged gain in market power might call into question whether the firm really does have market power over price or innovation.⁴⁰ However, courts might

³⁸ See, e.g., *United States v. Aluminum Co. of Am.*, 148 F.2d 416, 427 (2d Cir. 1945) (*Alcoa*) (“[I]t is no excuse for ‘monopolizing’ a market that the monopoly has not been used to extract from the consumer more than a ‘fair’ profit. The Act has wider purposes. Indeed, even though we disregarded all but economic considerations, it would by no means follow that such concentration of producing power is to be desired, when it has not been used extortionately. Many people believe that possession of unchallenged economic power deadens initiative, discourages thrift and depresses energy; that immunity from competition is a narcotic, and rivalry is a stimulant, to industrial progress; that the spur of constant stress is necessary to counteract an inevitable disposition to let well enough alone.”).

³⁹ Antitrust plaintiffs are therefore not required to prove the specific way in which the unlawfully obtained market power was used or is likely to be used in order to establish a violation of the antitrust laws, nor are they required to prove the specific way such market power would be used if the defendant succeeded in monopolizing the market in order to establish an unlawful attempt to monopolize in violation of Section 2.

⁴⁰ But it does not compel such a conclusion. The court in the *Microsoft* case rejected Microsoft’s argument that it should find that Microsoft does not have monopoly power because it “does not behave like a monopolist.” *United States v. Microsoft Corp.*, 253 F.3d 34, 56 (D.C. Cir. 2001) (en banc). The court reasoned that, among other things, structural assessments of market power are sufficient to determine whether a firm faces competition and that, in any event, “a price lower than the short-term profit-maximizing price is not inconsistent with possession or improper use of monopoly power.” *Id.* at 57.

appropriately give little credit to past behavior if conditions affecting the exercise of market power have changed.⁴¹

B. THE ANTICOMPETITIVE CONDUCT ELEMENT

Anticompetitive conduct is not rigorously defined by the often imprecise language in the cases. *Grinnell* suggested that it is conduct that increases market power other than by “superior product, business acumen, or historic accident.”⁴² *Alcoa* contrasted it with conduct that reflects “superior skill, foresight and industry.”⁴³ *Microsoft* distinguished it from “competition on the merits because it involves, for example, greater efficiency or enhanced consumer appeal.”⁴⁴

But the meaning of anticompetitive conduct can be inferred from the facts and decisions of the cases.⁴⁵ It means conduct that tends to weaken constraints imposed by rivals and does not itself tend to increase welfare by promoting innovation or otherwise. Conduct that is anticompetitive in this sense—reduced competition with no offsetting benefits—harms the competitive process.⁴⁶

Some anticompetitive conduct does not itself harm trading partners except insofar as it results in increased market power for the defendant that is ultimately used to the detriment of trading partners in one way or another. Mergers, for example, are often found to be anticompetitive, and thus unlawful, even before they have been consummated and on the basis of a prediction that

⁴¹ See *United States v. Gen. Dynamics Corp.*, 415 U.S. 486 (1974) (holding that past market shares are not a good measure of market power if market circumstances have changed); *United States v. Baker Hughes Inc.*, 908 F.2d 981, 985–86 (D.C. Cir. 1990) (noting that past market shares were “volatile” and did not affect pricing or “diminish[] innovation”).

⁴² *United States v. Grinnell Corp.*, 384 U.S. 563, 571 (1996).

⁴³ *Alcoa*, 148 F.2d at 430.

⁴⁴ *Microsoft*, 253 F.3d at 59.

⁴⁵ Most recent Section 2 cases have alleged one or more of the following means by which defendants have attempted to perpetuate or extend their monopoly power: restricting competitors’ access to essential products or services, tying arrangements, exclusive dealing arrangements, or predatory pricing. See, e.g., Thomas A. Piraino, Jr., *Identifying Monopolists’ Illegal Conduct Under the Sherman Act*, 75 N.Y.U. L. REV. 809, 833 (2000). For a more general discussion of conduct that may invoke Section 2 liability, see, for example, Einer Elhauge, *Defining Better Monopolization Standards*, 56 STAN. L. REV. 253 (2003), and A. Douglas Melamed, *Exclusive Dealing Agreements and Other Exclusionary Conduct—Are There Unifying Principles?*, 73 ANTITRUST L.J. 375 (2006).

⁴⁶ Jonathan Baker observes that the types of conduct that generally raise concerns for Section 2 liability are also likely to harm incentives for innovation. See Jonathan B. Baker, *Beyond Schumpeter vs. Arrow: How Antitrust Fosters Innovation*, 74 ANTITRUST L.J. 575 (2007); Jonathan B. Baker, *Exclusion as a Core Competition Concern*, 78 ANTITRUST L.J. 527, 584 (2013) (“[A] focus on ‘dynamic competition’ does not justify exclusionary conduct like monopolization.”). See also Ilya Segal & Michael Whinston, *Antitrust in Innovative Industries*, 97 AM. ECON. REV. 1703 (2007).

they will increase market power and harm trading partners in the future. An obvious example of nonmerger conduct of this type would be predatory pricing that benefits consumers in the short run but might lead in the long run to additional market power and consumer harm.⁴⁷ And some exclusionary conduct takes the form of inducements to customers or suppliers not to deal in whole or in part with competitors; such inducements may benefit the participating customers or suppliers in the short run but might harm those trading partners in the future by increasing the defendant's market power.

III. ARE INNOVATION EFFECTS RELEVANT TO ANTITRUST LIABILITY?

Innovation effects might be relevant to antitrust liability in three ways. First, conduct might violate the antitrust laws if it leads or is likely to lead to both increased prices and reduced innovation. Second, conduct might violate the antitrust laws if it is likely to adversely affect innovation but not price. Third, innovation benefits might be offered as a defense to otherwise unlawful conduct.

A. INNOVATION HARMS WHEN PRICE EFFECTS CAN BE PROVEN OR PRESUMED

The complaints filed against Google and Facebook are not exceptional because they allege harm to innovation. Innovation allegations are common in merger challenges. In the years 2004–2014, more than 80 percent of complaints filed by the DOJ and the FTC that objected to mergers in R&D-intensive industries included allegations of harm to innovation.⁴⁸ Numerous challenges to mergers in the pharmaceutical sector that alleged harm to innovation were resolved with agreements to divest R&D assets or license intellectual property.

Innovation allegations are also no stranger to Section 2 complaints, although complaints that allege monopolization are far fewer in number than complaints that object to mergers or acquisitions under Section 7 of the Clayton Act. In *United States v. Microsoft*, the DOJ alleged that “Microsoft’s conduct adversely affect[ed] innovation . . . by”:⁴⁹

⁴⁷ See, e.g., *Brooke Grp. Ltd. v. Brown & Williamson Tobacco Corp.*, 509 U.S. 209, 224 (1993) (explaining that predatory, below-cost prices benefit consumers in the short run and that consumers are harmed only by subsequent recoupment “in the form of later monopoly profits”); see also *Fashion Originators’ Guild of Am. v. FTC*, 312 U.S. 457, 467 (1941) (violation of Sherman or Clayton Acts may exist “even though a combination may temporarily or even permanently reduce the price of the articles manufactured or sold”).

⁴⁸ See Gilbert & Greene, *supra* note 16.

⁴⁹ Complaint ¶ 37, *United States v. Microsoft Corp.*, No. 98-1232 (D.D.C. May 18, 1998).

- a. impairing the incentive of Microsoft's competitors and potential competitors to undertake research and development, because they know that Microsoft will be able to limit the rewards from any resulting innovation;
- b. impairing the ability of Microsoft's competitors and potential competitors to obtain financing for research and development;
- c. inhibiting Microsoft's competitors that nevertheless succeed in developing promising innovations from effectively marketing their improved products to customers;
- d. reducing the incentive and ability of OEMs to innovate and differentiate their products in ways that would appeal to customers; and
- e. reducing competition and the spur to innovation by Microsoft and others that only competition can provide.⁵⁰

Although antitrust complaints have often included allegations of harm to innovation, those allegations have rarely—if ever—determined antitrust liability. The court of appeals in *United States v. Microsoft* did not directly address the innovation allegations raised in the complaint, and it is doubtful that the outcome of the case would have been different without them. Nearly all of the many merger complaints that allege innovation harms include allegations of non-innovation harm to competition in current or future product markets that, if proven, would be sufficient by themselves to sustain a challenge.⁵¹ In these cases, where adverse price effects can be proved or presumed, the plaintiff's case does not require proof of harm to innovation, and such proof is superfluous.

Harm to innovation is not, however, irrelevant in these cases. Much antitrust law reflects a judgment about the relative importance of avoiding false negatives and false positives. Conduct that threatens both adverse price effects and adverse innovation effects is more costly than conduct that threatens only adverse price effects. That is especially so given that innovation generally contributes far more to economic welfare than avoiding higher prices.⁵² Antitrust law might thus be more concerned about false negatives, and thus more aggressive, where adverse innovation effects are likely.

B. INNOVATION HARMS IN THE ABSENCE OF PRICE EFFECTS

Harm to innovation can be central to the antitrust claim if price effects cannot be proven or predicted. Conduct might suppress innovation that would otherwise have improved product quality or resulted in new products sold in different and perhaps new markets without having a direct impact on price.

⁵⁰ *Id.*

⁵¹ See, e.g., 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 (2001); see also GILBERT, INNOVATION MATTERS, *supra* note 30, ch. 7 (discussing examples).

⁵² See *supra* note 6.

Price and product quality, however, are inextricably connected, so this seemingly simple proposition requires explanation.

A monopolist's conduct might increase prices either directly or indirectly by reducing product quality and thus increasing the quality-adjusted price. In a tangible goods market, reduced product quality might reflect cost savings that are manifested in, for example, smaller-sized candy bars or reduced quality control in manufacturing. For digital platforms, reduced quality might take the form of, for example, more ads per page, ads that are less informative, or privacy policies that are less consumer-friendly.⁵³ A reduction in search quality can cause consumers to search less or substitute other sources of information.

Rivals often compete by offering different price-quality combinations. For example, Honda competes against Toyota's Lexus by offering different combinations of price and quality. If improving product quality entails higher costs, it will often require higher prices, and firms will have to offer higher quality to compete successfully against products with lower prices.

A decrease in quality with no price reduction can be characterized as an increase in the "quality-adjusted price," and an increase in quality with no price increase is a decrease in the quality-adjusted price. When both price and quality are reduced or increased, one cannot determine by looking at either price or quality alone that quality-adjusted prices have changed. Nor can one say in that situation, by looking at either price or quality alone, whether consumers are better off or worse off.

From the perspective of consumers, the effect of an increase in quality is similar to that of a reduction in price—i.e., getting more for the same expenditure or other consideration. However, the effects of competition on the incentive to improve product quality can differ from the effects of competition on the incentive to lower the product's price. Consumers that are most likely to switch suppliers can have different preferences for quality and react differently to relative price and quality differences compared to other consumers. A monopolist chooses a combination of price and quality that maximizes profits from sales to all its customers, but the monopolist can be vulnerable to competition from rivals that attract its marginal customers by offering lower quality and lower prices. The effect of the entry of budget airlines on the quality of coach services is a familiar example that suggests that competition can lead to lower quality; the opposite also can occur.⁵⁴

⁵³ See, e.g., Maurice E. Stucke & Ariel Ezrachi, *When Competition Fails to Optimize Quality: A Look at Search Engines*, 18 YALE J.L. & TECH. 70 (2016).

⁵⁴ See Michael Spence, *Cost Reduction, Competition, and Industry Performance*, 52 ECONOMETRICA 101 (1984).

An improvement in the quality of a product can result from a choice, such as the ingredients in a candy bar, or an innovation that requires investment in R&D. Incentives for costly innovation depend on industry and technological characteristics in addition to factors that affect incentives to choose product quality. We describe these determinants of R&D incentives in Part IV below.

Both the incentive to compete on product quality and the incentive to innovate are relevant to our hypothetical cases. As to the first, the incentive to compete on product quality, consider the display of advertisements by a supplier of search or social networking services. A quality dimension is the amount and utility of advertising displayed by the services. Although the interaction between rivalry and consumer preferences for quality generally can have different effects, the outcome is unambiguous in our hypotheticals if users prefer to view more informative or consumer-friendly unsponsored search results or content. Because the services are provided at a zero price, there is no trade-off between price and quality. Rivals can compete for switchable consumers by offering higher quality displays, and they have an incentive to do so because information and attention supplied by consumers attract revenues from advertisers that seek the business of consumers. Monopoly power in search or social network services reduces the competitive incentive to offer higher quality services and can thus be expected to result in a reduction in quality and therefore an increase in the quality-adjusted price.

There is a close correspondence between our analysis of the effects of competition on the quality of zero-price services and approaches that emphasize competition for consumer attention. Tim Wu, for example, explains that “attention brokers” (which include Facebook and Google) balance the supply of free content to attract the attention of consumers against the space allocated for revenue-generating advertisements, and competition affects a broker’s profit-maximizing mix of content and advertising.⁵⁵ Although a focus on attention is insightful for the analysis of competitive effects in some zero-price markets, we show that similar results not limited to “attention brokers” can be obtained by following a more traditional approach that relies on the determinants of non-price competition.

For the second category, the incentive to innovate, let’s add to the hypothetical cases the allegation that anticompetitive conduct enabled our hypothetical defendant to maintain a dominant position in search without engaging in R&D efforts that would otherwise have been required to update its search algorithms and displays or enabled our hypothetical defendant to dominate social networking without making otherwise necessary investments in improving the display and interactive use of video content. And let’s add the assumption that

⁵⁵ Wu, *supra* note 8, at 789–93.

quality-adjusted price effects (such as the volume of informative advertisements) as a result of the anticompetitive conduct cannot be proved or presumed without consideration of possible innovation in the future.

