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Innovation Matters

Competition Policy for the High-Technology Economy

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1 Introduction

Current antitrust enforcement has its priorities backwards... the promotion of production and innovation efficiency should be the first economic goal of antitrust policy.

—Joseph F. Brodley, “The Economic Goals of Antitrust: Efficiency, Consumer Welfare, and Technological Progress” (1987)

There is widespread concern that competition is not working for the high-technology economy. Dominant firms supply many information, computing, and internet services. Business creation has slowed. Venture capitalists shun start-ups that would compete with the major digital platforms. Firms that dominate high-tech industries have managed to acquire or eliminate many potential competitors. Politicians on the left and the right are demanding more aggressive antitrust enforcement, including breaking up high-tech titans or limiting their operations to prevent them from discriminating against firms that rely on their services.

Some lay the blame for the failure of competition in the high-technology economy on misguided antitrust enforcement, which has been captured by economic arguments that equate consumer welfare with low market prices. There are calls to replace this consumer welfare standard with alternative approaches that allow a broader consideration of the effects of policies on dimensions other than price, such as jobs, privacy, inequality, and the concentration of political power.¹

A focus on consumer welfare has been a stabilizing influence for antitrust enforcement. Alternative goals are often less precise or they admit policies that do not benefit consumers in the near term or in the more distant future. The main thesis of this book is that antitrust enforcement has to change to address challenges to competition in the

high-technology economy, and that positive change can occur without sacrificing a focus on consumer welfare. The answer is to move from *price-centric* to *innovation-centric* competition policies. The transition will require a different emphasis in antitrust enforcement, different analytical approaches, and substantive changes to methodologies and presumptions that have been adopted by the courts that enforce the antitrust laws.

Antitrust agencies have taken steps to address innovation in their enforcement decisions. In 1993, General Motors (GM) proposed to sell its Allison Transmission Division to ZF Friedrichshafen AG. The companies were two of the world's largest manufacturers of automatic transmissions for large trucks, buses, and other commercial and military vehicles. At the time, I was the Deputy Assistant Attorney General for Economics in the Antitrust Division at the US Department of Justice (DOJ).² There were serious concerns in the Division about the transaction, but they did not fit into the usual enforcement boxes. Although Allison and ZF competed in Europe, ZF was only a minor manufacturer of medium- and heavy-duty automatic transmissions for vehicles sold in the US. Because ZF had a small share of sales in the US, the transaction was unlikely to have a very large effect on the prices paid by US customers.

But lawyers and economists in the Antitrust Division had a different concern: The merger (technically, an acquisition of GM's Allison Division by ZF),³ if allowed to occur, would have reduced the merged company's motivation to innovate by eliminating rivalry between Allison and ZF in Europe, which would have had negative consequences for buyers in the US. (By "innovation," I mean a new or improved product or process that differs significantly from previous products or processes.⁴ Innovation is more than invention, which is the act of discovering a new product or process, because innovation requires that an invention be put into active use or be made available for use by others.⁵) The GM-ZF transaction, if allowed to occur, would have denied US buyers the benefits of new or improved products that both GM's Allison Division and ZF would have had an incentive to develop if they remained independent.

The DOJ challenged the proposed merger.⁶ The complaint emphasized harm to innovation as well as traditional adverse price effects. In its complaint, the Antitrust Division defined an "innovation market," which included Allison and ZF as two of the most important competitors engaged in research and development (R&D) for automatic transmissions used in large trucks, buses, and other commercial and military

vehicles, and alleged that the merger would create a near-monopoly in the innovation market and reduce incentives to innovate. The parties abandoned their proposed merger in response to the complaint.

The GM-ZF merger challenge caused a stir in the staid antitrust community. Some accused the Antitrust Division of ignoring accepted antitrust principles by losing its traditional focus on price effects. Others railed that too little was known about innovation incentives to admit such concerns into the antitrust policy sphere. Despite these objections, the merger protected innovation incentives for automatic transmissions used in large trucks and buses, which is what we would expect today from developments in economic theory and empirical research on market structure and innovation.

Since the GM-ZF complaint, there have been more calls for antitrust enforcement to challenge mergers and other conduct that would harm innovation. In the late 1990s, the Antitrust Division investigated whether Microsoft's conduct related to its Windows personal computer (PC) operating system and Internet Explorer browsing software promoted innovation or was an abuse of monopoly.⁷ In 2001, the Federal Trade Commission (FTC) investigated whether a merger of Genzyme and Novazyme would promote or delay a cure for a genetic disorder that is often fatal for hundreds of young patients. More recently, the FTC had to decide whether changes to Google's search engine were a consumer-friendly innovation or an anticompetitive design change that excluded competitors. Since the GM-ZF case, both the Antitrust Division and the FTC have addressed innovation concerns in numerous other proposed mergers, acquisitions, and joint ventures.

