Startup Acquisitions, Error Costs, and Antitrust Policy

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Startup acquisitions by dominant incumbents, especially in high tech, have recently attracted significant attention. Many researchers and practitioners worry about harms to competition or innovation. However, there has been very little antitrust enforcement in this area. This is emblematic of a prominent feature of modern antitrust law: a strong preference for erring on the side of nonenforcement. A leading rationale for this preference is the claim that market power self-corrects by attracting new entrants who discipline incumbents.

As a result, plaintiffs generally face very demanding evidentiary requirements, which are particularly hard to satisfy in the case of startup acquisitions. A typical startup is both new and small, providing little data for estimating competitive effects. Despite this uncertainty, it is unlikely that society is best served by a policy of near-universal inaction. Recent work in economics, both empirical and theoretical, identifies various harms to competition and innovation as a result of startup acquisitions in concentrated markets. Further, the traditional error cost argument is particularly inapposite in this context, as startup acquisitions may be undertaken precisely because they forestall competitive entry. We therefore argue for expanded antitrust intervention (that is, more than zero) in startup acquisitions by dominant incumbents. In practice, the acquirer's market power and the transaction value may be useful signals of the risk of harm.

INTRODUCTION

High tech industries are not only lucrative, but also highly innovative and dynamic. Large firms are not their sole source of innovation, however. Many valuable technologies are first developed by startup companies. Innovative startups are frequently acquired by powerful incumbents at an early stage. Well-known examples include acquisitions of WhatsApp and Instagram by Facebook; Waze and DoubleClick by Google; and GitHub and LinkedIn by Microsoft. These cases have drawn very little antitrust scrutiny, leading many commentators to question whether antitrust is in need of reform.[1]

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1 See, for example, Carl Shapiro, *Antitrust in a Time of Populism*, 61 Intl J Indust Org 714, 741 (2018) ("[T]here would be a big payoff in terms of competition and innovation

This paucity of meaningful oversight is driven by uncertainty about a startup's future impact on the marketplace. Merger enforcement is usually directed at proposed combinations of large, established firms. It largely focuses on the estimated immediate effect of the proposed deal on competition.[2] But startups are new and comparatively small, leaving little data with which to estimate competitive effects. Further, the relevant antitrust concerns relate mainly to more speculative effects on future competition. Rather than taking calculated steps to balance such uncertainties against the potential benefits of enforcement, antitrust policy has maintained a rigid policy of near-universal inaction.

This result is emblematic of a broader principle often associated with the influential Chicago School[3] of antitrust thought, which has had significant influence on the Supreme Court in recent decades.[4] This principle holds that antitrust should err on the side of nonintervention (false negatives), because erroneous condemnations (false positives) are seen as more socially costly.[5] A leading rationale is that competitive entry will discipline anticompetitive behavior organically, whereas the adverse effects of erroneous intervention will persist indefinitely.[6] This view has

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if the [antitrust authorities] could selectively prevent mergers that serve to solidify the positions of leading incumbent firms, including dominant technology firms, by eliminating future challengers."). See also Steven Davidoff Solomon, *Tech Giants Gobble Start-Ups in an Antitrust Blind Spot* (NY Times, Aug 16, 2016), archived at https://perma.cc/5YXC-WDSB.

[2]   See United States Department of Justice and Federal Trade Commission, *Horizontal Merger Guidelines* *3–4 (Aug 19, 2010), archived at https://perma.cc/6J2Y-FE5M. See also Part II.C.

[3]   See generally Robert H. Bork, *The Antitrust Paradox: A Policy at War with Itself* (Basic Books 1978); Richard A. Posner, *The Chicago School of Antitrust Analysis*, 127 U Pa L Rev 925 (1979).

[4]   See, for example, Jonathan B. Baker, *A Preface to Post-Chicago Antitrust*, in Antonio Cucinotta, Roberto Pardolesi, and Roger Van den Bergh, eds, *Post-Chicago Developments in Antitrust Law* 60, 65 (Edward Elgar 2002) ("The Chicago School supplanted the reigning antitrust orthodoxy in an antitrust revolution led from the top—mainly by the Supreme Court—beginning in the mid-1970s."); William H. Page, *Legal Realism and the Shaping of Modern Antitrust*, 44 Emory L J 1, 47–69 (1995) (discussing the Chicago School's influence on the Supreme Court's antitrust jurisprudence).

[5]   This argument is often credited to Judge Frank Easterbrook's seminal 1984 article. Frank H. Easterbrook, *The Limits of Antitrust*, 63 Tex L Rev 1, 21 (1984) ("If judges tolerate inefficient practices, the wrongly-tolerated practices will disappear under the onslaught of competition. The costs of [false positives] are borne by consumers, who lose the efficient practices and get nothing in return."). See also Part I.A.