Absence of quality-adjusted price effects from challenged conduct might be a consequence of regulation or contractual commitments that fix quality levels. For example, our hypothetical defendants might have agreements with advertisers about the number of ads that are displayed on a search engine results page or the home page of a social network. Alternatively, a case might involve a software product that is licensed at a zero price and cannot be improved without a large R&D expenditure.

The hypothetical cases now raise the question how innovation effects might affect the antitrust analysis in the absence of quality-adjusted price effects. As with the assessment of quality-adjusted price effects, innovation harms can be expected only where a firm or firms acting in concert have both the ability and the incentive to suppress innovation. The ability to suppress innovation requires monopoly power over the relevant R&D assets for new or improved services. By contrast to price effects, however, where firms with the ability to increase price can be presumed to have the incentive to do so, firms with the ability to suppress innovation might not have the incentive to do so. We discuss issues regarding incentives to suppress innovation in Part IV below.

C. FUTURE INNOVATION BENEFITS AS AN AFFIRMATIVE DEFENSE

In our hypothetical Section 2 cases, it is difficult to see how courts can reach a decision that protects consumers without paying attention to alleged innovation benefits as well as harms from challenged conduct, and a similar conclusion might apply to actual cases such as *United States v. Google* and *FTC v. Facebook*. Innovation effects can be an affirmative defense in a case involving monopolization of a product market.⁵⁶ A defendant might argue that its otherwise unlawful conduct increases innovation incentives by enabling the firm to appropriate greater value from its R&D efforts that are not likely to

⁵⁶ The court in the seminal *Microsoft* case explained that otherwise anticompetitive conduct does not violate Section 2 if it is shown to be “a form of competition on the merits because it involves, for example, greater efficiency or enhanced consumer appeal.” *United States v. Microsoft Corp.*, 253 F.3d 34, 59 (D.C. Cir. 2001) (en banc). “[C]ompetition on the merits” would thus seem clearly to encompass investments in innovation that are likely to increase efficiency or the attractiveness of products to consumers. *Id.* at 65. The court in that case, mindful that overriding product design decisions could “deter . . . innovation,” held that one of the three innovative product design features at issue was not anticompetitive, even though it tended to exclude rivals, because it was added for “valid technical reasons.” *Id.* at 65–67.

The 2010 Merger Guidelines are even more explicit. They make clear that an otherwise anticompetitive merger might be justified if shown to increase the ability of the merging parties to conduct R&D or to appropriate the benefits of their innovations. Horizontal Merger Guidelines, *supra* note 20, § 10.

be protected effectively by intellectual property laws. For example, the defendant might argue that, absent exclusive dealing with distributors or input suppliers, its rivals might more easily copy its intellectual property.⁵⁷

The defendant might also argue that its conduct increased its ability to innovate without adversely affecting its incentive to do so. It might, for example, argue that exclusive dealing arrangements facilitate R&D collaboration and thus make innovation more likely or that the challenged conduct promoted innovation by enabling or facilitating the combination of complementary assets.⁵⁸ Thus, Facebook might argue in the FTC litigation that its acquisition of Instagram increased the likelihood of innovation by combining its scale with Instagram's know-how and personnel.

The likelihood and magnitude of the increased innovation would have to be greater when used to offset evidence of actual or likely harm to quality-adjusted prices than when used only to rebut a presumption of reduced innovation. It would suffice in the latter case to show that the allegedly unlawful conduct was not likely on balance to reduce innovation, but that showing alone would not suffice to justify conduct that increased or was likely to increase quality-adjusted prices.

IV. WHAT ECONOMICS TEACHES US ABOUT THE RELATIONSHIP BETWEEN COMPETITION AND INNOVATION

Antitrust enforcement has been grounded on the rebuttable notion that a significant increase in market concentration has a predictable consequence for higher quality-adjusted prices. The theory is that an increase in market concentration tends to make the demand for a firm's product less elastic, which in most situations creates an incentive for the firm to charge a higher price or supply a lower quality without a compensating reduction in price.⁵⁹ This the-

⁵⁷ Otherwise anticompetitive exclusive dealing and similar restrictions have been found not to violate the antitrust laws on the ground that they increase incentives for investment in productive activity. *See, e.g.,* *Thompson Everett, Inc. v. Nat'l Cable Advert., L.P.*, 57 F.3d 1317, 1395 (4th Cir. 1995) (affirming summary judgment for defendant in part on the ground that the exclusive contracts were necessary to protect investments in improved services).

⁵⁸ *See, e.g.,* David J. Teece, *Profiting from Innovation in the Digital Economy: Enabling Technologies, Standards, and Licensing Models in the Wireless World*, 47 *RSCH. POL'Y* 1367 (2018).

⁵⁹ Market concentration does not affect equilibrium prices if two or more suppliers compete in price and sell identical products with constant marginal costs. *See* Joseph Bertrand, *Review of Walras's Theorie Mathematique de la Richesse Sociale and Cournot's Recherches sur les Principes Mathematiques de la Theorie des Richesses*, 67 *J. DES SAVANTS* 499 (1883). Many market equilibria are possible if firms interact repeatedly and develop reputations for aggressive or coordinated behavior. *See, e.g.,* Drew Fudenberg & Jean Tirole, *Noncooperative Game Theory for Industrial Organization: An Introduction and Overview*, in 1 *HANDBOOK OF INDUSTRIAL ORGANIZATION* 259 (Richard Schmalensee & Robert Willig eds., 1989). And, as noted in Part III, competition can lead to lower quality in some circumstances.

ory applies even if the harm is manifest in a market with a zero price; a degradation of quality is equivalent to an increase in the quality-adjusted price, even if the nominal price is zero.

Competition from actual or potential rivals can be a powerful incentive for innovation to develop new or improved products or to reduce costs, just as competition can spur price reductions or quality improvements. But the correspondence between the number and size of potential innovators for a new or improved product and the realized pace or level of innovation is less clear than the correspondence between competition and price. A long history of economic theory and empirical evidence shows that the relationship between the number or size of potential innovators and innovation depends on a number of factors, including the ability of successful innovators to appropriate value from their discoveries,⁶⁰ the extent to which an innovation replaces profits earned by the innovator,⁶¹ dynamic considerations such as the ability and incentive of a firm to maintain a technological advantage over rivals,⁶² and incentives for a firm to innovate to convince its customers to upgrade to an improved product.⁶³

A. APPROPRIATION

Innovation incentives depend in part on the ability of firms to appropriate value from their R&D expenditures. If two firms compete and each can copy a discovery made by its rival at a small fraction of the cost of the R&D required to make the discovery in the first place, then each can reason that it is more profitable to copy its successful rival than to undertake costly investment in R&D.⁶⁴ By contrast, imitation is less of a concern for a monopolist whose market power is protected by entry barriers. More generally, a reduction in the

⁶⁰ Joseph Schumpeter's writings identify the importance of appropriability as a determinant of incentives for investment in R&D. See SCHUMPETER 1942, *supra* note 21; see also Wesley M. Cohen & Richard C. Levin, *Empirical Studies of Innovation and Market Structure*, in 2 HANDBOOK OF INDUSTRIAL ORGANIZATION 1059 (Richard Schmalensee & Robert Willig eds., 1989).

⁶¹ For a theoretical description of this replacement effect, see 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 (Richard R. Nelson ed., 1962). For empirical evidence of the replacement effect, see, for example, Mitsuru Igami, *Estimating the Innovator's Dilemma: Structural Analysis of Creative Destruction in the Hard Disk Drive Industry, 1981–1998*, 125 J. POL. ECON. 798 (2017).

⁶² See, e.g., Drew Fudenberg et al., *Preemption, Leapfrogging and Competition in Patent Races*, 22 EUR. ECON. REV. 3 (1983); Ulrich Doraszelski, *An R&D Race with Knowledge Accumulation*, 34 RAND J. ECON. 20 (2003); Philippe Aghion et al., *Competition, Imitation and Growth with Step-by-Step Innovation*, 68 REV. ECON. STUD. 467 (2001); GILBERT, INNOVATION MATTERS, *supra* note 30, ch. 4.

⁶³ See, e.g., Ronald L. Goettler & Brett R. Gordon, *Does AMD Spur Intel to Innovate More?*, 119 J. POL. ECON. 1141 (2011).

⁶⁴ The risk of imitation does not necessarily deter R&D rivalry. See the discussion of R&D investment following compulsory licensing orders on pages 31–32, *infra*.

number of firms that can invest in R&D does not necessarily imply a reduction in incentives to innovate because, with fewer rivals, there is a correspondingly lower risk of imitation.⁶⁵

There are, however, many ways for firms, including firms in the high-technology economy, to appropriate value from innovations that do not depend on market shares. Intellectual property rights protect many inventions from imitation (although not from non-infringing substitutes), and innovators can benefit from first-mover advantages and secrecy. In some industries, high entry barriers, network effects, and complementary assets such as distribution systems enable firms to capture value from their innovations by limiting the ability of actual or potential rivals to compete profitably.

B. REPLACEMENT EFFECTS

R&D might lead to increased revenues for firms if it results in new or improved products. But firms might be reluctant to invest in R&D if they fear that those products will cannibalize profits that they would otherwise earn in the absence of innovation. This is the “replacement effect” identified by Kenneth Arrow.⁶⁶ All other things equal, for products sold at positive prices this replacement effect is likely to be greatest for firms with the largest market shares, and thus the most profits to lose. In a two-sided platform, the replacement effect is relevant for products supplied at a zero price if innovation would replace profits earned on the revenue side of the platform. The operator of a search platform, for example, would be reluctant to develop an innovative feature that enhanced the user experience by enabling the user to bypass ads or to obtain advertiser-supported content from a different source.

To explore the implications of this replacement effect, it is useful to partition cases that allege suppression of innovation into two categories: coincident and non-coincident market innovation. Coincident innovation is a product improvement or cost reduction for which there is a replacement effect: the innovation cannibalizes existing profits that would have been earned in its absence. The existing profits that are relevant to the replacement effect are earned by the innovator or by a firm in a downstream market that licenses or purchases an innovation from an upstream innovator.⁶⁷ A firm that has market power in the product market in which an innovation is employed can be ex-

⁶⁵ For a discussion of the implications of appropriation and imitation for R&D incentives see, for example, Michael L. Katz & Carl Shapiro, *R&D Rivalry with Licensing or Imitation*, 77 AM. ECON. REV. 402 (1987), and Richard Gilbert, *Competition, Mergers, and R&D Diversity*, 54 REV. INDUS. ORG. 465 (2019).

⁶⁶ See Arrow, *supra* note 61.

⁶⁷ For simplicity, we generally refer to the common situation in which the innovating firm and the firm with market power in the product market are the same, but our analysis is not limited to that situation.

pected to have or anticipate profits that would be subject to a replacement effect, and in this article we generally assume that profits at risk from innovation are a consequence of a defendant's market power.⁶⁸ The replacement effect is absent for non-coincident innovation. Non-coincident innovations might eliminate existing profits, but they are not profits earned by the innovator or by a licensee or customer of an upstream innovator.

C. COINCIDENT MARKET INNOVATION

Economic theory teaches that a firm's profits from existing products or processes suppress a firm's incentives to invest in new products or processes that would cannibalize its existing profits.⁶⁹ These profits are at risk from coincident market innovation, and concerns about reducing these profits would reduce the firm's incentive both to innovate itself and to implement innovations purchased or licensed from others. Consequently, concerns about the exercise of monopoly power in a product market are likely to complement concerns about the suppression of innovation that is coincident with the product market.

The replacement effect is relevant to both coincident innovations that are incremental and those that are drastic. Incremental innovations are improvements that divert sales from existing products or reduce the use of existing processes, but they do not make existing products or processes obsolete. Drastic innovations supplant existing products or processes and are examples of the "gale of creative destruction" described by Joseph Schumpeter.⁷⁰ Both incremental and drastic innovations have replacement effects if they reduce sales of existing products or the use of existing processes.

The monopolist also has incentives that in some circumstances will counteract the replacement effect. One such incentive reflects the fact that, although a monopolist's existing profits dull its incentives to invest in an innovation that would replace those profits, a monopolist can have a special incentive to innovate if, by doing so, it can protect its monopoly. The economics literature uses the term "preemptive innovation" to denote investment in R&D, including acquisition of innovation inputs like intellectual property, for

⁶⁸ While we think this assumption is a reasonable shorthand, market power is neither necessary nor sufficient for a replacement effect. Profits can exist without market power if they are rents or quasi-rents from factors of production that are in limited supply. *See* ALFRED MARSHALL, *PRINCIPLES OF ECONOMICS: AN INTRODUCTORY VOLUME* (8th ed. 1920). Firms that compete with differentiated products can have market power without earning supra-normal profits that would be cannibalized by an innovation. *See* EDWARD HASTINGS CHAMBERLIN, *THE THEORY OF MONOPOLISTIC COMPETITION* (8th ed. 1933).

⁶⁹ Those profits also suppress the incentive to innovate of upstream firms that anticipate selling or licensing their innovations to a firm with market power in the coincident product market.

⁷⁰ *See* SCHUMPETER 1942, *supra* note 21.

this purpose.⁷¹ In keeping with the focus of this article, we use the term “monopoly preemption” to describe such conduct.