Antitrust enforcers often voice their concerns about protecting innovation, and the history of antitrust legislation supports the objective of preserving opportunities for dynamic competition. Nonetheless, antitrust enforcement evolved over more than a century to promote price competition by preventing mergers or other conduct that may widen the gap between prices and production costs, often to the exclusion of concerns about innovation.

The foundational statutes for US antitrust law are the Sherman and Clayton Acts. Section 1 of the Sherman Act prohibits contracts, combinations, or conspiracies in restraint of trade.⁸ Section 2 does the same for monopolization or attempts to monopolize.⁹ Section 7 of the Clayton Act prohibits mergers and acquisitions whose effects may be substantially to lessen competition, or to tend to create a monopoly.¹⁰ The FTC addresses unfair and deceptive methods of competition under Section 5

of the Federal Trade Commission Act.¹¹ The statute covers conduct that would violate the Sherman Antitrust Act or the Clayton Act, but may address other conduct that is likely to harm competition.¹²

Other jurisdictions have their own versions of the Sherman and Clayton Acts.¹³ For instance, Article 101 of the Treaty on the Functioning of the European Union prohibits cartels and other agreements that could disrupt free competition in the internal market of the European Economic Area (EEA), and Article 102 prohibits any undertaking that holds a dominant position in a market from abusing that position. Council Regulation 139/2004 prohibits mergers and acquisitions that would significantly reduce competition in the EEA.

It is understandable why antitrust enforcement came to focus its power on price competition. The proscriptions in the antitrust statutes are vague, and courts have had to create their own guidebooks to interpret them. Economic theory provided an internally consistent description of how price competition benefits consumers and established a nexus with the apparent objectives of the antitrust laws. Courts, antitrust agencies, and economists developed tools that facilitate a quantitative evaluation of price impacts. The promotion of price competition was not necessarily the only objective of antitrust law, but the application of economic methodologies to evaluate and promote price competition was something that the courts could do well.

This book is an attempt to collect in one place the current state of knowledge about antitrust enforcement for innovation and price competition for future products and services, to complement the state of knowledge about antitrust enforcement for price competition for existing products and services. The narrative is directed to an audience of economists, competition enforcers, and practitioners, although I hope that the book will appeal to others with interests in competition policy.

Chapter 2 describes the distinctive features of the high-tech economy and the challenges they raise for antitrust enforcement. These features include the potential for industry disruption, network effects, the importance of intellectual property, and the fact that many high-tech firms operate as platforms that coordinate prices and terms of service for different firms and users. Network effects reinforce the dominance of major internet companies because consumers value the participation of other consumers in their services. Intellectual property, economies of scale from R&D and the aggregation of data, and platform characteristics such as zero prices for some services, erect additional barriers to new competition and complicate the evaluation of alleged antitrust harms. Fur-

thermore, tech titans have developed reputations for acquiring potential competitors and for competing aggressively against start-ups that attempt to enter markets that they serve, or that they have the capabilities to serve. Chapter 2 describes the frenetic pace of acquisitions by Google's parent company Alphabet, Facebook, Apple, Amazon, and Microsoft.

This chapter addresses whether the distinctive features of the high-technology economy warrant a different or more aggressive approach to antitrust enforcement. The antitrust laws are sufficiently flexible to allow for innovation-centric competition policy; however, the laws have been interpreted over time in ways that raise obstacles to sound enforcement policies for innovation. Many legal precedents have evolved that are not helpful for an evaluation of harm to innovation. These precedents support measures that promote short-run economic efficiency by moving prices closer to marginal production costs. While this evolution has had positive results for consumer-friendly competition enforcement in "old economy" industries such as manufacturing, mining, and services, it does not necessarily promote innovation, which requires the expectation of positive profits to motivate investment in R&D.

A major obstacle to an innovation-centric competition policy is the traditional emphasis in antitrust litigation on market definition and market shares. Market definition identifies the products and services that are relevant to an antitrust evaluation and their geographic locations. Firm market shares follow from the calculation of sales, revenues, or other relevant firm characteristics, such as production capacities, in the defined markets. Market definition and the calculation of market shares often are not useful analytical tools for a merger or conduct by a firm that is likely to harm incentives to invest in R&D or threaten competition in a future market. The precise boundaries of a market that does not presently exist are inherently uncertain. Moreover, given relevant future markets, available data at best allows a prediction of firm shares in these future markets.