[6]   See, for example, David S. Evans and A. Jorge Padilla, *Designing Antitrust Rules for Assessing Unilateral Practices: A Neo-Chicago Approach*, 72 U Chi L Rev 73, 84 (2005) ("If an anticompetitive business practice is mistakenly permitted, the resulting monopoly profits attract competition and new entrants, at least in the long run. . . . By contrast,

spurred very demanding evidentiary requirements, making it difficult for plaintiffs to prevail in most kinds of antitrust cases.[7]

Thus, considering the uncertainties they present, it is unsurprising that startup acquisitions have received very little antitrust scrutiny. However, a growing body of economic theory and empirics identifies various harmful effects from such acquisitions. Over time, they can expand the technological gap between industry leaders and "laggards" (smaller or less successful rivals).[8] The product market is thus left less competitive and more concentrated.[9] Startups are sometimes acquired by dominant firms solely to exclude rivals from accessing such technologies.[10] In addition, incentives for innovation may also be adversely affected, as they are influenced in part by the prospect of future acquisitions.[11] An innovator's decisions about what lines of research to invest can become skewed.[12] Further, once a habitual acquirer becomes sufficiently dominant, its willingness to pay for new technologies falls, reducing the returns innovators receive for future inventions.[13] Incentives for prospective startups to innovate are thus weakened.[14]

To be sure, in most startup acquisitions, it is probably not possible to precisely predict the transaction's but-for impact on commerce.[15] But it does not follow that society is best served by a policy that permits dominant incumbents to acquire all promising startups soon after they form. These acquisitions may have significant adverse effects in the aggregate, even if it is difficult to

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market forces play little corrective role for procompetitive business practices deemed anticompetitive.").

[7]   For example, Professor Michael Carrier finds that, in antitrust claims arising under the rule of reason, modern plaintiffs prevail on final judgment in only a tiny percentage of cases. Michael A. Carrier, *The Rule of Reason: An Empirical Update for the 21st Century*, 16 Geo Mason L Rev 827, 830 (2009).

[8]   Kevin A. Bryan and Erik Hovenkamp, *Antitrust Limits on Startup Acquisitions,* Rev Indust Org *16 (forthcoming 2020), archived at https://perma.cc/M5E4-ANPJ.

[9]   Id at *6, 10–12.

[10]   See Part II.A.1.

[11]   Given the role of startup acquisitions in fostering innovation and entrepreneurship, one cannot focus on competitive effects in a vacuum. An efficient policy must improve the balance of competition and innovative activity.

[12]   See Part II.A.2.

[13]   Bryan and Hovenkamp, *Antitrust Limits on Startup Acquisitions* at *17 (cited in note 8).

[14]   Id at *18–19.

[15]   A limited exception arises in cases in which the acquirer is a monopolist and the startup is clearly a prospective competitor. See Part II.A.1.

assess how any particular transaction would influence the marketplace. Consequently, society may benefit from a policy that permits limited intervention based on reasonably ascertainable evidence, even if this carries some risk of false positives.[16]

The traditional argument favoring false negatives is particularly ill-suited to this setting.[17] There is a clear circularity problem. The driving force behind the error cost argument, competitive entry, is directly threatened by the conduct in question. One cannot expect potential entrants to discipline anticompetitive behavior if they are consistently absorbed by powerful incumbents. When the market leader is sufficiently dominant, it is generally most profitable (for both the leader and the startup) for technology rights to be sold exclusively to the leader. This softens competition by increasing the leader's technological advantage over its competitors. Hence there is no reason to expect that the market will self-correct the problem, as it is more profitable than the alternative.

This Essay is organized as follows. In Part I, we address the error cost argument and some subsequent rebuttals. Part II addresses the potential harms from startup acquisitions by dominant incumbents, provides supporting empirical evidence, and explains why current merger policy is unlikely to provide a satisfactory solution. In Part III we argue that expanded (albeit limited) intervention in startup acquisitions is likely to be beneficial, and that the traditional error cost argument holds little weight in such cases. We also discuss reasonable indicia for the likelihood of harm and potential remedies that might be implemented in practice. We conclude by noting that the error cost argument for nonintervention may be inappropriately applied in many other settings as well.

I. Error Costs and Market Entry

The complexities of antitrust are often difficult for courts to manage in practice, and it is important for antitrust policy to be mindful of these administrative limitations.[18] Further, the effects

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16   See Part III.

17   For a broader critique, see Jonathan B. Baker, *Taking the Error Out of "Error Cost" Analysis: What's Wrong with Antitrust's Right*, 80 Antitrust L J 1, 7–36 (2015). See also Alan Devlin and Michael Jacobs, *Antitrust Error*, 52 Wm & Mary L Rev 75, 97–100 (2010); Oliver E. Williamson, *Delimiting Antitrust*, 76 Georgetown L J 271, 281–89 (1987).