Monopoly preemption might occur if, for example, the monopolist is able to create, or induce others to create and transfer to it, an invention that because of patent protection or otherwise cannot be emulated by rivals and that would largely insulate the monopolist from competition. The incentives for monopoly preemption can increase likely innovation both directly, by increasing the monopolist’s R&D effort, and indirectly, if it entails acquiring the intellectual property or other fruits of R&D efforts by other firms. The prospect of such acquisitions can incentivize potential licensors to invest in R&D.

While monopoly preemption that promotes innovation is a theoretical possibility, it is likely only in very special circumstances. The monopolist must face a realistic threat of increased or new competition, and it must be able to extinguish or significantly reduce that threat by a new innovation that increases product quality or reduces the monopolist’s costs. And even when those conditions exist, the monopolist’s incentive to invest in preemptive innovation might be modest because the uncertain link between R&D effort and successful innovation makes it difficult for the monopolist to be confident that an aggressive R&D strategy would enable it to preempt rivals.⁷²

While the incentive to preserve monopoly profits can induce increased innovation, it can also induce exclusionary conduct.⁷³ In this context, exclusionary conduct might take the form of out-bidding rivals for an exclusive license to needed innovation inputs or even excessive, predatory investment in R&D activities.⁷⁴ For example, pharmaceutical companies that dominate a therapeutic category can have a special incentive to outbid rivals to license new drugs that might threaten their dominance. This special incentive provides an indirect spur for innovation of new drugs, and it can give the monopolist assets that promote its own innovation efforts. But, post-acquisition, when the competitive threat is extinguished, the replacement effect can suppress the licensee’s incentive to develop the acquired drug.⁷⁵

⁷¹ See Richard J. Gilbert & David M.G. Newbery, *Preemptive Patenting and the Persistence of Monopoly*, 72 AM. ECON. REV. 514 (1982).

⁷² See Jennifer F. Reinganum, *Uncertain Innovation and the Persistence of Monopoly*, 73 AM. ECON. REV. 741 (1983).

⁷³ See, e.g., Stephen C. Salop, *The Raising Rivals’ Cost Foreclosure Paradigm, Conditional Pricing Practices, and the Flawed Incremental Price-Cost Test*, 81 ANTITRUST L.J. 371, 408 (2017) (maintaining market power is more valuable than maintaining or achieving viability in a competitive market).

⁷⁴ Product design changes that excluded rivals and were not necessary to achieve efficiency benefits have been found to violate Section 2. See, e.g., *United States v. Microsoft Corp.*, 253 F.3d 34, 66–67 (D.C. Cir. 2001) (en banc).

⁷⁵ Colleen Cunningham, Florian Ederer & Song Ma, *Killer Acquisitions*, 129 J. POL. ECON. 649 (2021). In some cases, acquisitions of new drugs or other innovation inputs might be in-

Monopoly preemption gives the monopolist (or a potential licensor to it) no special incentive to innovate if innovation is drastic and both the monopolist and a potential competitor can appropriate the same value from the innovation. Indeed, unless the monopolist can successfully innovate to prevent competition, the net payoff from drastic innovation, and hence the incentive to invest in coincident innovation, is lower for a monopolist because the innovation will replace larger preexisting profits for the monopolist than for a small or new competitor. Even a monopolist, however, will have an incentive to invest in drastic innovations if the replacement effect is more than offset by the prospect of even larger profits from the new products or if the monopolist fears that, if it does not innovate, someone else will.

Several factors might counteract the replacement effect. Firms have incentives to innovate to grow their markets,⁷⁶ win sales from their rivals,⁷⁷ and, for a monopolist, maintain monopoly power.⁷⁸ Also, if a firm sells a durable good, it will have an incentive to invest in R&D to encourage customers to upgrade their purchases. A firm that sells a durable good is in competition with its own past sales and past sales by its rivals, because remaining with a prior purchase is a competitive alternative to a repeat purchase.⁷⁹ Innovation allows the firm to offer a more compelling reason for consumers to upgrade. Monopoly power can increase the incentive for a firm to upgrade its product by allowing the firm to extract greater profit from upgrades because it can charge higher prices for the upgrades than if it faced more intense competition. The importance of the monopoly power incentive for innovation depends on many factors, including technological opportunities, consumer preferences, the size of the installed base, information spillovers, the rate at which new consumers and new suppliers enter the market, the extent to which firms and consumers are forward-looking, and the rate at which older goods depreciate.⁸⁰

Although monopoly power can incentivize coincident market innovation under some circumstances, innovation incentives are generally limited by the firm's desire to protect the profits that it earns from its existing products.

tended from the outset, not to assist the acquirer's own innovation, but only to deprive actual or potential competitors (including the seller of the inputs) of access to those inputs. Those acquisitions are anticompetitive because they are likely both to suppress innovation and to perpetuate monopoly.

⁷⁶ See, e.g., F.M. Scherer, *Corporate Inventive Output, Profits, and Growth*, 73 J. POL. ECON. 290, 290 (1965) ("Successful invention and innovation can increase profits . . . by widening the profit margin earned on a dollar of sales (or . . . invested capital) and by opening up new opportunities for profitable sales growth.").

⁷⁷ See references cited *infra* note 91.

⁷⁸ See Gilbert & Newbery, *supra* note 71.

⁷⁹ See R.H. Coase, *Durability and Monopoly*, 15 J.L. & ECON. 143 (1972).

⁸⁰ See Goettler & Gordon, *supra* note 63.

Overall, both theory and evidence support the conclusion that monopoly profits typically dull incentives for coincident market innovation compared to firms that operate in more competitive markets, unless the latter are unable to appropriate significant value from their R&D expenditures. Moreover, when monopoly power heightens incentives to innovate, either to preempt rivals or to enable higher profits from sales of upgrades for a durable good, it is accompanied by harm from higher quality-adjusted prices as a result of the monopoly power and, possibly, by exclusion of competitors and innovation by them.

An important feature of coincident market innovation is that the ability and incentive to innovate depend on market power both in R&D and in the product market. A firm that has a monopoly over assets necessary to invest successfully in R&D for a product or production process has the *ability* to suppress innovation for the relevant product or process. A firm that has existing profits resulting from market power in the product market in which the innovation will be employed that are at risk from the innovation has a reduced *incentive* to invest in R&D because of the replacement effect—provided, however, that the conditions necessary for monopoly preemption are not present. For markets in which monopoly preemption is not likely, we can draw three conclusions:

- (1) Conduct that enables a firm to acquire or maintain monopoly power in the product market is likely to harm coincident market innovation if the firm already has monopoly power in R&D because that conduct will reduce the firm's incentive to innovate.
- (2) Harm to innovation is less likely if the firm does not also have or obtain monopoly power over the relevant R&D assets because, absent such power, other firms will have the ability to innovate, and they might have the incentive to do so if they anticipate selling their innovations or licensing their innovations to competitors or potential new entrants in the relevant product market. This competitive response is most likely if the innovation is drastic because competition with the incumbent is less likely to affect a competitor's incentive to invest in or license a drastic innovation.
- (3) Conduct that enables a firm to acquire or maintain monopoly power in R&D is likely to harm coincident market innovation if that conduct does not also reduce that firm's market power in the product market or increase its ability to appropriate value from its innovation and therefore increase the firm's incentive to innovate. By enabling the firm to acquire or maintain monopoly power in R&D, the conduct will both increase the firm's ability to suppress innovation and reduce the likelihood that others will innovate.

Coincident market innovation can sometimes simplify the task of identifying likely innovators because it is often the case that the firms included in the relevant product market are also the firms that are the most likely innovators. Suppose the allegation is that a dominant supplier of passenger jet engines has engaged in exclusionary conduct in violation of Section 2. The firms that are likely to make improvements in passenger jet engines (which is coincident market innovation) include and might be limited to the firms that currently manufacture these engines, unless the improvements are in components or materials that are sourced from a different industry.

However, innovation can come from unexpected sources, including from firms that do not currently participate in the relevant product market. Drastic innovations are especially likely to come from unexpected sources. The innovators that disrupted the market for plain paper copiers that Xerox once dominated were not the same firms that had competed head-to-head with Xerox. They were manufacturers of light-duty machines, which they upgraded to meet the requirements of a commercial office copier. Many of the innovators that disrupted the market for instant photography were suppliers of digital cameras that did not previously compete with earlier leaders like Kodak and Polaroid in instant photography.⁸¹ Apple, which disrupted the market for mobile phones and pocket cameras, had not previously been a manufacturer of mobile phones or cameras.⁸²

As these examples illustrate, the number of potential innovators often will exceed the number of firms that participate in the product market. And, importantly, the replacement effect does not directly apply to potential innovators that do not presently operate in the product market in which the potential future innovation will be commercialized. These potential innovators do not have profits that are at risk from innovation and therefore are not directly deterred by a replacement effect. As noted above, however, they might be indirectly deterred by such an effect to the extent that their investment in innovation is based on an expectation of selling or licensing the innovation to firms that already operate in that product market and whose demand for their innovations would be diminished by a replacement effect.⁸³

⁸¹ One notable exception is Fujifilm, which marketed an instant camera and film, mostly in Japan in the 1980s. Fujifilm, *Birth of "Photorama"—Development of Fuji Instant Photo System*, web.archive.org/web/20070630032021/http://www.fujifilm.co.jp/history/dai5-02.html (archived June 30, 2007) (translated from Japanese).

⁸² Apple tried to market an actual digital camera, the QuickTake, in 1994, and ironically it was manufactured by Kodak. Richard Trenholm, *History of Digital Cameras: From '70s Prototypes to iPhone and Galaxy's Everyday Wonders*, CNET (May 31, 2021), www.cnet.com/tech/computing/history-of-digital-cameras-from-70s-prototypes-to-iphone-and-galaxys-everyday-wonders/.

⁸³ The replacement effect might be ameliorated to the extent that firms not presently in the relevant product market would be able successfully to enter and exploit new technology in the market. That possibility would both create additional potential licensees for the new technology

Sometimes a firm that participates in the product market in which an innovation might be employed is not a likely innovator. For example, the FTC declined to oppose the acquisition of McDonnell Douglas by Boeing because it concluded that McDonnell Douglas was no longer a competitive constraint for future large commercial aircraft.⁸⁴ In that case, the current participants in the product market overstated the competition to develop the next generation of the product.

Product market monopolists might engage in anticompetitive conduct in order to prevent or forestall both incremental and drastic innovation by actual or potential competitors. Consistent with Schumpeter's gales of creative destruction, dominant firms are more likely to be vulnerable to drastic rather than incremental innovation. Drastic innovations are in general more likely from new entrants that do not have profits at risk from innovation. Dominant firms often tend to focus on coincident innovation for incremental improvements to their existing products and tend to underestimate the potential for new, disruptive technologies.⁸⁵ And disruptive technologies often require technical or organizational capabilities that dominant firms do not possess.⁸⁶

Because incremental innovations are improvements to existing products or processes, while drastic innovations can emerge from unexpected directions, it is often easier for monopolies to identify likely sources of threatening incremental innovation than sources of drastic innovations. Anticompetitive conduct aimed at identified competitive threats is therefore more likely as a general matter to suppress incremental innovation than drastic innovation. Nonetheless, conduct by a monopolist that raises entry barriers, such as the conduct at issue in *United States v. Microsoft*, is likely also to suppress drastic

and provide a competitive incentive for firms already in the market to obtain a license to the new technology notwithstanding the threatened loss of profits from their existing products. This amelioration effect is likely to be less important if the firm that has market power in the relevant product market has monopoly power over R&D assets and is for strategic or other reasons unwilling to license its innovations to new entrants in the product market.

⁸⁴ "[O]ur decision not to challenge the proposed merger was a result of evidence that (1) McDonnell Douglas, looking to the future, no longer constitutes a meaningful competitive force in the commercial aircraft market and (2) there is no economically plausible strategy that McDonnell Douglas could follow, either as a stand-alone concern or as part of another concern, that would change that grim prospect." Statement of Chairman Robert Pitofsky and Commissioners Janet D. Steiger, Roscoe B. Starek III and Christine A. Varney in the Matter of The Boeing Company/McDonnell Douglas Corporation (July 1, 1997), www.ftc.gov/public-statements/1997/07/statement-chairman-robert-pitofsky-commissioners-janet-d-steiger-roscoe-b.

⁸⁵ See CLAYTON M. CHRISTENSEN, *THE INNOVATOR'S DILEMMA: WHEN NEW TECHNOLOGIES CAUSE GREAT FIRMS TO FAIL* (1997). Furthermore, monopoly power does not provide dominant firms with greater incentives than smaller rivals for drastic innovations. See Gilbert & Newbery, *supra* note 71.

⁸⁶ See, e.g., Rebecca M. Henderson & Kim B. Clark, *Architectural Innovation: The Reconfiguration of Existing Product Technologies and the Failure of Established Firms*, 35 ADMIN. SCI. Q. 9 (1990).

innovation from unidentified sources as well as targeted incremental innovation. Of course, firms with market power do not always suppress innovation or focus on incremental improvements at the expense of drastic innovation. Apple is known for pursuing major innovations even if they do not address consumer desires for modest improvements. Steve Jobs reportedly said, “If you don’t cannibalize yourself, someone else will.”⁸⁷ This attitude is not the mindset of a firm that thinks of itself as insulated from competition.

D. NON-COINCIDENT MARKET INNOVATION

Non-coincident innovation does not jeopardize existing profits earned by an innovator or by a firm that licenses or purchases an innovation; the innovation occurs in a market different from the market in which the defendant is a monopolist. For example, if a dominant jet engine manufacturer is a fledgling supplier of avionics, its efforts to innovate for the avionics market would be non-coincident innovation in the market for jet engines, and its incentives to invest in such innovation would not be diminished by the replacement effect because, by assumption, it has no profits at risk in avionics. Non-coincident market innovation also includes innovation by technology firms that license or sell their technologies to others if neither the suppliers of the new technologies nor their licensees or buyers have existing profits that are at risk from the innovation.