In some other respects, traditional price-centric antitrust enforcement policies do not conflict with policies that prevent harm to innovation. For example, as discussed in detail in chapter 8, courts applied conventional antitrust principles to evaluate allegations that agreements between Microsoft and suppliers of software and hardware excluded competition in violation of Sections 1 and 2 of the Sherman Act. The resulting enforcement outcomes generally aligned with policies that are more focused on innovation, although the ability of network effects to reinforce market dominance calls for stiffer enforcement of

exclusionary agreements. Conduct that makes it more difficult to attract customers to a competing product can cause a market with network effects to favor a dominant supplier, even though the conduct falls short of the substantial foreclosure standard that most courts have adopted for unlawful exclusive dealing under Section 1 of the Sherman Act.

Chapter 3 focuses on two fundamental themes of innovation competition: the “replacement effect,” first described by Kenneth Arrow,¹⁴ and the “Schumpeterian” theory of imperfect competition and the appropriation of private returns for R&D.¹⁵ These two themes have dramatically different implications. Kenneth Arrow pointed out that the existing profits that firms earn in imperfectly competitive markets can dull innovation incentives. The incentive to innovate is the difference in a firm’s profit with and without an innovation. This difference is reduced if an innovation replaces profits that firms earn from their existing products or technologies. In contrast, Joseph Schumpeter argued that imperfectly competitive markets provide innovation incentives that are absent in highly competitive markets by making it easier for firms to profit from their discoveries and by providing a more stable flow of earnings to cover the costs of R&D.

Both themes provide valuable insights, but they omit important considerations that can change their predictions. Arrow explained the replacement effect in a highly simplified model that abstracts from R&D competition and industry dynamics and is limited to process innovations that lower a firm’s production cost. For example, contrary to Arrow’s prediction that monopoly power discourages incentives to invest in R&D, monopoly power can have the opposite effect if innovation allows the firm to maintain its monopoly by preempting competition from potential rivals. Incentives for product innovations are more complex than incentives for process innovations because a firm can benefit by coordinating prices for existing and new products.

Modern economic theory and empirical evidence suggest that industry concentration can allow innovators to appropriate greater profit from their innovations under some circumstances. This is consistent with Schumpeter’s argument that imperfectly competitive markets promote innovation incentives, but empirical evidence does not generally support a Schumpeterian perspective that monopoly power promotes innovation. There is no evidence that monopoly encourages R&D investment by providing a more stable flow of earnings. Some (but not all) empirical studies discussed in chapter 6 show greater R&D investment or innovation output in more competitive markets, and

empirical studies do not generally support a conclusion that mergers promote R&D investment or innovation.

Chapter 4 provides further elaboration of the complex interactions between competition and innovation incentives. This chapter addresses issues that include market dynamics, cumulative innovation in which discoveries build on prior discoveries, and managerial and organizational theories of corporate behavior. Simple models of innovation competition and races to patent a discovery generally show that an increase in rivalry increases the probability of discovery and advances the likely date of a discovery. More complicated dynamic models capture the interdependence between market structures that motivate investment in R&D and the market structures that result from successful innovation. These theories show that competition can reduce the rate of innovation in some instances and demonstrate the importance of technological differences among firms for innovation incentives. Theories of corporate behavior for innovation emphasize cognitive distortions and organizational adjustments that cause dominant firms to ignore or eschew innovation opportunities, although predictions of the theories often are not fundamentally different from predictions of models that focus solely on economic incentives.

Antitrust authorities and the courts have limited policy levers to influence innovation. Antitrust enforcement can restrain single-firm conduct, establish limits on permissible agreements, and either prevent mergers and acquisitions or condition them on structural or behavioral remedies. Neither the antitrust authorities nor the courts can control competition directly. Chapter 5 addresses theoretical issues that are relevant to the analysis of the effects of mergers on innovation incentives and future price competition. In recent years, almost every challenge by US antitrust authorities of a merger or acquisition in a high-tech industry has included an allegation of harm to innovation. Yet the Horizontal Merger Guidelines, a joint publication of the DOJ and the FTC, barely mentioned innovation until the most recent revision of these guidelines in 2010.