18   See, for example, David McGowan, *Between Logic and Experience: Error Costs and United States v. Microsoft Corp.*, 20 Berkeley Tech L J 1185, 1244 (2005) ("[E]conomic

of an antitrust judgment are often felt by many parties not before the court, including most or all consumers in the relevant market. Thus, a natural question is what costs arise from different types of judicial errors and how they compare. Beginning in the late twentieth century, many scholars set upon this question of "error costs" in antitrust, leading to a widespread view that it is far less harmful to condone an anticompetitive practice than to condemn an efficient one.[19]

The argument's driving premise is that false negatives will generally self-correct over time, while false positives will not.[20] The most commonly given justification for this is that anticompetitive behavior invites new competition, attracted by the prospect of dethroning a high-priced incumbent.[21] After all, higher prices are the easiest to undercut while still turning a profit. Entry is thus more enticing when the relevant market is less competitive, all else being equal.

This argument is complemented by the theory of market "contestability," introduced by Professor William Baumol in the 1980s.[22] This theory describes markets that are concentrated but nevertheless competitive because the prospect of entry deters incumbents from setting supracompetitive prices.[23] Such a market

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analysis is more sophisticated than in the past, as is our understanding of the limitations of the courts."); Easterbrook, 63 Tex L Rev at 4 (cited in note 5) ("Antitrust is costly. The judges act with imperfect information about the effects of the practices at stake."); *United States v Topco Associates, Inc*, 405 US 596, 609 (1972) ("The fact is that courts are of limited utility in examining difficult economic problems.").

   19   See, for example, Joshua D. Wright, *Abandoning Antitrust's Chicago Obsession: The Case for Evidence-Based Antitrust*, 78 Antitrust L J 241, 248 (2012) ("The error-cost framework begins with the presumption that the costs of false convictions in the antitrust context are likely to be significantly larger than the costs of false acquittals."); McGowan, 20 Berkeley Tech L J at 1188 (cited in note 18) ("[T]he law should be more averse to false positives . . . than to false negatives.").

   20   See, for example, Easterbrook, 63 Tex L Rev at 3 (cited in note 5) ("[J]udicial errors that tolerate baleful practices are self-correcting, while erroneous condemnations are not."); Fred S. McChesney, *Talking 'Bout My Antitrust Generation: Competition for and in the Field of Competition Law*, 52 Emory L J 1401, 1412 (2003) ("Letting the guilty go free in antitrust is generally a self-correcting problem.").

   21   Easterbrook, 63 Tex L Rev at 15 (cited in note 5).

   22   William J. Baumol, *Contestable Markets: An Uprising in the Theory of Industry Structure*, 72 Am Econ Rev 1, 4 (1982) (arguing that concentrated industries will nevertheless be competitive if they are "contestable" in the sense that the threat of entry is ever looming).

   23   Id at 3–5.

is said to be "contestable."[24] This theory, when applicable,[25] suggests that market concentration does not necessarily preclude competitive behavior. While arguments about contestability are typically not focused on error costs specifically, they give some theoretical support to the proposition that markets will end up correcting anticompetitive behavior over time, which is the core premise behind the traditional error cost argument.

A.   Strategic Behavior and Entry

Arguments about market power and contestability have advanced greatly among economists since the price-theoretic intellectual origins of the Chicago School. In a price-theoretic world, conduct is a function of demand, cost, and technology. Firms are ex ante identical in the technology they can access and can freely enter markets. Excess profits therefore attract entry.[26] Regulatory error that improperly permits anticompetitive behavior by a firm will lead to excess profits, hence pressure to enter. The welfare harms of error, it is argued, are thus less than they appear.[27]

The problem with this argument is that it abstracts away from strategic interactions among the incumbent and the entrant.[28] If a new firm is considering entry, the incumbent may

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[24]   Id at 3–4.

[25]   The theory hinges on a number of strong assumptions, most notably that entry is relatively easy and expedient. See, for example, Avinash Dixit, *Recent Developments in Oligopoly Theory*, 72 Am Econ Rev 12, 15–16 (1982). That ease of entry is relevant to market self-correction is mostly undisputed on all side of the literature. See Baker, 80 Antitrust L J at 9 n 34 (cited in note 17).

[26]   See generally, for example, George J. Stigler, *A Theory of Oligopoly*, 72 J Pol Econ 44 (1964).

[27]   Though the Chicago School predates formal contestability models, they both share the underlying property of competition for the market with limited barriers to entry. See, for example, Richard J. Gilbert, *The Role of Potential Competition in Industrial Organization*, 3 J Econ Persp 107, 113 (1989):

> In many respects, the Chicago school theory of markets is a weak form of the contestable markets hypothesis. Whereas entry barriers are nonexistent in perfectly contestable markets, they play a minor and temporary role in the Chicago School. With two or more firms contestable markets act as if they are perfectly competitive. In the Chicago School, markets are "workably" competitive.