A monopolist might, however, have an incentive to suppress innovation by others in such non-coincident markets. For example, the jet engine manufacturer might condition engine sales to airframe manufacturers on agreements to use its avionics package. The agreement excludes rival suppliers of avionics and is likely to suppress innovation for these products. Other examples of efforts to suppress non-coincident market innovation by other firms include the alleged refusals by IBM to provide adequate information for manufacturers of peripheral devices to interoperate with IBM’s mainframe computers.⁸⁸ The alleged suppression of innovation in these cases would have occurred in the markets for the peripheral devices rather than in the market for mainframe computers. The refusal might have been intended to further IBM’s sales of peripheral devices or, by reducing the availability of complements provided by other firms, to reduce the likelihood of new entry into the mainframe market.

Non-coincident market innovation is less affected by the structure of the relevant product market than coincident market innovation. This is so for two reasons. First, the structure of the product market is less likely to help identify

⁸⁷ WALTER ISAACSON, *STEVE JOBS: THE EXCLUSIVE BIOGRAPHY* 408 (2011) (quoting Steve Jobs).

⁸⁸ *See, e.g.*, cases cited *infra* note 115.

the likely sources of innovation for products or processes that are sold or used in a different market for which the innovator does not have profits at risk from the innovation. Second, the replacement effect is absent for non-coincident market innovation because the defendant whose conduct is at issue in the anti-trust case does not have market power in the product market in which the innovation might be employed and thus does not have an incentive to suppress innovation because of the replacement effect.

For both of these reasons, analysis of the ability and incentive to suppress non-coincident market innovation is likely to be more difficult than the corresponding analysis for coincident market innovation. Because the structure of the product market is not likely to be as relevant to identifying the likely sources of innovation, it might be difficult to assess the ability of an alleged monopolist to suppress non-coincident innovation. And it is sometimes more difficult to assess the defendant's incentive to suppress non-coincident innovation in the absence of a replacement effect.

Notwithstanding these limitations, conduct that enables a firm to gain or maintain monopoly power over the relevant R&D assets, and thus its ability to suppress innovation, will tend to reduce innovation unless that conduct also increases the defendant's incentive to innovate. Conduct might increase a defendant's incentive to innovate if it increases its ability to appropriate the benefits of innovation.

E. INNOVATION EFFECTS OF MARKET POWER ARE FACT-DEPENDENT

Market power in a product market and in R&D can have varying effects on innovation incentives. An increase in product market power can suppress the incentive to invest in coincident innovation through the replacement effect, but product market power also can promote innovation by facilitating appropriation. Similarly, an increase in R&D rivalry can increase or decrease total industry R&D investment, with the latter effect also resulting from a decrease in appropriation. Several studies show that increases in product market competition or R&D rivalry display an "inverted-U" relationship with total industry innovation under some circumstances, with innovation peaking at a moderate level of competition or R&D rivalry.⁸⁹

⁸⁹ See Philippe Aghion et al., *Competition and Innovation: An Inverted-U Relationship*, 120 Q.J. ECON. 701 (2005); Philippe Aghion et al., *Competition, Imitation and Growth with Step-by-Step Innovation*, 68 REV. ECON. STUDIES 467 (2001); Philippe Aghion, Christopher Harris & John Vickers, *Competition and Growth with Step-by-Step Innovation: An Example*, 41 EUR. ECON. REV. 771 (1997). These papers analyze the effect of competition in a duopoly. The analysis is extended to an oligopoly in Richard Gilbert, Christian Riis & Erlend S. Riis, *Stepwise Innovation by an Oligopoly*, 61 INT'L J. INDUS. ORG. 413 (2018).

Low levels of rivalry do not promote R&D, and conduct that reduces the number of firms with the ability and incentive to invest in innovation to a low level is likely to suppress innovation. Returning to the avionics example, suppose that the defendant is one of only two firms with the ability and incentive to engage in the relevant R&D. Suppose also that each firm can profitably invest in a project that has a 50-50 probability of success or failure that is independent of the success or failure of its rival's project. When both firms invest, the probability that at least one firm will be successful is three-quarters. If only one firm invests, the probability of success is one-half. Exclusionary conduct that causes a rival to forgo investment in R&D harms consumers and economic welfare by suppressing the probability that society would benefit from innovation, unless that conduct increases the ability or incentive of the defendant to invest in R&D by an amount sufficient to compensate for the reduced investment by the rival.⁹⁰

A reduction in the number of R&D or product market rivals reduces the incentives of the remaining firms to innovate to avoid losing out to a rival. This reduced incentive to invest in (or an incentive to suppress) R&D effort parallels upward pricing pressure from a merger that results when the merging parties have reduced incentives to use lower prices to divert sales from their merger partners.⁹¹ The analogy is imperfect, however, because mergers and

⁹⁰ In the avionics example, the conduct at issue would have to increase the defendant's likelihood of successful innovation to at least 75% in order to offset the loss of the rival's investment in innovation, and even that increase would not offset the lost heterogeneity of innovation programs.

⁹¹ See Joseph Farrell & Carl Shapiro, *Antitrust Evaluation of Horizontal Mergers: An Economic Alternative to Market Definition*, 10 B.E. J. THEORETICAL ECON. 1 (2010). Carl Shapiro extends the diversion theory to the effects of mergers on innovation in Carl Shapiro, *Competition and Innovation: Did Arrow Hit the Bull's Eye?*, in THE RATE AND DIRECTION OF INVENTIVE ACTIVITY REVISITED 361 (Josh Lerner & Scott Stern eds., 2012). See also Giulio Federico, Fiona Scott Morton & Carl Shapiro, *Antitrust and Innovation: Welcoming and Protecting Disruption*, in 20 INNOVATION POLICY & THE ECONOMY 125 (Josh Lerner & Scott Stern eds., 2020); Michael L. Katz & Howard A. Shelanski, *Merger Policy and Innovation: Must Enforcement Change to Account for Technological Change?*, in 5 INNOVATION POLICY & THE ECONOMY 109 (Adam B. Jaffe, Josh Lerner & Scott Stern eds., 2005). For theoretical examples of mergers that are likely to reduce investment in R&D, see, for example, Giulio Federico, Gregor Langus & Tommaso Valletti, *A Simple Model of Mergers and Innovation*, 157 ECON. LETTERS 136 (2017); Giulio Federico, Gregor Langus & Tommaso Valletti, *Horizontal Mergers and Product Innovation*, 59 INT'L J. INDUS. ORG. 1 (2018); Gilbert, *supra* note 65. For an example of an industry in which a merger increases prices but has no effect on R&D, see Raaj Kumar Sah & Joseph E. Stiglitz, *The Invariance of Market Innovation to the Number of Firms*, 18 RAND J. ECON. 98 (1987). Mergers, however, can promote innovation by creating R&D efficiencies (see, e.g., Vincenzo Denicolo & Michele Polo, *The Innovation Theory of Harm: An Appraisal* (Mar. 22, 2018) (unpublished manuscript), ssrn-com.libproxy.berkeley.edu/abstract=3146731), or by increasing appropriation, although possibly as a consequence of higher product prices. See, e.g., Yongmin Chen & Marius Schwartz, *Product Innovation Incentives: Monopoly vs. Competition*, 22 J. ECON. & MGMT. STRATEGY 513 (2013); Marc Bourreau & Bruno Jullien, *Mergers, Investments and Demand Expansion*, 167 ECON. LETTERS 136 (2018); Bruno Jullien & Yassine Lefouili, *Horizontal Mergers and Innovation*, 14 J. COMPETITION L. & ECON. 364 (2018).

other conduct that increases market power can increase the incentive of the remaining firms to innovate by increasing their ability to appropriate value from their innovations and by reducing the cost of R&D. Absent these effects, exclusionary conduct or a merger that results in a small number of R&D or product market rivals is likely to reduce the amount and diversity of R&D activity for both coincident and non-coincident market innovation.

Not surprisingly, therefore, many antitrust challenges to mergers allege harm to innovation from a reduction in the number of potential rivals for both coincident⁹² and non-coincident⁹³ market innovation. Non-merger conduct can also have adverse innovation effects by excluding rivals. In *United States v. Microsoft*, for example, the exclusion of the Netscape Navigator internet browser reduced the likelihood that Netscape or other suppliers of complementary products would innovate in ways that would create competition for Windows. In this example, conduct that affected non-coincident innovation (in markets for browsers and other complementary products) also affected the likelihood of innovation for Intel-compatible personal computer operating systems because the affected non-coincident innovation was seen as a potential source of or complement to new entry into the operating systems market. Numerous merger and non-merger consent decrees have included requirements to preserve entities as independent potential innovators or require licensing of intellectual property to facilitate competition for coincident or non-coincident innovation.

A reduction in the number of innovators does not, however, necessarily reduce the incentive to innovate, even in a market with few potential innovators. For example, the FTC declined to oppose the acquisition of Novazyme Pharmaceuticals by the Genzyme Corporation even though Genzyme and Novazyme were the only companies actively engaged in preclinical studies related to enzyme-replacement treatment for Pompe disease. Although the acquisition was a merger to monopoly for the relevant R&D, the case had exceptional circumstances that led the FTC to conclude that it would not suppress innovation.

⁹² An example of a merger complaint that alleged harm to coincident market innovation is the DOJ's challenge to the proposed merger of Applied Materials and Tokyo Electron, two of very few firms with the capability to develop and manufacture leading-edge semiconductor tools for high-volume semiconductor manufacturing. See Nicolas Hill, Nancy L. Rose & Tor Winston, *Economics at the Antitrust Division 2014–2015: Comcast/Time Warner Cable and Applied Materials/Tokyo Electron*, 47 REV. INDUS. ORG. 425 (2015).

⁹³ The proposed merger of Nielson Holdings and Arbitron is an example of a transaction that threatened non-coincident market innovation. The FTC alleged that Nielson and Arbitron were the mostly likely developers of a national syndicated cross-platform audience measurement service, although neither company offered such a service at the time of their proposed merger. See Complaint, Nielsen Holdings N.V., FTC Docket No. C-4439 (Feb. 28, 2014).

Pompe disease is a rare, often fatal, disease affecting infants and children. Therapies for Pompe disease fall under the Orphan Drug Act. The Act lowers the payoff to a firm that is behind a leader in an R&D competition by granting seven years of market exclusivity to the first Pompe therapy to gain FDA approval; a second therapy may break that exclusivity only if it demonstrates clear superiority.⁹⁴ The Act thus increased the risk associated with R&D investment by any firm that feared that it might not be the first to develop a Pompe therapy.⁹⁵ We therefore agree with the statement of Joseph Schumpeter in his Presidential address before the American Economic Association that “economic analysis offers no material in support of *indiscriminate* ‘trust busting’ and that such material must be looked for in the particular circumstances of each individual case.”⁹⁶ The unusual facts in the Genzyme/Novazyme merger and the possibility of similarly unusual facts in other cases do not, however, justify rejecting a presumption that a merger or exclusionary conduct that creates or maintains a monopoly over the relevant R&D assets is likely to have an adverse effect on R&D effort.

F. EMPIRICAL STUDIES

Monopoly power over R&D assets creates the ability to suppress innovation. All other things equal, such monopoly power presumptively reduces the likelihood of innovation. Validation of this theoretical proposition requires empirical evidence, as we have noted that other factors that might be present along with monopoly power can affect a firm’s incentive to innovate.

While only a few empirical studies directly address the effect of market or monopoly power in R&D on innovation, some empirical evidence of the effects of R&D competition on innovation incentives can be gleaned from observing the effects of compulsory licensing decrees that target dominant firms. These compulsory licensing decrees include the 1956 decrees that obligated

⁹⁴ In terms of the numerical example above, the regulatory context meant that, even if each firm had a 50% chance of solving the technical problems needed to develop an effective therapy, each would act on the assumption that its chance of developing a commercially valuable therapy was much less than that because technical success might be of little value to the second innovator. In the example above, the probabilities of commercial success by the two firms were independent of one another; that was not the case in the Genzyme/Novazyme merger.

⁹⁵ Statement of Chairman Timothy J. Muris in the Matter of Genzyme Corporation/Novazyme Pharmaceuticals, Inc. (Jan. 13, 2004), www.ftc.gov/system/files/attachments/press-releases/ftc-closes-its-investigation-genzyme-corporations-2001-acquisition-novazyme-pharmaceuticals-inc./murisgenzymestmt.pdf. The FTC had the benefit of hindsight because its review occurred more than two years after the merger was completed. The FTC found no evidence that the merger reduced R&D spending on either the Genzyme or the Novazyme program or slowed progress along either of the R&D paths and found benefits from sharing research results. *Id.* at 17. We agree with Commissioner Muris’s statement that “[a]ssessing the effects of a merger on the pace of innovation is especially fact-dependent.” *Id.* at 2.

⁹⁶ Joseph A. Schumpeter, *Science and Ideology*, 39 AM. ECON. REV. 357–58 (1949).

AT&T and IBM to license their existing patents royalty-free and to license any future patents at a reasonable royalty;⁹⁷ the 1975 decree that settled the FTC allegation that the Xerox Corporation monopolized the market for plain paper office copiers by requiring Xerox to grant licenses to its relevant patents to any willing licensees at modest royalties;⁹⁸ and numerous other compulsory licensing decrees that the FTC or DOJ accepted to resolve innovation concerns from proposed mergers or acquisitions. Following the imposition of these decrees, many of the affected industries experienced an increase in industry-wide R&D expenditures or patenting and few, if any, experienced a significant decrease that could not be explained by special circumstances.⁹⁹ The fact that compulsory licensing did not discourage R&D in these industries does not imply that patent protection was or is unnecessary to motivate important discoveries, including the discoveries claimed by the patents that the defendants were required to license. Rather, these examples show that R&D investment often thrives when patent rights that sustain monopoly power and raise barriers to R&D competition are eliminated or limited.¹⁰⁰ Similar results would be likely from the elimination or reduction of other obstacles to R&D competition.