The major tech platforms are adept at identifying potential competitors and acquiring them before they can achieve a scale that triggers antitrust review. The ability of many high-tech firms to identify and acquire promising competitors justifies greater antitrust scrutiny of acquisitions of potential competitors. Courts have been reluctant to challenge the acquisition of a potential competitor absent clear evidence that the potential competitor would have entered the relevant market

without the acquisition. A recommendation offered in this chapter is that courts should reverse this historical reluctance if the potential competitor is an innovator. If the acquisition of a successful innovator would harm competition, antitrust enforcers should block the acquisition even if the probability of success is small, unless the acquisition has other efficiency benefits. A qualification is that, in some instances, the opportunity to sell a start-up or promising R&D project to an established firm is the most powerful incentive for innovation and the best way to commercialize a new product. Prohibiting acquisition by an established firm could discourage innovation if the innovator cannot partner with the acquiring firm for which it offers the most value. Furthermore, some established companies are likely to compete directly against start-ups if they cannot acquire them, and the threat of this competition can be a significant deterrent for innovation by new entrants.

Chapter 6 reviews the empirical literature related to competition, mergers, and innovation. The empirical evidence for a link between competition and innovation is somewhat mixed. While several studies show that competition promotes innovation, others find either a negative effect or no effect. One result that appears in several empirical studies is that the positive effect of competition on innovation is greater for firms that are at or near the frontier of efficient production. Competition has a less-positive effect, and may discourage innovation, for firms that substantially lag their rivals. These empirical results are consistent with the theory described by the Arrow replacement effect and Schumpeterian appropriation incentives.

A merger differs from a reduction in competition because it leaves the R&D assets of the merging firms intact, at least in the near term, but centralizes control of the merging parties' R&D decisions. Because mergers are related to, but not equivalent to, a reduction in competition, this chapter summarizes the empirical literature on competition and mergers separately.

Only a few empirical studies apply sophisticated statistical techniques to uncover the effects of mergers on R&D and innovation, and the few sophisticated studies do not identify a consistent pattern of results. Furthermore, observations are censored because antitrust authorities challenge mergers that they believe have anticompetitive effects, and consequently these mergers would not appear in the data. Despite these limitations, these studies do not support a conclusion that mergers generally promote R&D investment or innovation.

Case studies are useful illustrations of the successes and failures of antitrust policy for innovation. I begin in chapter 7 with examples of merger enforcement by US and European antitrust agencies in cases that alleged innovation concerns. The chapter reviews several instances in which the agencies refused to accept a structural or behavioral remedy to address their competition concerns and consequently the parties abandoned the proposed transactions. The challenges reviewed in this chapter appeared to have restored innovation incentives and future price competition that the agencies alleged would have been harmed by the merger.

In most proposed mergers and acquisitions, the antitrust agencies resolve their innovation concerns by negotiating consent decrees that mandate partial divestitures or licensing agreements. Chapter 7 reviews several of these consent decrees and follows the performance of entities that were the recipients of divested assets or patent licenses. Some of the divestiture agreements appear to have achieved the objective of restoring innovation incentives that might have been lessened by the proposed transaction, while others appear to have been less successful. For some proposed mergers or acquisitions in which the parties agreed to divest R&D assets to a third party, there is little evidence that the recipient of the divested assets continued to invest in R&D directed toward the applications for which the antitrust agency expressed innovation concerns. Broad licensing obligations have had a better success record. The merging parties and the industry as a whole continued to invest in R&D and file for patents at rates that were comparable to or higher than the premerger levels.

Chapters 8 and 9 deal with single-firm conduct that affects innovation by examining and inferring policy lessons from two significant examples. Chapter 8 discusses the antitrust case brought by the US DOJ and several states against Microsoft for monopolizing the market for PC operating systems. This chapter also describes cases brought by the European Commission (EC) that challenged Microsoft's conduct related to media players and workgroup servers.

The Microsoft cases illustrate several themes that are explored throughout this book. In the US case, the appellate court recognized the challenges of crafting appropriate antitrust enforcement for a dynamic market characterized by strong network effects, but it rejected the argument that the antitrust laws are not applicable to firms that operate in the high-technology economy. The court largely applied

traditional antitrust principles, but it also carved out differential treatment for linking software products when it refused to condemn the tying of the Internet Explorer web browser to the Windows operating system.

A central allegation in the US case and in a related case brought by the EC was that Microsoft's actions prevented the Netscape internet browser from undermining Microsoft's monopoly by becoming a platform to develop applications that would run on different operating systems. That has yet to occur. Nonetheless, the consent decree that ended the US litigation and decisions by the EC had beneficial effects for software innovation by constraining conduct by Microsoft that would exclude competition and by encouraging Microsoft to make its software products interoperable with other products.