[28]   See, for example, Oliver E. Williamson, Book Review, 46 U Chi L Rev 526, 528 (1979):

> I would caution, however, that static analysis is appropriate only if strategic considerations can be presumed to be absent—where by "strategic" I refer to efforts by established firms to take up or maintain advance positions . . . or to respond contingently to rivalry in ways designed to discipline existing rivals and/or discourage potential competition.

have effective deterrence strategies.[29] In particular, the incumbent may be able to invest ex ante in ways that limit entry. Further, the actions necessary to deter entry may harmfully distort socially useful incumbent investments, such as research and development (R&D), product variety, or product diffusion. We treat each of these cases in turn.

To deter entry by inducing potential entrants to believe that competition with the monopolist will be unprofitable requires the post-entry deterrence action to be credible. In the traditional Chicago School framework, entrants have access to the same technology, with the same economies of scale as incumbents.[30] If actions or investments pre-entry do not affect the nature of competition post-entry, then strategic interaction is irrelevant: the extent of entry is affected only by static post-entry profits available to the entrant.[31]

However, there are a number of straightforward strategies by which an incumbent can leverage its market power to deter entry. Incurring sunk costs that lower future marginal costs causes the post-entry price to fall, and can therefore make entry unprofitable.[32] Network effects and other switching costs that require coordination across buyers permit short-term monopoly to turn into long-term deterred entry.[33] Empirically, firms do appear

Both promoters and detractors of these theories were aware that frameworks based on threat of entry limiting market power neglected game theoretic concerns. See, for example, Michael Spence, *Contestable Markets and the Theory of Industry Structure: A Review Article*, 21 J Econ Lit 981, 982 (1983) ("It is quite clear the authors are aware that these strategic . . . problems have been set aside. The debate will center on the empirical importance of . . . these deliberately neglected aspects of industry structure.").

[29] With even a small probability that incumbents are "spiteful," entry by all future firms is deterred by threatening to punish the first with, for example, a price war. See Reinhard Selten, *The Chain Store Paradox*, 9 Theory & Decision 127, 131–32 (1978). For exhaustive examples of credible deterrence with perfect rationality, see Jean Tirole, *The Theory of Industrial Organization* 305–52, 361–80 (MIT 1988).

[30] George J. Stigler, *The Organization of Industry* 67 (Richard D. Irwin 1968) (defining a barrier to entry as "a cost of producing (at some or every rate of output) which must be borne by a firm which seeks to enter an industry but is not borne by firms already in the industry").

[31] See Spence, 21 J Econ Lit at 987 (cited in note 28) (discussing the importance of completely reversible fixed costs).

[32] See Avinash Dixit, *The Role of Investment in Entry-Deterrence*, 90 Econ J 95, 104–05 (1980).

[33] See, for example, Joseph Farrell and Paul Klemperer, *Coordination and Lock-In: Competition with Switching Costs and Network Effects*, in Mark Armstrong and Robert H. Porter, eds, 3 *Handbook of Industrial Organization* 1967, 1972 (Elsevier 2007) ("Ex ante competition often fails to compete away ex post rents: switching costs typically raise oligopoly profits and proprietary network effects often do, especially if expectations fail to track relative surplus.").

to react to the threat of entry in a different manner than they do to realized entry.[34] For instance, when Southwest begins flying from A to B when they are already flying from B to C, the probability they begin flying to A to C thereafter increases as there are economies of scope across routes.[35] The mere threat of those flights induces competitors to drop prices on A to C.[36] When Southwest has already committed to fly from A to C, there is no such preemptive price cutting.[37] Similar entry-deterring actions have been shown in excess advertising of soon-to-expire pharmaceuticals, and in new procedures among potentially competing hospitals.[38] That is, a model in which firms can never credibly deter entry, and hence one in which regulatory error leading to excess profits necessarily attracts entry, reflects neither modern economic theory nor recent empirical results.

Indeed, welfare is harmed not only when entry is successfully deterred, but also from the inefficiencies that arise as firms attempt to deter entry. Efficient markets are not only about price, but also about the amount of innovation, the extent of variety available to consumers, the compatibility of products in a network setting, and the avoidance of "money burning" through zero-sum advertising.[39]

For instance, consolidation in radio permitted by the Telecommunications Act of 1996[40] led new station entry to fall.[41] Why were entrants not attracted by the more profitable consolidated entry? Newly merged incumbents modestly differentiated their

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[34] See, for example, Austan Goolsbee and Chad Syverson, *How Do Incumbents Respond to the Threat of Entry? Evidence from the Major Airlines*, 123 Q J Econ 1611, 1618–21 (2008).

[35] Id at 1614–15.

[36] Id at 1618.

[37] Id at 1629–30.

[38] See Glenn Ellison and Sara Fisher Ellison, *Strategic Entry Deterrence and the Behavior of Pharmaceutical Incumbents Prior to Patent Expiration* 3 Am Econ J: Microecon 1, 6–11 (2011); Leemore S. Dafny, *Games Hospitals Play: Entry Deterrence in Hospital Procedure Markets*, 14 J Econ & Mgmt Strategy 513, 526–36 (2005).