The relationship between product market power and innovation is more uncertain than the relationship between product market power and price. That uncertainty, however, is reduced, but not eliminated, by empirical research that includes inter-industry econometric studies, industry case studies of innovation, and the effects of mergers on R&D. These empirical studies generally, though not uniformly, support a presumption that the creation or maintenance of market power in product markets dulls incentives for innovation targeted at those markets. This effect is attributable to both diminished competitive incentives to innovate associated with the control of relevant R&D assets and increased replacement effects associated with increased market power in the relevant product market.¹⁰¹

⁹⁷ See, e.g., Martin Watzinger et al., *How Antitrust Enforcement Can Spur Innovation: Bell Labs and the 1956 Consent Decree*, 12 AM. ECON. J.: ECON. POL'Y 328 (2020).

⁹⁸ See, e.g., Timothy F. Bresnahan, *Post-Entry Competition in the Plain Paper Copier Market*, 75 AM. ECON. REV.: PAPERS & PROCEEDINGS 15 (1985).

⁹⁹ See Colleen Chien, *Cheap Drugs at What Price to Innovation: Does the Compulsory Licensing of Pharmaceuticals Hurt Innovation?*, 18 BERKELEY TECH. L.J. 853 (2003); GILBERT, INNOVATION MATTERS, *supra* note 30, chs. 6 & 7.

¹⁰⁰ Obligations to license patents that are essential to a standard at royalties that are fair and nondiscriminatory (FRAND) are voluntarily undertaken by the patent holder and create a different kind of license obligation. FRAND obligations generally promote innovation by encouraging the adoption and use of a standard and follow-on innovation within the standard. See, e.g., Jorge L. Contreras, *A Brief History of FRAND: Analyzing Current Debates in Standard Setting and Antitrust Through a Historical Lens*, 80 ANTITRUST L.J. 39 (2015).

¹⁰¹ Creation or maintenance of market power in the product market is sufficient to support a presumption of reduced incentives to innovate when the conditions necessary for monopoly preemption are absent. Theory suggests, however, that creation or maintenance of monopoly power

Most inter-industry studies find a negative relationship between product market concentration (an imperfect proxy for market power) and innovation or R&D investment.¹⁰² There are exceptions, but they should be assessed in light of the limitations that inter-industry studies have for the prediction of innovation harms from product market concentration. Market concentration is often a result of innovation, and that relationship confounds predictions of the effects of market concentration or market power on innovation.¹⁰³ Most of the empirical studies rely on aggregated measures of product market concentration; they do not focus specifically on the consequences of product market monopoly, and most do not separately identify market power in R&D to assess the ability of a firm to suppress innovation. Furthermore, these studies include only indirect measures of the ability of firms to appropriate value in different industries. And few studies distinguish coincident and non-coincident market innovation by examining the relationship between market concentration or measures of market power with innovations that occur in different markets.

Case studies allow a more precise measure of the output of innovation by examining actual product improvements in more narrowly defined industries. They also avoid inter-industry variations in key dimensions, such as appropriability and technological opportunity, that can obscure the relationship between market structure and R&D investment or innovation, although variations in appropriability and opportunity can and do change over time within an industry. Case studies generally find that, compared to highly concentrated markets, more competitive product markets spur innovation.¹⁰⁴

over *R&D assets* is necessary in order to presume actual harm to innovation. This higher standard in the case of R&D assets is warranted both because serendipity and other factors weaken the relationship between measurable R&D assets and likely innovation and because firms with *market power* in R&D are likely to have substantial incentives to innovate.

¹⁰² See GILBERT, *INNOVATION MATTERS*, *supra* note 30, ch. 6 (surveying the empirical evidence). A recent empirical study suggests that the existence of price-fixing cartels in markets with multiple competing firms is associated with increased investment in R&D by the cartel members. The author interprets this result as suggesting that competition suppresses innovation. Hyo Kang, *How Does Competition Affect Innovation? Evidence from U.S. Antitrust Cases* (June 2020). But the cartels suppressed only price competition, and the study is thus best understood as suggesting only that suppression of price competition in markets with multiple competing firms will tend to increase non-price competition, including innovation. See, e.g., George J. Stigler, *Price and Non-Price Competition*, 76 J. POL. ECON. 149 (1968); George W. Douglas & James C. Miller, *Quality Competition, Industry Equilibrium, and Efficiency in the Price-Constrained Airline Market*, 64 AM. ECON. REV. 657 (1974).

¹⁰³ See, e.g., Richard Blundell, Rachel Griffith & John Van Reenen, *Market Share, Market Value and Innovation in a Panel of British Manufacturing Firms*, 66 REV. ECON. STUD. 529, 530 (1999) (arguing that empirical studies of the relationship between innovation and market share should address “reverse causality: firms who innovate will grow and therefore have higher market shares”).

¹⁰⁴ See, e.g., Josh Lerner, *An Empirical Exploration of a Technology Race*, 28 RAND J. ECON. 228 (1997); Igami, *supra* note 61. Jonathan Baker recounts innovation by small firms in the

Merger studies offer additional insights into the effects of market structures on innovation or investment in R&D. Some studies show a reduction in R&D and innovation from mergers while others show no effect or even some benefit.¹⁰⁵ The empirical result that mergers in high-technology industries do not always demonstrate a reduction in R&D or innovation should be interpreted with caution because the studies are limited to mergers that have not been blocked by antitrust authorities. These are typically mergers in markets with modest levels of concentration. Also, mergers might generate efficiencies that increase the parties' ability to innovate and thus offset any tendency of the merger to reduce innovation incentives. Consequently, the observation that some mergers may have innovation benefits does not contradict a conclusion that monopoly power is not conducive to innovation.

Our discussion of innovation incentives has focused on technologies that create new or improved products. Innovation incentives are similar for process innovations that reduce production or distribution costs if the innovator can appropriate value by licensing the technology to others. If licensing is not practicable, the ability of an innovator to appropriate value from a process innovation is proportional to its scale of production. In that case, product market competition can reduce incentives for process innovation by reducing the scale at which each firm in a highly competitive industry operates. However, lower costs made possible by a process innovation can enable the innovator to profitably take sales from its rivals if trade secrets or other factors inhibit the ability of the rivals to emulate the innovation; the prospect of increased sales can more than offset the negative effect of competition on innovation incentives in some circumstances.¹⁰⁶

Taken as a whole, economic theory and empirical evidence suggest that monopoly in R&D activity discourages innovation and that market power in product markets is likely to inhibit innovation intended to be commercialized

automobile manufacturing industry. Jonathan B. Baker, *Fringe Firms and Incentives to Innovate*, 63 ANTITRUST L.J. 621 (1995).

¹⁰⁵ Compare, e.g., Carmine Ornaghi, *Mergers and Innovation in Big Pharma*, 27 INT'L J. INDUS. ORG. 70 (2009) (finding merged firms did less R&D and produced fewer new drugs), with Patricia M. Danzon, Andrew Epstein & Sean Nicholson, *Mergers and Acquisitions in the Pharmaceutical and Biotech Industries*, 28 MANAGERIAL & DECISION ECON. 307 (2007) (finding no adverse effect from mergers of large firms). Mitsuru Igami and Kosuke Uetake find that mergers in the hard disk drive industry harmed innovation when the industry had only few competitors but had no significant effect on innovation when they occurred with more than a few competitors. Mitsuru Igami & Kosuke Uetake, *Mergers, Innovation, and Entry-Exit Dynamics: Consolidation of the Hard Disk Drive Industry, 1996–2016*, 87 REV. ECON. STUD. 2672 (2020).

¹⁰⁶ See, e.g., Xavier Vives, *Innovation and Competitive Pressure*, 56 J. INDUS. ECON. 419 (2008); Ángel L. López & Xavier Vives, *Overlapping Ownership, R&D Spillovers, and Antitrust Policy*, 127 J. POL. ECON. 2394 (2019); see also Blundell, Griffith & Van Reenen, *supra* note 103 (finding evidence that, within industries, firms with large market shares introduce more innovations).

in that market when successful innovators can appropriate significant value from their R&D investments. Nonetheless, the theory can yield contradictory conclusions depending on the factual assumptions, and the empirical evidence often fails to account for many of the relevant factors that affect R&D incentives. While there is theoretical and empirical evidence to support a presumption that monopoly suppresses innovation, it is not a demonstrable fact applicable to every circumstance.

G. IMPLICATIONS FOR OUR HYPOTHETICALS

Suppose in our hypothetical cases a firm has willfully achieved or maintained a monopoly in either production or R&D on the “free” side of the two-sided platform, at least in part as a result of anticompetitive conduct. We assume that the revenue side of the two-sided market is competitive and remains so after the challenged conduct; hence, any anticompetitive effects of conduct by our hypothetical monopolist are realized in their impact on services provided on the side of the platform for which consumers do not pay a monetary price.

A reasonable assumption for our hypotheticals is that consumers prefer to see more informative responses to search queries and more content from their social network friends. Displays have higher quality if they offer more informative responses or more content from friends. If increases in product quality on the “free” side of the platforms generate increased returns from the revenue side of the platforms that exceed the cost of the product quality increases, we expect that an increase in rivalry that might have occurred in the absence of the challenged conduct would lead firms to compete for consumers by improving the quality of their displays for internet search or social networking. We reach this conclusion because, under these admittedly strong assumptions, there is no price-quality tradeoff that might elicit different responses from consumers and possibly lead a monopoly supplier to offer a higher service quality (at a higher price) than would be sustained with greater rivalry.¹⁰⁷

Competition for revenue from the paid side of the two-sided platform would also encourage greater investment in R&D directed, for example, to improvements to search algorithms or display technologies that are more complex than merely devoting less space to advertisements. Our hypotheticals are two-sided platforms. The innovations we address occur on the “free” side of

¹⁰⁷ Market power on the revenue side can influence incentives to exercise market power on the “free” side by increasing as well as decreasing service quality. For example, a platform might exercise monopoly power by restricting space devoted to advertising (i.e., by increasing quality on the “free” side) if, by doing so, it can extract more revenue from a dominant advertiser. See Andrea Prat & Tommaso Valletti, *Attention Oligopoly*, AM. ECON. J.: MICROECONOMICS (forthcoming 2021), ssrn.com/abstract=3197930.

the two-sided platform, but they affect revenues obtained from the paid side of the platform. Hence, if an innovation cannibalizes revenues, the innovation and the resulting replacement effect occur on different sides of the platform. If a single market encompassing both sides of the platform were defined for antitrust purposes, the replacement effect from the innovation would be coincident with the market in which the innovation occurs.¹⁰⁸ Even if separate markets are defined for the two sides of the platform, and if the platform has market power on the revenue side, the innovation effects are coincident because the replacement effects on the revenue side are internalized by the platform innovator on the “free” side, just as replacement effects in a downstream product market are internalized by an upstream innovator that anticipates licensing or selling the innovation to a firm with market power in the product market.

In our hypothetical internet search case, for example, a reasonable expectation is that the innovation effects would coincide with the market in which the defendant has a monopoly. The likely potential innovators are few. Although specialized search services, such as product comparison services, threaten our hypothetical monopolist’s profits and we cannot exclude the possibility that innovations for internet search will occur from an unanticipated source, given the maturity of this industry the most likely innovators are Google, Bing, Yahoo, and DuckDuckGo.¹⁰⁹ New search technologies also could emerge from foreign suppliers such as Baidu (China) or Yandex (Russia), or from edge providers such as Amazon or Apple. Notwithstanding that innovations occur on the “free” side of the market, they have the potential to disrupt the profits that our hypothetical monopolist defendant earns from its advertising business.

Our search hypothetical is a demonstration of coincident market innovation with a possible replacement effect from the revenue side of the market. For example, an improvement to an algorithm used to rank web pages could increase advertising revenues, but any such benefit for a hypothetical search monopolist would be only an increment to its existing revenues. The improvement might also compromise profits from some existing advertising services.

¹⁰⁸ The Supreme Court held in *Ohio v. American Express Co.*, 138 S. Ct. 2274, 2287 (2018), that a single market should be defined for both sides of a two-sided platform in certain circumstances. This holding has been criticized by numerous commentators. See, e.g., Herbert Hovenkamp, *The Looming Crisis in Antitrust Economics*, 101 B.U. L. REV. 489 (2021); Katz & Melamed, *supra* note 11; but see, e.g., DAVID S. EVANS & RICHARD SCHMALENSEE, ANTITRUST ANALYSIS OF PLATFORM MARKETS: WHY THE SUPREME COURT GOT IT RIGHT IN *AMERICAN EXPRESS* 63 (2019).

¹⁰⁹ Microsoft’s Bing-branded search engine also supplies search results for Yahoo and DuckDuckGo. Nonetheless, Yahoo and DuckDuckGo have an independent ability to compete against Google by offering a differentiated search experience. For example, DuckDuckGo claims that, unlike other search engines, it does not collect or share personal information. See *We Don’t Collect or Share Personal Information*, DUCKDUCKGO, duckduckgo.com/privacy.