Chapter 9 describes investigations by the FTC and the EC that addressed the display of Google search results for comparison shopping services (CSS). CSS websites collect product offers from online retailers and allow users to click on links to the retailers' websites to make a purchase. A redesign of Google's search algorithms gave prominent position to its proprietary CSS in response to relevant queries, while demoting independent CSS websites in Google search results. The redesign caused a substantial reduction of internet traffic to independent CSS websites, and concentrated consumer attention on Google's proprietary CSS. Although the Microsoft cases largely addressed the company's efforts to maintain its monopoly power in PC operating systems, the Google case addressed conduct that arguably extended that company's monopoly power in internet search and advertising to the related activity of comparison shopping services.

The Google Shopping case offers insights into the antitrust treatment of broad categories of conduct that arise in the context of other high-technology platforms. One category is the incentive and ability of digital platforms to preference their products and services over those of their rivals. The alleged preference in the Google Shopping case is Google's demotion of rival CSS websites in its search results and the prominent placement of its own CSS in response to product queries. Similar allegations have been raised about preferential placement by Amazon for its private label products on its online retail platform and allegations that Apple favors its proprietary apps in response to app searches.

A second broad category is the antitrust treatment of innovations and product designs that exclude rivals without compensating con-

sumer benefits. Concerns about the ability of dominant high-tech firms to design their products in ways that imitate and eliminate potential competition have had repercussions for innovation by potential rivals. Venture capitalists describe a “kill zone” of technologies that surround the businesses of the tech titans. Technologies in the kill zone are unattractive for venture capital because there is a high risk that the dominant firm will extinguish independent innovators if they are successful. The Google Shopping case illustrates the challenge of identifying and enforcing anticompetitive conduct when dominant firms can easily integrate into related operations.

The FTC and the EC focused on similar issues in the Google Shopping case and studied similar evidence, but their investigations had different outcomes. The FTC decided not to challenge Google’s conduct related to the design of its search displays; the EC fined Google for violating European antitrust law and ordered the company to design a search display that does not preference its own CSS. The disparate outcomes reflect different approaches to product designs that can exclude competition in the two jurisdictions. Unfortunately, the FTC did not explain the reason for its decision any detail. The EC published a detailed decision, but it did not explain how it evaluated the costs and benefits from Google’s conduct.

This chapter describes several tests that have been proposed to identify conduct related to innovation and product designs that have anti-competitive effects (sometimes called “predatory innovation”). Each of these tests has significant limitations. The chapter concludes that the most useful analytical approach is a truncated rule of reason that exempts substantial new designs or innovations from potential antitrust liability unless they are accompanied by other conduct that has exclusionary effects without compensating benefits. Product designs or claimed innovations that have little or no merit would be candidates for a full rule of reason analysis that evaluates the benefits from these designs or claimed innovations and compares them to their exclusionary effects.

Following the truncated rule of reason, Google’s conduct in the comparison shopping case would escape antitrust condemnation if a court concludes that its proprietary shopping product is a significant innovation and if Google has a pro-competitive justification for demoting competing CSS websites in its search results. This approach would not exonerate Google if the demotion of competing CSS websites has little or no efficiency justification.

Next, chapter 10 addresses antitrust policy for standards and for conduct that affects interoperability or compatibility. Two or more systems are interoperable if they can communicate efficiently with each other. Applications are compatible if they can function within the same work environment, such as Microsoft Word and Excel. Interoperability is sufficient but not necessary for compatibility. Interoperability standards can promote innovation by allowing firms to specialize in components and exploit economies of scale with the knowledge that their components will be compatible with other components that together provide valuable services. However, standards also have antitrust risks. Dominant firms can exclude rivals by unilaterally promoting a standard that is not compatible with products supplied by their rivals. Cooperative standard-setting raises the types of risks that are common when actual or potential competitors discuss their joint interests in commercial applications. Intellectual property (IP) rights further complicate the standard-setting process because standards can confer substantial market power on owners of IP rights that are essential to make, use, or sell products that comply with the standards.

Finally, chapter 11 concludes with some remarks regarding the adaptations that courts and antitrust authorities must make to implement innovation-centric competition policy. The chapter closes with comments about the suitability of structural reforms to address the ability and incentives of major tech platforms to harm competition and innovation.