[39] See, for example, Philippe Aghion, Ufuk Akcigit, and Peter Howitt, *What Do We Learn from Schumpeterian Growth Theory?* in Philippe Aghion and Steven N. Durlauf, eds, 2B *Handbook of Economic Growth* 515, 520–21 (Elsevier 2014) (discussing new theories of endogenous market structure due to innovation and the inefficient level of R&D under monopoly). See also generally Farrell and Klemperer, *Coordination and Lock-In* (cited in note 33) (discussing models in which deliberate incompatibility with rival products is profit enhancing); and Part II.A.2 (discussing models in which innovation direction is distorted by incumbents attempting to deter entry).

[40] Pub L No 104-104, 110 Stat 56, codified as amended in various sections of Title 47.

[41] Steven T. Berry and Joel Waldfogel, *Do Mergers Increase Product Variety? Evidence from Radio Broadcasting*, 116 Q J Econ 1009, 1018–19 (2001).

station offerings in such a way that, despite consolidation, there were no profitable "holes" in the variety spectrum worth incurring the fixed cost of setting up a station.[42] The particular station variety was chosen for entry deterrence reasons rather than efficiency concerns.[43] Attempts to deter not only reduce welfare by successfully deterring competition, but further harm welfare by pushing incumbents away from the most efficient product variety mix. As we discuss in the following Part, similar dual long-run harms of market power—less entry with its consequent higher prices, and distortions along other margins used by the incumbent to prevent entry—occur in highly innovative industries.

II. STARTUP ACQUISITIONS AND ANTITRUST POLICY

In this Part we consider the potential justifications for limited antitrust intervention in startup acquisitions. Throughout our analysis, we focus on cases where the acquiring firm is highly dominant within a relevant product market, meaning that it has significant market power.

A. Potential Harms

Antitrust usually focuses on potential injuries to competition. Such considerations are certainly relevant in the present context, too, but they do not tell the full story. Startups are typically innovative enterprises, and potential acquisitions may thus play an important role in the innovation and entrepreneurship processes. We address both sets of considerations below. The next Section then discusses empirical findings that shed light on these potential harms.

1. Diminished competition.

An important question in antitrust treatment of mergers and acquisitions is whether the proposed combination is "horizontal" or "vertical."[44] The two types of mergers receive different treatment

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[42] Id at 1012, 1021–24.

[43] Id at 1021–23 (describing a theoretical model of, and empirical evidence for, deterrence through product variety).

[44] A horizontal merger is one in which the parties are competitors (or potential competitors), such as a merger between competing computer manufacturers. By contrast, a vertical merger involves parties located at different levels of a supply chain (and who thus do not directly compete), such as a merger between a computer manufacturer and an operating system developer.

because they involve different theories of harm and different potential justifications.[45] In the horizontal case, the startup is a new or potential competitor of the acquiring incumbent. In this case, the potential antitrust concerns are more salient, for the acquisition necessarily forestalls competitive entry. Indeed, the acquirer may have no interest in actually using the startup's technology; it may simply wish to prevent such technology from reaching the marketplace.[46]

For example, in *Federal Trade Commission v Mallinckrodt ARD, Inc*,[47] the defendant was initially a monopolist in the market for adrenocorticotropic hormone drugs used for the treatment of infantile spasms.[48] It outbid potential rivals to acquire the domestic rights to the lone competing product, named Acthar, which had not previously been marketed in the United States.[49] The Federal Trade Commission (FTC) brought suit and succeeded in securing a stipulated judgment in which the defendant would be required to license the rights to sell Acthar to a competing US manufacturer, in addition to paying a $100 million fine.[50]

However, *Mallinckrodt* is a somewhat rare case in which the relevant acquisition target was obviously a prospective direct competitor in a clearly defined market that was otherwise utterly dominated by the acquirer. In practice, matters are rarely this clear-cut. First, in many instances, the startup presently offers only a technology that is complementary to the acquirer's product.

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[45]   For horizontal mergers, see generally *Horizontal Merger Guidelines* (cited in note 2); Michael D. Whinston, *Antitrust Policy Toward Horizontal Mergers*, in Armstrong and Porter, eds, 3 *Handbook of Industrial Organization* at 2369 (cited in note 33). For vertical merger enforcement, see generally Steven C. Salop and Daniel P. Culley, *Revising the US Vertical Merger Guidelines: Policy Issues and an Interim Guide for Practitioners*, 4 J Antitrust Enforcement 1 (2016); Steven C. Salop, *Invigorating Vertical Merger Enforcement*, 127 Yale L J 1962 (2018).

[46]   See, for example, Colleen Cunningham, Florian Ederer, and Song Ma, *Killer Acquisitions* *1, 38 (unpublished manuscript, 2018), archived at https://perma.cc/SRS5-47LZ (finding that about 6 percent of new innovation projects in the pharmaceutical industry are acquired to "terminate development of the target's innovations to preempt future competition").