A new search competitor could implement the new algorithm without an equivalent replacement effect. Scale, network effects, reputation, and perhaps intellectual property protections enable our hypothetical defendant to appropriate value from innovation in search technology, so monopoly power in search is not necessary to enable the hypothetical defendant to solve an appropriation problem that might otherwise discourage innovation. Moreover, our hypothetical defendant does not have the ability to preempt rival innovation by scaling up its own R&D efforts: the conditions necessary for monopoly preemption are absent because the defendant's R&D is unlikely to foreclose the ability of rivals to develop search-related innovations.

Economic theory and evidence thus suggest that monopoly power in internet search is likely to suppress innovation in search technology for two reasons. First, if monopoly power in search implies monopoly power in R&D for search technologies, our hypothetical monopolist has the ability to suppress innovation directed to new internet search technologies. Second, to the extent that monopoly power in search implies revenues at risk from innovation from the paid side of the two-sided market, there is a potential replacement effect that would discourage innovation incentives. Of course, these effects do not imply that our hypothetical monopolist is not or cannot be an innovator. Rather, they suggest that, all other things equal, anticompetitive conduct that achieves or maintains a monopoly in internet search is likely to result in less innovation than otherwise.

Our hypothetical social network example presents some additional complications for understanding the effects of market power on costly investments in social networking technologies. Because of strong network effects, our hypothetical social network monopolist has few direct competitors,¹¹⁰ and competition in social networking is most likely from differentiated products. Instagram threatened competition from a service that enabled sharing of photos and videos. WhatsApp was a potential competitor whose messaging service might have evolved into a social network service. Before they were acquired by Facebook, Instagram and WhatsApp were non-coincident market innovators with respect to the market for social networking, in which neither innovator had market power. The success of Instagram and WhatsApp as potential competitors for a social network monopolist before they were acquired suggests that predicting the sources of innovation for social networking might

¹¹⁰ Antitrust authorities have concluded that professional networks, such as LinkedIn, do not belong in the same relevant antitrust market as Facebook. *See, e.g.*, Case M.8124—Microsoft/LinkedIn, Comm'n Decision, C (2016) 8404 final, ec.europa.eu/competition/mergers/cases/decisions/m8124_1349_5.pdf.

be even more difficult than predicting the likely sources of innovation for internet search.¹¹¹

Although it is particularly difficult to describe the potential innovators for social networking, alleged anticompetitive conduct by a hypothetical social network monopolist that eliminates or weakens potential sources of innovation should raise Section 2 concerns. The elimination or weakening of potential innovation rivals can take the form of acquisitions of nascent competitors or other actions, such as conditions that limit access to interconnections, which make it difficult for rivals to compete with existing or new products. Arguably, acquisitions are a means by which potential rivals can monetize their R&D efforts, and the prospect of such acquisitions might in some situations motivate investment in innovation. But such acquisitions offer no benefit for consumers unless the acquisitions enable efficiencies that cannot be obtained by some other means, including acquisitions by other firms.

Our hypotheticals raise significant concerns about the creation or maintenance of monopoly power to the detriment of consumers. However, by design, these hypotheticals assume that harm might occur only in quality improvements or product innovation. The latter, in particular, is an effect that has received little attention from the courts. In the next Part we discuss how courts might address innovation effects. For completeness, we do not limit this discussion to our hypotheticals.

V. LEGAL STANDARDS FOR INNOVATION UNDER SECTION 2

Economic theory and empirical evidence indicate that market power in a product market often, but not always, depresses incentives to innovate. Given this uncertain correspondence, what legal standards should apply for innovation under Section 2 of the Sherman Act? The following questions are relevant to this inquiry.

- (1) When is innovation analysis necessary for Section 2 enforcement?
- (2) If innovation analysis is necessary, is creation or maintenance of the ability to suppress innovation sufficient for Section 2 liability?

¹¹¹ If Instagram or WhatsApp obtained market power in the social networking market, innovation by them in social networking would be coincident market innovation. Innovation by Instagram or WhatsApp in social networking would also be coincident market innovation after they became owned and controlled by Facebook, which we assume for the purpose of our example to have monopoly power in the social networking market, even if Instagram and WhatsApp did not themselves have market power in that market. There would be a replacement effect after the acquisition if innovation by Instagram or WhatsApp would cannibalize existing profits by Facebook in social networking.

- (3) If ability to suppress innovation is not sufficient for Section 2 liability, which party should bear the burden of showing whether the defendant is likely to have the incentive to suppress innovation?
- (4) Should increased likelihood of innovation be a cognizable affirmative defense to Section 2 liability?
- (5) What evidence is necessary for (1)–(4)?

Questions about the legal significance of innovation effects can arise in three contexts: where likely price or other non-price harms have been proven, where the conduct at issue is not likely to result in any such harm but might harm innovation, and where innovation benefits are raised as an affirmative defense to otherwise unlawful conduct. We discuss each of these in the following subsections.

A. HARM TO INNOVATION WHERE ACTUAL OR LIKELY PRICE OR OTHER
NON-PRICE HARMS HAVE BEEN PROVEN

In Part III, we noted that innovation concerns can be superfluous to Section 2 enforcement that addresses monopoly power and its consequences for prices in existing markets. If conduct is likely to have adverse price effects, the fact that conduct might also suppress innovation is an additional adverse effect that need not be established to find a violation of Section 2. For example, if a dominant manufacturer of jet engines for passenger aircraft engages in exclusionary conduct that is likely to maintain monopoly prices, the fact that the conduct might also suppress jet engine innovation is not necessary to establish Section 2 liability. Similarly, conduct can have adverse non-price effects other than for innovation that are relatively predictable and, if significant, do not require further analysis of harm to innovation for Section 2 liability.

Because monopolization cases typically allege price increases and a decrease in quality is analogous to an increase in price even for a zero-price service, we expect Section 2 cases will rarely depend on innovation effects. Nonetheless, innovation effects should not be ignored in such cases, especially in the high-technology economy. Proof of adverse effects on innovation might be relevant to determining appropriate antitrust remedies and might provide additional support for a finding of liability if price or quality effects are uncertain or insubstantial.

More important, when there is an expectation that increased market power in a product market is likely to discourage innovation incentives (as the Arrow replacement effect demonstrates), courts should be less concerned about the risk of false positives and more concerned about the risk of false negatives, even in cases that are principally focused on price or other non-innovation harm. Heightened interest in avoiding false negatives could affect both legal

rulings and the court's assessment of the facts. Consider predatory pricing, for example. Even assuming that current law is optimal for cases alleging only adverse price or quantity effects, proof by the plaintiff that the allegedly predatory conduct was likely to reduce innovation could prompt the court to relax the onerous legal burdens imposed on plaintiffs by the controversial recoupment requirement¹¹² or the requirement that price reductions are unlawful only if they exclude equally efficient rivals.¹¹³ Or the court might be more willing to find below-cost pricing on the basis of indirect proof and circumstantial evidence, instead of requiring the kind of meticulous evidence that courts have required in the past.¹¹⁴

B. HARM TO INNOVATION IN THE ABSENCE OF PRICE OR OTHER NON-PRICE HARMS

In the context of our hypotheticals, a price-centric analysis is appropriate if monopoly power enables the firm to raise the quality-adjusted price by degrading the quality of search results or by scrimping on costs, such as by employing servers that save costs but provide slower responses to search queries. By contrast, an innovation-centric analysis is appropriate if the concern is that the defendant's conduct increases its ability or incentive to suppress investment in R&D and thus reduce the likelihood of innovation, such as new or significantly improved search services.

Several litigated cases have addressed allegations that a firm employed innovation as a component of an exclusionary strategy to maintain a monopoly.¹¹⁵ Few litigated cases, however, have addressed alleged *suppression* of

¹¹² While evidence of likely recoupment can be helpful in assessing claims of predatory pricing, the Supreme Court made proof of likely recoupment by "sustained supracompetitive pricing" an element of the offense in order to reduce the risk of false positives. *Brooke Grp. Ltd. v. Brown & Williamson Tobacco Corp.*, 509 U.S. 209, 226 (1993). The Court paid no attention to the possible impact of predatory pricing on innovation. *See generally* C. Scott Hemphill & Philip J. Weiser, *Beyond Brooke Group: Bringing Reality to the Law of Predatory Pricing*, 127 *YALE L.J.* 2048 (2018) (criticizing the recoupment requirement).

¹¹³ The Supreme Court seemed to embrace this standard in *Brooke Group*, 509 U.S. at 223 (expressing indifference to exclusion of firms with a higher "cost structure" than that of the defendant), and that idea has informed antitrust law regarding predatory and bundled pricing ever since. *See, e.g.*, *Cascade Health Sols. v. PeaceHealth*, 515 F.3d 883, 909 (9th Cir. 2007) (adopting rule that would prohibit only those bundled discounts that could exclude an "equally efficient competitor"). Economists have long understood that even a less efficient rival can reduce a firm's market power by imposing a ceiling on its exploitation and that exclusion of a less efficient competitor can prevent that competitor from becoming more efficient over time. *See, e.g.*, Aaron S. Edlin, *Stopping Above-Cost Predatory Pricing*, 111 *YALE L.J.* 941 (2002).

¹¹⁴ *See, e.g.*, *United States v. AMR Corp.*, 335 F.3d 1109, 1117–21 (10th Cir. 2003) (rejecting predatory pricing claim on the ground that the available data did not permit direct measurement of variable costs).

¹¹⁵ These cases include allegations of exclusionary product designs—for example, *Berkey Photo, Inc. v. Eastman Kodak Co.*, 603 F.2d 263 (2d Cir. 1979); *Telex Corp. v. IBM Corp.*, 510 F.2d 894 (10th Cir. 1975); *In re Apple iPod iTunes Antitrust Litig.*, 796 F. Supp. 2d 1137 (N.D.

innovation as a violation of the Clayton Act or Sherman Act,¹¹⁶ and at least one court has questioned whether evidence of a reduction of innovation can be sufficient to establish antitrust injury in the absence of proof that consumers would value the suppressed innovation.¹¹⁷ There is no basis in antitrust jurisprudence for such skepticism. As explained above, anticompetitive conduct that increases market power is deemed to cause antitrust injury regardless of the manner in which the defendant might use that power to the detriment of trading partners. Harm to trading partners is presumed from such an increase in market power. Similarly, harm to trading partners should be presumed if suppression of innovation is shown to be likely, even if the specific manifestation of that harm is not known or proven in the litigation.

We believe the analysis of a case alleging harm to innovation under Section 2 should proceed as described in the following paragraphs. For this discussion, we assume the defendant has engaged in anticompetitive conduct or a merger whose competitive effects are at issue. The key issue then becomes whether, as a consequence of such conduct or merger, the defendant has gained or maintained monopoly power over either relevant R&D assets or a product market that is likely to reduce innovation compared to the but-for world. Whether the conduct or merger will have that result depends on its effect on the defendant's ability and incentive to suppress innovation.

Cal. 2011)—and strategic innovation in pharmaceutical markets—for example, *In re Namenda Direct Purchaser Antitrust Litig.*, 331 F. Supp. 3d 152 (S.D.N.Y. 2018); and *In re Suboxone*, 421 F. Supp. 3d 12 (E.D. Pa. 2019). For a review of exclusionary innovation by pharmaceutical companies, see, for example, Robin Feldman, *May Your Drug Price Be Evergreen*, 5 J.L. & BIOSCIENCES 590 (2018).

¹¹⁶ In *Babcock & Wilcox Co. v. United Technologies Corp.*, the court considered whether a merger had anticompetitive effects within a market for R&D of electric power generation equipment, but the court concluded that the plaintiff did not establish the total size of the alleged market and failed to establish any anticompetitive effects. 435 F. Supp. 1249, 1275 (N.D. Ohio 1977). A few cases have considered whether grant-backs of patent rights violate the antitrust laws on the ground that they might suppress innovation incentives. A grant-back 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. Grant-backs might adversely affect competition if they substantially reduce the licensee's incentives to engage in R&D and thereby limit rivalry. Antitrust Guidelines for the Licensing of Intellectual Property, *supra* note 7, § 5.6. See, e.g., *Kobe, Inc. v. Dempsey Pump Co.*, 198 F.2d 416, 420 (10th Cir. 1952); *United States v. Besser Mfg. Co.*, 96 F. Supp. 304, 311 (E.D. Mich. 1951). Courts have also dealt with joint venture agreements that allegedly suppressed innovation. See, e.g., *United States v. Auto. Mfrs. Ass'n*, 307 F. Supp. 617 (C.D. Cal. 1969) (holding that a consent decree settled allegations of conspiracy to suppress automotive pollution control R&D).

¹¹⁷ *CollegeNET, Inc. v. Common Application, Inc.*, 104 F. Supp. 3d 1137, 1148 (D. Or. 2015), *rev'd*, 711 F. App'x 405 (9th Cir. 2017) (“Certainly, decreased innovation and choice can be relevant to a court's finding of antitrust injury” but “this Court does not find . . . support for the proposition that an injury solely based on less innovation and choice is sufficient to state a claim for antitrust injury.”).

1. *The Defendant's Ability to Suppress Innovation*

For purposes of assessing the *ability* of the defendant to suppress innovation, we need to focus on the potential innovators. We can think of the potential innovators as participants in what the antitrust agency guidelines call an R&D market. The DOJ-FTC Antitrust Guidelines for the Licensing of Intellectual Property define an R&D market as follows:

A research and development market consists of the assets comprising research and development related to the identification of a commercializable product, or directed to particular new or improved goods or processes, and the close substitutes for that research and development. When research and development is directed to particular new or improved goods or processes, the close substitutes may include research and development efforts, technologies, and goods that significantly constrain the exercise of market power with respect to the relevant research and development, for example by limiting the ability and incentive of a hypothetical monopolist to reduce the pace of research and development.¹¹⁸

In many cases, the relevant R&D assets can be identified and measured. They include funds allocated to R&D, patents, and the number and training of engineers and other R&D specialists. These assets do not include basic research, because basic research is aimed at accumulating knowledge or understanding of a discipline rather than creating an identified new product or process. A corollary is that cases that allege monopolization of R&D are more likely to be about “development” than (basic) “research.”

Other factors relevant to likely innovation success are more difficult to observe and measure. These include organizational talents of firm managers.¹¹⁹ It is not clear how consideration of these factors might affect antitrust analysis. Even if firms' past successes are generally attributable in whole or in part to their management skills, there is no reason to expect the distribution of relevant organizational and management talent to favor firms that created or maintained monopoly power by anticompetitive conduct and thus to warrant antitrust forbearance as a general matter. On the contrary, powerful incumbents are especially likely to be complacent and to have an excessive commitment to satisfying existing customers and short-term growth objectives that might discourage innovation.¹²⁰

For coincident market innovation effects, the relevant R&D market will often include the same firms that sell the products that would be displaced by new or improved goods or processes. In other circumstances, the relevant

¹¹⁸ Antitrust Guidelines for the Licensing of Intellectual Property, *supra* note 7, § 3.2.3, at 11–12.

¹¹⁹ *See, e.g.*, Petit & Teece, *supra* note 23, at 12, 14 (emphasizing internal firm structure and high-level organizational management skills).

¹²⁰ *See, e.g.*, CHRISTENSEN, *supra* note 85.

R&D market might include parties that are not current competitors. The relevant R&D market for self-driving vehicles, for example, would include firms, such as Apple and Google, which are not current producers of vehicles. The composition of a relevant R&D market is likely to include parties that are not current producers of products in markets that would be affected by innovation when innovation is not coincident with current production. However, the composition of the relevant R&D market can be broader than the market for existing production even if innovation is a coincident market effect, as the examples of plain-paper copiers and instant photography discussed above illustrate, or narrower, as in the example of the acquisition of McDonnell Douglas by Boeing.

R&D is an input into the activity of innovation, which if successful produces a new or improved product or a reduction in the cost of producing an existing product. R&D is not a product or an invention that has commercial value independent of the products or processes that it benefits. An R&D market is best thought of as a market consisting of the competing sources of potential innovation rather than as a measure of the output of innovation. Focusing on R&D assets is a way of assessing the relative size and importance of the various potential innovators and thus the ability of the defendant to suppress innovation.¹²¹

Some judicial decisions suggest that courts might have difficulty assessing R&D markets in that way. In *SCM v. Xerox*, the court held that there could be no antitrust liability resulting from patent acquisitions prior to the emergence of the relevant product market and the commercialization of the patented inventions.¹²² More recently, in *Golden Gate*, a district court addressed allegations that the merger of Pfizer and Wyeth injured competition in “[t]he innovation market for the research and development of new prescription [and branded] pharmaceutical products.”¹²³ The court held that the plaintiffs failed to state a claim under the antitrust laws on the ground that the complaint did not “identify the consumers who purchase goods or services in the alleged innovation markets.”¹²⁴ The court went on to note that, “[a]ssuming, *arguendo*, the consumers are persons or entities who would purchase new products

¹²¹ In product markets, the competitive importance of firms is often estimated by looking at past sales (see Horizontal Merger Guidelines, *supra* note 20, at 16–17), except where circumstances are such that past sales are not a good predictor of future sales. *See, e.g.*, *United States v. Gen. Dynamics Corp.*, 415 U.S. 486 (1974). Past sales of innovations, whether instantiated in products or licensed in technology markets, are not likely to be good proxies for competitive significance in R&D markets because, by definition, those sales are generated by different and prior innovations, not future and uncertain innovations.

¹²² *SCM Corp. v. Xerox Corp.*, 645 F.2d 1195, 1207–09 (2d Cir. 1981).

¹²³ *Golden Gate Pharmacy Servs., Inc. v. Pfizer, Inc.*, No. C-09-3854, 2009 WL 4723739, at *4 (N.D. Cal. Dec. 2, 2009) (quoting First Amended Complaint ¶ 17(c)–(d)).

¹²⁴ *Id.*

ultimately developed by the companies,” the complaint failed to allege that those products “will be reasonably interchangeable.”¹²⁵

The reasoning in these cases should not be an obstacle to using the R&D market concept when assessing innovation effects in antitrust cases. The *SCM* case was based in large part on the court’s deference to the rights of patent holders;¹²⁶ that deference has been rejected in more recent cases.¹²⁷ While both the *SCM* and *Golden Gate* cases reflect the courts’ greater familiarity and comfort with traditional product markets, courts have since become familiar with addressing antitrust issues involving technology markets in which patents and other intellectual property are licensed independently of the products that embody or implement the licensed technologies.¹²⁸ Most important, the kinds of R&D markets we envision can be described without the pleading defects identified in *Golden Gate*. The markets include potential suppliers of innovations that will enable products, or processes affecting the production of products, that are alternatives for one another. The innovations might be licensed or sold in technology markets to product producers, or they might be used by the innovator in its own products.

In ordinary usage, the term “market” suggests an arena of commercial transactions. Courts ought to be able to look beyond that ordinary usage when dealing with R&D markets. The R&D market concept is a convenient tool to help identify the likely innovators that might be able to put competitive pressure on the monopolist to innovate or otherwise preclude the monopolist from being able to suppress innovation with respect to a commercializable product. A firm that has a monopoly over the relevant R&D assets is the only firm that is a potential innovator for relevant discoveries. A monopolist in a relevant R&D market thus has the ability to suppress that innovation. A dominant position can be inferred by a preponderance of R&D spending or control of essential R&D assets such as patent rights that are necessary to innovate or sell a new or improved product.

The relationship between market shares (which may be measured by R&D expenditures, patent counts, or other relevant R&D assets) and market domi-

¹²⁵ *Id.*

¹²⁶ See *SCM*, 645 F.2d at 1206–08.

¹²⁷ *E.g.*, *United States v. Microsoft Corp.*, 253 F.3d 34, 63 (D.C. Cir. 2001) (en banc) (rejecting defendant’s claim of “an absolute and unfettered right to use its intellectual property as it wishes” and saying that the claim “borders upon the frivolous”).

¹²⁸ *E.g.*, *Rambus Inc. v. FTC*, 522 F.3d 456 (D.C. Cir. 2008) (alleging monopolization of market in which patented technologies were licensed to product producers); Complaint ¶ 1, *Union Oil Co. of Cal.*, FTC Docket No. 9305 (Mar. 4, 2003) (alleging a “technology market”), www.ftc.gov/sites/default/files/documents/cases/2003/03/030304unocaladmincmplt.pdf; resolved after trial by consent. Decision & Order, *Union Oil Co. of Cal.*, FTC Docket No. 9305, (June 10, 2005), www.ftc.gov/sites/default/files/documents/cases/2005/06/050610do9305.pdf.

nance for innovation is weaker than the relationship between market shares and dominance for competition in existing product markets. A firm with a small share of R&D expenditures can be a significant innovator because, for example, it benefits from unique talent or serendipity. That happenstance is unlikely for some types of innovations. The next fuel-efficient passenger jet engine is unlikely to come from a garage tinkerer. Nonetheless, antitrust enforcers should conclude that a firm is an R&D market monopolist only if measures such as R&D expenditures and patent rights in the relevant R&D market indicate an overwhelming level of dominance.

Under some circumstances, the firms that are likely innovators can be identified with reasonable certitude, and the effects of their R&D investments can be predicted with reasonable confidence. In other circumstances, antitrust enforcers might be unable to identify firms that are likely investors in R&D or the effects from their investments. Courts should pay little attention to alleged innovation harms if they cannot identify likely innovators or the kinds of investment in innovation that would otherwise have been made. That is more likely to be the case if innovation harms occur in non-coincident markets, although the presence or absence of coincidence is not, by itself, determinative of these conditions.

2. *The Defendant's Incentive to Suppress Innovation*

A firm that has a monopoly of a relevant R&D market has the ability to suppress innovation. An antitrust case based on harm to competition requires more than that. It also requires proof that the defendant will have an *incentive* to suppress innovation. As discussed above, in contrast to price incentives, a firm with an ability to suppress innovation will not necessarily have the incentive to do so.

a. Coincident Market Innovation

For coincident market innovation, a replacement effect from profits that are at risk from the innovation gives the firm an incentive to suppress R&D effort either directly, if it is the potential innovator, or indirectly, if the potential innovator anticipates selling or licensing its innovation to a different firm with market power in the product market in which the innovation is employed, provided that the conditions necessary for monopoly preemption are absent. Note that, while the assessment of a firm's ability to suppress innovation is based on the R&D market, a firm's incentive to suppress innovation is based on the replacement effect in the coincident product market.

Holding other factors constant, when the conditions necessary for monopoly preemption are absent, conduct that creates or maintains the firm's monopoly power in the coincident product market can therefore be presumed to

be likely to reduce innovation if the firm has monopoly power in the R&D market. A similar but weaker effect can be presumed even if the firm does not have monopoly power in the R&D market because the replacement effect will reduce the firm's incentive to innovate. Conduct that creates or maintains the firm's monopoly power in the R&D market will increase the ability of the firm to suppress innovation and can be presumed to be likely to reduce innovation.

These presumptions can be rebutted if the defendant can demonstrate that the challenged conduct is not likely under the circumstances to result in decreased innovation. With respect to conduct that created or increased the defendant's monopoly in the product market, the defendant might, for example, try to prove that the conduct increased its incentive to innovate by facilitating its access to complementary assets that enhance its ability to appropriate value from the innovation.

To evaluate this rebuttal, the court should assess the magnitude of the appropriation benefits not otherwise attainable relative to other factors that would affect the firm's innovation incentives. It should not be sufficient for the defendant to show monopoly power that enables it to appropriate value from an innovation simply by charging higher prices that are likely to eliminate the consumer benefits from the innovation.¹²⁹ Furthermore, it should not be sufficient for a defendant to show only that it has not exercised monopoly power to suppress innovation in the past for the same reason that it is not a defense that prices have not been increased in the past.

If the market power prerequisites are satisfied and the presumption of likely suppression of innovation is not adequately rebutted, the court can predict coincident market innovation harm. To complete the antitrust analysis, the harm needs to be connected to the creation or maintenance of monopoly power as a result of anticompetitive conduct.

Importantly, the prediction of harm to coincident market innovation can be based on creation or maintenance of monopoly power in either the R&D market or the coincident product market. The former will increase the defendant's ability to suppress innovation, and the latter is likely to increase the defendant's incentive to do so when conditions necessary for monopoly preemption are absent. An increase in the defendant's ability to suppress innovation will

¹²⁹ Recall that high prices can increase a monopolist's incentive to invest in R&D to upgrade a durable good. See discussion *supra* Part IV. The statement in text assumes that the court is assessing the defendant's conduct with respect to its effect on consumer welfare, rather than total welfare. The distinction between consumer and total welfare is otherwise immaterial to the analysis set forth in this article. Whether the antitrust laws are focused on consumer welfare or total welfare is not entirely settled. See, e.g., Roger D. Blair & Daniel Sokol, *Welfare Standards in U.S. and E.U. Antitrust Enforcement*, 81 *FORDHAM L. REV.* 2497, 2541 (2013).

reduce the likelihood of innovation as long as there is no offsetting reduction in the defendant's incentive to suppress innovation. Similarly, an increase in the defendant's incentive to suppress innovation because of increased market power in the product market will reduce the likelihood of innovation as long as there is no offsetting reduction in the defendant's power in the R&D market or increase in the defendant's ability to innovate or to appropriate value from innovation. Moreover, courts should not accept without careful scrutiny the unique incentive of the monopolist to engage in preemptive innovation as a defense to anticompetitive conduct used to monopolize R&D or product markets. First, as noted, the circumstances required for monopoly preemption to motivate increased R&D effort are limited. Second, successful preemption perpetuates monopoly, with resulting harm from higher prices and the possible exclusion of future innovators.

b. Non-Coincident Market Innovation

When firms have the ability to prevent imitation and appropriate value from their innovations, conduct that creates or maintains monopoly power in an R&D market can be presumed to result in reduced non-coincident market innovation. Although the relationship between market power over necessary R&D assets and innovation is less clear than the relationship between product market power and price, economic theory and empirical evidence provide support for the presumption that a monopoly of R&D does not promote innovation when appropriation measures such as strong intellectual property rights are available. However, in the case of non-coincident market innovation, there is no additional incentive for the defendant to suppress innovation arising from market power in the relevant product market. There is no reason to expect that a defendant's monopoly power in a product market might affect its innovation incentives for non-coincident market innovation because, by definition, the innovation is commercialized in a different market.¹³⁰

Special circumstances, such as those present in the merger of Genzyme and Novazyme, can rebut the presumption that monopoly power in R&D has adverse effects. A defendant should not, however, be permitted to rebut this presumption by arguing that the competition it faces in the downstream product market will give it a robust incentive to innovate. This is so for two reasons. First, monopolization of the R&D market will reduce the number of

¹³⁰ As explained above, there is a potential replacement effect if the likely buyers or licensees of the innovation have market power in the product market in which the innovation is employed. Innovation in this situation should not be regarded as non-coincident innovation merely because the monopolist in the R&D market that supplies an innovation to the downstream market does not itself have market power in the relevant product market in which the innovation is employed. The antitrust analysis can thus take as given whatever degree of concentration there is in the product market and the resulting replacement effect.

viable potential innovators and thus the aggregate market-wide likelihood of innovation, at least absent proof that the defendant gained an increased ability to innovate or to appropriate value from an innovation as a result of the conduct at issue. The logic underlying this effect is illustrated by the example above of the difference between a market with two potential innovators, each of which has a 50-50 chance of successful innovation, and a market with only one such potential innovator. Second, if the defendant has used or is using anticompetitive conduct to monopolize the R&D market, there is a risk that it would use the resulting innovation to gain market power in the downstream product market and not permit rivals to benefit from the innovation.