[47]   Complaint for Injunctive and Other Equitable Relief, *Federal Trade Commission v Mallinckrodt ARD, Inc*, No 1:17-cv-00120 (DDC filed Jan 18, 2017) (available on Westlaw at 2017 WL 242849).

[48]   Id at *2–3.

[49]   Id.

[50]   Stipulated Order for Permanent Injunction and Equitable Monetary Relief, *Federal Trade Commission v Mallinckrodt ARD, Inc*, No 1:17-cv-00120, *10–14, 16–18 (DDC filed Jan 30, 2017), archived at https://perma.cc/2HZX-YW38.

Although it may be quite plausible that the startup would eventually have entered the acquirer's product market (or vice versa) but for the acquisition, this may be impossible to prove as of the acquisition date. Second, the startup's technology may be complementary in some respects but substitutable in others, making it hard to say whether it should be regarded as a competitor.[51] This challenge is particularly salient in high tech sectors, where it is often difficult to define markets.[52]

For these reasons, many startup acquisitions will be presumptively vertical in the sense that they are not provably horizontal. However, in such cases there may still be a material risk of anticompetitive harm if the acquisition prevents the acquirer's rivals from obtaining access to a promising new technology developed by the startup. That is, if the acquirer is dominant in its product market, then its motivation for the acquisition may be (in whole or in part) to exclude its smaller rivals from gaining access to the startup technology.[53] This prevents rivals from improving their own products, thereby extending the acquirer's market advantage relative to a scenario in which several or all incumbents obtain the rights to the startup technology.

Consider a simple example. Suppose there is a dominant leader in the market for smartphones and that the startup technology is an improved processor for mobile devices. The leader maintains an advantage due to the fact that its smartphone is technologically superior in some respects, and/or because it has lower production costs. We can think of either possibility as an advantage in terms of quality.[54] Any smartphone producer can improve its product quality by utilizing the new processor; all else

[51]   For example, both Google and DoubleClick (which was acquired by Google) provide online advertising services, but they differ in numerous respects, including the type and placement of ads, as well as the ancillary tools and services provided to advertisers and ad hosts. There is disagreement as to whether they compete, with some asserting that the types of advertising they provide are generally not viewed as substitutes. For a thorough discussion, see Robert W. Hahn and Hal J. Singer, *An Antitrust Analysis of Google's Proposed Acquisition of DoubleClick* *26–29 (AEI-Brookings Joint Center for Regulatory Studies Related Publication No 07-24, Feb 2008), archived at https://perma.cc/LZF3-9LFY.

[52]   See, for example, Christopher Pleatsikas and David Teece, *The Analysis of Market Definition and Market Power in the Context of Rapid Innovation*, 19 Intl J Indust Org 665, 676 (2001).

[53]   See Bryan and Hovenkamp, *Antitrust Limits on Startup Acquisitions* at *12–13 (cited in note 8).

[54]   Either making a product technologically better or lowering its production costs will benefit consumers and increase the relevant firm's market share. In the case of an improvement in the technology, this makes the product comparatively more valuable to

being unchanged, this quality improvement would increase demand for this producer's smartphone.[55] Suppose that, before the startup emerges, the leader is using a processor that is at least as good as that used by the laggards (which would at least partially explain why this firm is the leader to begin with). Then, if the leader and laggards all obtain access to the new processor, the rivals will partially catch up to the leader: their own smartphones improve in quality by incrementally more. By leaving the firms on more equal footing, this would make the market more competitive and less concentrated.[56]

By contrast, if the dominant smartphone producer obtains exclusive rights to the startup and then declines to license the processor technology (or to sell the processors wholesale) to its smaller rivals, then it will increase its market dominance.[57] Its own quality level improves, but its rivals' do not. This leaves the market less competitive. Rivals' smartphones now look comparatively worse to consumers, leading these firms to apply less competitive pressure and hence permitting the dominant firm to behave more like a pure monopolist.[58] The result is that static consumer surplus is lower (perhaps significantly so) than if the acquirer's rivals had also obtained access to the startup technology.[59]

As in the pure horizontal case, the acquisition may serve no purpose other than to forestall an increase in competition. That is, the acquirer itself may derive little or no value from using the startup technology itself, perhaps because it is already using a comparable (or superior) alternative technology. However, smaller rivals may still benefit from using it, and the acquirer may purchase the exclusive rights to prevent them from obtaining access to it.[60] In this case, there is no static welfare improvement from the acquisition, since the startup technology is simply not used. Consumers are thus worse off than they would have been if

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consumers, which shifts demand upward. In the case of a cost reduction, this induces the firm to set a lower price and make more sales, which similarly benefits consumers. Id at *7.

[55] Id at *8–10 (providing a formal game-theoretic model of the qualitative effects discussed herein).

[56] Id at *16.

[57] Bryan and Hovenkamp, *Antitrust Limits on Startup Acquisitions* at *8–10 (cited in note 8).