Special circumstances can also warrant a presumption of harm to innovation. For example, anticompetitive conduct by a monopolist that significantly increases entry barriers to the monopolized product market can be presumed to reduce likely coincident or non-coincident innovation because it will both reduce competitive incentives on the monopolist to innovate and reduce the likely commercial success of, and thus incentives to invest in, innovation by other firms targeted at the monopolized market. Those circumstances would warrant a presumption of harm to innovation even if neither the monopolist nor any other firm had monopoly power in the R&D market.¹³¹

C. INNOVATION BENEFITS AS AN AFFIRMATIVE DEFENSE

Courts should give attention to plausible innovation effects, not just in support of finding an antitrust violation, but also because innovation effects might be asserted as an affirmative defense to allegations of antitrust liability based on proven or presumed increases in quality-adjusted prices. The defendant might, for example, argue that the conduct at issue in the case increased the likelihood of innovation by enabling the defendant to obtain access to important R&D assets and thus increased its ability to innovate, or that it significantly increased its ability to appropriate the benefits of its innovations and thus increased its incentive to innovate.

Innovation as an affirmative defense appeared in the litigation of the recent attempt by the DOJ to block Sabre's acquisition of Farelogix. Sabre is the largest global distribution system (GDS) that allows airlines to sell tickets through travel agencies in the United States. Farelogix offers a service that allows airlines to bypass GDSs and connect directly to travel agencies. The complaint alleged that, "[i]nstead of innovating to compete with Farelogix,

¹³¹ *United States v. Microsoft* is an example of a case in which reduced likelihood of innovation could be predicted as a result of increased barriers to a monopolized product market even with no evidence of market power over R&D assets. *Microsoft*, 253 F.3d 34.

Sabre has resorted to eliminating the competitive threat by acquiring Farelogix.”¹³²

The district court rejected the DOJ’s allegation that the acquisition would eliminate a small, but innovative, rival. The court found that the DOJ offered nothing more than vague generalities that the acquisition would dull incentives to promote and develop Farelogix’s innovative services.¹³³ Instead, the court agreed with Sabre that the acquisition would promote innovation by enabling Sabre to integrate Farelogix’s innovative services into its GDS platform. It is unclear why the court was persuaded by the defendants’ argument that the acquisition would promote innovation while rejecting the plaintiff’s claim that the acquisition would suppress innovation.

The court’s opinion in *Sabre* might be exceptional because antitrust enforcement authorities and the courts typically impose a high bar for efficiency defenses. Moreover, the DOJ-FTC Horizontal Merger Guidelines raise the bar even higher for efficiency defenses related to R&D. They note:

The Agencies have found that certain types of efficiencies are more likely to be cognizable and substantial than others. . . . [E]fficiencies, such as those relating to research and development, are potentially substantial but are generally less susceptible to verification and may be the result of anticompetitive output reductions.¹³⁴

Nonetheless, the *Sabre* case illustrates that courts can be receptive to an efficiencies defense for R&D, at least in merger cases, and might react similarly in a Section 2 context. In *United States v. Microsoft*, the court of appeals accepted Microsoft’s proffered efficiency justification when it concluded that the Windows 98 override of a consumer’s choice of default web browser did not provide a distinct basis for Section 2 liability.¹³⁵

If the court concludes that the conduct at issue is likely both to harm competition in a product market and to increase the likelihood of innovation, or that it is likely to increase innovation even though it is likely to create or maintain a monopoly in an R&D market, the court should determine whether

¹³² Complaint ¶ 43, *United States v. Sabre Corp.*, No. 1:19-cv-01548 (D. Del. Aug. 20, 2019).

¹³³ The court also rejected the DOJ’s attempt to block the acquisition because it concluded that the government had not proven a relevant market in which Sabre and Farelogix compete. *Sabre*, 452 F. Supp. 3d 97, 136 (D. Del. 2020), *vacated*, No. 20-1767, 2020 WL4915824 (3d Cir. July 20, 2020). The merger was abandoned after it was blocked by the UK’s Competition and Markets Authority. Diane Bartz, *Sabre, Farelogix Terminate Merger Agreement*, REUTERS (May 1, 2020), www.reuters.com/article/us-farelogix-m-a-sabre/sabre-farelogix-terminate-merger-agreement-idUSKBN22D697.

¹³⁴ Horizontal Merger Guidelines, *supra* note 20, at 31.

¹³⁵ *Microsoft*, 253 F.3d at 95.

there are less restrictive means of obtaining the innovation benefits.¹³⁶ Thus, for example, if the conduct includes acquiring or obtaining an exclusive license to intellectual property, the court should determine whether exclusivity was necessary to enable the monopolist to appropriate the benefits of the anticipated innovation.

If the court determines that the conduct both will harm competition and is reasonably necessary to achieve innovation benefits, it should attempt to balance the harms and the benefits.¹³⁷ In doing so, the court should be mindful both that the welfare benefits of innovation are often greater than the static welfare costs of increased market power in a product market and that exclusionary conduct can both increase quality-adjusted prices and reduce future innovation by rivals.

D. STANDARDS FOR PROOF

These arguments are not difficult to describe in principle. More difficult is determining how to prove them. General economic theory and empirical evidence are relevant to the inquiry, but these sources often provide little support for a demonstration that the particular conduct at issue will increase or decrease innovation. Corporate documents and other contemporaneous evidence might shed light on the defendant's motives, how it perceived its incentives to innovate, and the likely effect of the conduct or transaction at issue on those incentives. The defendant should have access to other types of evidence of complementarities or other transaction-specific factors that affect its ability or incentive to innovate.

As we explained in Part IV, monopoly of the relevant R&D market gives the firm the *ability to suppress* both coincident and non-coincident innovation. Therefore, proof that allegedly anticompetitive conduct caused or is likely to cause the creation or maintenance of monopoly power in a relevant R&D

¹³⁶ In the context of a merger, the court would need to determine whether the benefits are merger-specific. Horizontal Merger Guidelines, *supra* note 20, § 10; *see, e.g.*, *United States v. H&R Block, Inc.*, 833 F. Supp. 2d 36, 89 (D.D.C. 2011).

¹³⁷ While the cases often refer to balancing, few if any state precisely what this means. Alternatives suggested by courts and commentators include: (1) ad hoc comparing of the magnitudes of the benefits and harms (e.g., *Microsoft*, 253 F.3d at 59); (2) determining whether the harms are "disproportionate" to the benefits (3 PHILLIP AREEDA & HERBERT HOVENKAMP, *ANTITRUST LAW* ¶ 651e (4th ed. 2015)); and (3) determining whether the benefits are sufficiently large that it would have made business sense for the defendant to invest in and create them even if they did not increase its market power (e.g., Gregory J. Werden, *Identifying Exclusionary Conduct Under Section 2: The "No Economic Sense" Test*, 73 *ANTITRUST L.J.* 413 (2006); Melamed, *supra* note 45). We do not in this article address the question of how harms and benefits should be balanced in antitrust cases. We do think, however, that innovation effects should be weighted heavily in any balancing because of their importance for economic welfare.

market should be sufficient to create a presumption that the conduct will reduce innovation.

For coincident innovation, market power in the product market generally reduces a firm's incentive to innovate and thus increases its *incentive to suppress* innovation. Therefore, proof that the allegedly anticompetitive conduct caused or is likely to cause the creation or maintenance of monopoly power in the product market also should be sufficient to create a presumption that the conduct will reduce coincident innovation; this presumption will be stronger if the defendant has monopoly power in the R&D market.

A determination that the transaction or conduct at issue violates Section 2 should not require evidence or prediction about the particular innovations that are made less likely, nor should an affirmative defense require evidence about particular innovations that are made more likely by the conduct at issue. While such evidence might be illuminating, it should not be required because innovation is usually uncertain and difficult to predict with precision.¹³⁸ Proof that conduct will increase the ability or incentive of a firm with monopoly power in an R&D market to suppress innovation should suffice to establish the harm to competition required for a violation of Section 2. These conclusions align with the general principle that harm can be presumed if the defendant gains or maintains monopoly power¹³⁹ and with the decision in *United States v. Microsoft*, which held that the exclusion of nascent competition was sufficient for Section 2 liability without requiring a confident prediction of the innovations or new competition that might have resulted but for Microsoft's anticompetitive conduct.¹⁴⁰

Proof that the conduct at issue will *reduce the incentives* of the defendant to *suppress* innovation, perhaps by increasing its ability to appropriate the benefits of its innovation, should be sufficient to demonstrate a procompetitive benefit that the court should take into account in determining whether the conduct is likely to reduce innovation. This benefit should not, however, be

¹³⁸ Douglas Ginsburg and Joshua Wright have expressed skepticism about the ability of antitrust institutions to take account of dynamic effects in antitrust. Douglas H. Ginsburg & Joshua D. Wright, *Dynamic Analysis and the Limits of Antitrust Institutions*, 78 ANTITRUST L.J. 1 (2012). Their concerns should not, however, call into question the analysis described in this article. Ginsburg and Wright were primarily concerned about using complex economic tools to balance static and dynamic welfare effects in individual cases. They explicitly do not question the kinds of qualitative or directional predictions based on monopoly power on which our analysis is focused.

¹³⁹ See discussion *supra* Part II.

¹⁴⁰ A private plaintiff suing for damages from the suppression of innovation would have to show how it was injured by the suppressed innovations. While proof that the conduct at issue was likely as a general matter to suppress innovation that would have benefited the plaintiff might suffice for injunctive relief, the plaintiff would probably have the difficult task of identifying the specific innovations or type of innovations of which it was deprived in order to obtain a damages remedy.

sufficient to reverse a presumption that consumers are harmed by monopoly unless monopoly is necessary to solve an appropriation problem. Similarly, courts should recognize procompetitive benefit from proof that the conduct at issue will *reduce the ability* of the defendant *to suppress* innovation, perhaps by enhancing the ability of competitors to innovate.

Courts should be skeptical of claims that the conduct at issue will *increase the ability* of the defendant *to innovate* by creating or maintaining monopoly power. The conduct might have that effect if it combines complementary assets such as intellectual property or know-how needed for innovation. But if the conduct denies competitors access to such assets or know-how or otherwise increases their costs, it can be exclusionary. In that event, an affirmative defense based on claims of increased ability to innovate should turn on whether the defendant can demonstrate that the increased likelihood of a profitable innovation as a result of the increase in *its* ability to innovate will more than offset the reduced ability of *others* to innovate as a result of the defendant's challenged conduct. And the defense should be rejected if the defendant could have increased its ability to innovate without reducing the ability of others to innovate.

In the case of conduct that creates or maintains monopoly power in the coincident product market, the defense will turn on whether the defendant can demonstrate that the increase in its ability to innovate will more than offset its reduced incentive to innovate as a result of reduced competition in, and an increased replacement effect in, the product market. Absent such proof, courts should presume consumer harm from conduct that creates or maintains a monopoly in R&D or, for coincident innovation, from conduct that creates or maintains market power in the relevant product market when the defendant has a monopoly in R&D.

VI. CONCLUSION

Innovation is critical for antitrust enforcement, but it is complicated by the uncertain link between structural measures of the potential for innovation, such as R&D spending, and the generation of new or improved products. Most Section 2 cases are not likely to turn on innovation effects because increased market power usually enables a prediction that consumers will be harmed by an increase in quality-adjusted prices (or that suppliers will be harmed by a reduction in quality-adjusted prices). Concerns about adverse effects on innovation are superfluous for purposes of determining liability in those cases, except insofar as they might induce the court to be less concerned about the risk of a false positive and more concerned about the risk of a false negative. Innovation benefits could be used as an affirmative defense in such cases if there are no less-restrictive alternatives that provide comparable bene-

fits, and innovation effects should be taken into account in fashioning equitable remedies.

Section 2 liability can be based upon innovation concerns if the plaintiff can show that the defendant has the ability and the incentive to suppress innovation as a result of anticompetitive conduct that increased one or both of them. The ability to suppress innovation requires monopoly power in a market for R&D. The incentive requires evidence that the defendant will profit from a suppression of R&D.

Because incentives for coincident market innovation are as a general matter inversely correlated with market power in the relevant product market as a consequence of the replacement effect, proof that the conduct at issue either creates or maintains the defendant's monopoly power in the R&D market and does not reduce its share or market power in the product market, or that the conduct creates or maintains the defendant's monopoly power in the product market when it has monopoly power in the R&D market, should be sufficient to establish a rebuttable presumption of harm to innovation. A weaker presumption of reduced innovation can be based on proof that the conduct at issue creates or maintains the defendant's monopoly power in the product market even if the defendant does not have monopoly power in the R&D market. These presumptions mirror the approach to Section 2 liability for the evaluation of price effects in the sense that adverse effects can be presumed from increased market power and need not be proven. For a two-sided platform in which services are provided without monetary charge on one side, the adverse incentive for innovation from the replacement effect is operative if innovation risks a replacement effect on the revenue side of the market.

For non-coincident market innovation, a rebuttable presumption of harm to competition would require evidence of the creation or maintenance of monopoly power in an R&D market from alleged anticompetitive conduct that can be described with reasonable certitude. The presumption can be rebutted by proof that the added monopoly power is necessary for the firm to appropriate value for its R&D efforts.