[58] Competition becomes less intense as the technological gap between competing products grows larger, as the technological leader grows closer to a pure monopolist. Id at *7–8.

[59] Id at *12.

[60] Id at *12–13.

rivals had been able to utilize the new processor. First, the market is less competitive than it would have been, and hence output is lower. Second, consumers get comparatively less value (net of price) from rivals' smartphones, as the rivals have been denied access to the improved processor.

Of course, if the dominant firm's rivals would benefit from the startup technology, then they are willing to pay the startup for the right to use it. So how do we know that the dominant firm is willing to outbid them and thereby obtain exclusive rights? The most likely explanation is that it is generally more profitable in the aggregate to soften competition than to invigorate it. By extension, it is more profitable to preserve or increase the dominant firm's market power than to enable smaller rivals to catch up.[61] The result is that a dominant firm is generally willing to pay more to exclude rivals than such rivals would pay to gain ground on the dominant firm.

2. Innovation incentives.

The concern about competition, therefore, is that startups will sell their technology to industry leaders rather than to lagging incumbents even when the sale to laggards benefits consumers by increasing the competitiveness of the product market. A traditional error cost argument does not sit well here: the anticompetitive action is one that simultaneously limits the emergence of innovative new firms.[62]

There are further harms beyond reduced competition. Consider the decision problem of an innovator (a prospective startup, for instance) in deciding what kind of new technology to invest in. Some technologies improve the quality of all incumbents' products, such as flexible or unbreakable smartphone glass. Others merely reduce the technological gap between leaders and laggards, like giving smartphone manufacturers an alternative to an

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[61]   This is embodied in a well-known result that was originally highlighted by Professors Richard Gilbert and David Newbery in the context of preemptive patenting by a monopolist facing the prospect of competitive entry by an outside innovator. Richard J. Gilbert and David M.G. Newbery, *Preemptive Patenting and the Persistence of Monopoly*, 72 Am Econ Rev 514, 516 (1982). More generally, the result highlights that a new innovation will earn the largest return when the technology rights are allocated in a way that maintains or expands the market power of the leading firm.

[62]   See, for example, Ufuk Akcigit and Sina T. Ates, *Ten Facts on Declining Business Dynamism and Lessons from Endogenous Growth Theory* *29–31 (NBER Working Paper No 25755, Apr 2019), archived at https://perma.cc/8RNA-P3LF (discussing the empirical relevance of the decline in knowledge diffusion from industry leaders).

otherwise patented technology held by the market leader. Both types of invention improve consumer welfare: the former from directly improving the quality of all products, and the latter from inducing more competitive pricing behavior by reducing vertical differentiation.[63]

Nonetheless, the startup who can license freely is always biased against producing inventions that only help the laggards catch up. The purchase price or licensing fee charged by the startup depends on how the use of such invention would influence competition and industry profits, since these things determine an incumbent's willingness to pay to use a new technology. Inventions that improve all firms' technologies, when bought exclusively by the industry leader, directly benefit consumers while also increasing differentiation between the leader and laggard. The second effect can be strong enough that industry joint profits are highest when *only* the leader possesses the new technology.[64] However, an invention that only helps the laggard catch up increases competition without directly pushing the quality frontier forward. The industry leader may buy this technology solely to prevent this greater competition, but the purchase price will be lower than that of inventions that also increase the leader's product quality.[65]

Unrestricted startup acquisition, therefore, both makes it harder to compete against strong incumbents and distorts the direction of invention. Things get worse dynamically. As the market leader ingests startups and startups shift their research effort toward technology that helps the leader pull away from its competitors, lagging incumbents will exit. As the number of competing firms falls, the purchase price for startups also falls: The threat to sell to a firm's competitor improves the startup's bargaining power, and such bargaining power diminishes as there are fewer competitors.[66] This fall in purchase price therefore decreases the

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[63]   Note that the literature has identified some games and parameter spaces where decreasing vertical differentiation lowers welfare. Although firms price more competitively, the less efficient firm becomes more likely to steal business from the more efficient firm, and this composition effect can in extreme cases overwhelm the competition effect. See generally, for example, Sajal Lahiri and Yoshiyasu Ono, *Helping Minor Firms Reduces Welfare*, 98 Econ J 1199 (1988).

[64]   Bryan and Hovenkamp, *Antitrust Limits on Startup Acquisitions* at *8 (cited in note 8). See also Gilbert and Newbery, 72 Am Econ Rev at 517 (cited in note 61); Michael L. Katz and Carl Shapiro, *On the Licensing of Innovations*, 16 RAND J Econ 504, 507–10 (1985).

[65]   Bryan and Hovenkamp, *Antitrust Limits on Startup Acquisitions* at *15–17 (cited in note 8).

[66]   Id at *18–20.

incentive of startups to innovate, directly reducing productivity growth.[67]

B. Recent Empirical Research

Numerous recent articles cast light on the potential adverse effects that may result from a laissez-faire policy toward startup acquisitions.[68] The antitrust concerns are perhaps most salient when an acquisition is motivated purely by the desire to forestall new competition. To that end, one recent paper finds that, in the pharmaceutical industry, numerous innovative new firms are effectively terminated through "killer acquisitions" by incumbent firms.[69] In these acquisitions, the acquirer does not utilize or further develop the target's innovation, but instead merely prevents such innovation from entering into competition with the incumbent's own product.[70]

Although a startup is typically small, the economic effects of startup acquisitions may accumulate over time. To that end, another study finds that, following a statutory amendment that weakened the reporting requirements for prospective mergers, there was an increase in "anticompetitive deals whose individual size enables them to escape regulatory scrutiny but whose cumulative effect is large."[71] Indeed, between 1994 and 2011, "submarine" acquisitions of firms below the Hart-Scott-Rodino Act reporting limit cumulatively consolidated $407 billion in annual US output, equivalent to a 30 percent increase in four firm industry concentration.[72]

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[67]   Many theoretical models of innovation and market structure permit only R&D by existing competitors, showing a tradeoff in which greater competition induces R&D to "escape" competition, but also limits the time period during which R&D grants market leadership. See, for example, Philippe Aghion, et al, *Competition and Innovation: An Inverted-U Relationship*, 120 Q J Econ 701, 711–16 (2005). Startup acquisitions do not induce this tradeoff: in the context of these earlier models, unlimited startup acquisition is as if the lagging innovator could always license its technology to the leader. Bryan and Hovenkamp, *Antitrust Limits on Startup Acquisitions* at *5–6 (cited in note 8); Katz and Shapiro, 16 RAND J Econ at 510–13 (cited in note 64).

[68]   See, for example, Shapiro, 61 Intl J Indust Org at 740–43 (cited in note 1); Bryan and Hovenkamp, *Antitrust Limits on Startup Acquisitions* at *10–17 (cited in note 8); Cunningham, Ederer, and Ma, *Killer Acquisitions* at *34–41 (cited in note 46).

[69]   See Cunningham, Ederer, and Ma, *Killer Acquisitions* at *38 (cited in note 46).

[70]   Id.

[71]   Thomas G. Wollmann, *Stealth Consolidation: Evidence from an Amendment to the Hart-Scott-Rodino Act*, 1 Am Econ Rev: Insights 77, 77 (2019).

[72]   Id at 89–90. See also Thomas G. Wollmann, *Online Appendix to "Stealth Consolidation: Evidence from an Amendment to the Hart-Scott-Rodino Act [2018]"* (Jul 10, 2018), archived at https://perma.cc/6REN-QRJH.

One important concern is that dominant incumbents will acquire promising new technologies and then decline to license the relevant technologies to smaller rivals. Such a pattern would act to strengthen the market power of the dominant acquirer over time as its technological advantage grows. In this vein, several recent studies find that there is a widening gap between market leaders and laggards.[73] Additionally, a number of articles have purported to find evidence that markets are generally growing more concentrated over time, although this result has not been causally linked to acquisitions or any other specific practices.[74]

The preceding studies bear principally on potential harms to price competition, taking firms' technologies as given. But one may also be concerned about the potential impact of acquisitions on innovative activity, particularly in cases where the startup is an innovative enterprise. One recent study, relying on data from the pharmaceutical industry, finds that mergers generally lead to diminished R&D activity by both the merged firm and incumbent rivals.[75] An additional study finds that incumbents may rely on acquisitions of innovative startups as a substitute for conducting R&D internally.[76] Another study finds that, while innovative new

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[73]   See, for example, Martin Neil Baily and Nicholas Montalbano, *Why Is U.S. Productivity Growth So Slow? Possible Explanations and Policy Responses* *12–14 (Hutchins Center Working Paper No 22, Sep 2016), archived at https://perma.cc/R2X5-8N4G; Dan Andrews, Chiara Criscuolo, and Peter N. Gal, *Frontier Firms, Technology Diffusion and Public Policy: Micro Evidence from OECD Countries* *12, 23–25 (OECD Productivity Working Paper No 2, Nov 2015), archived at https://perma.cc/6KZR-WPP7. It should be noted, however, that these studies merely report aggregate trends; they do not causally link such trends to any particular firm conduct. But their findings may nevertheless justify reasonable concern for practices that, like acquisitions, have a direct influence on the gap between leaders and laggards.

[74]   See, for example, Gustavo Grullon, Yelena Larkin, and Roni Michaely, *Are US Industries Becoming More Concentrated?*, 23 Rev Fin 697, 701–04 (2019); David Autor, et al, *Concentrating on the Fall of the Labor Share*, 107 Am Econ Rev: Papers and Proceedings 180, 181–83 (2017). However, several scholars have disputed the methodological soundness of these studies, albeit without claiming that their conclusions are affirmatively wrong. See, for example, Jonathan B. Baker, *The Antitrust Paradigm: Restoring a Competitive Economy* 77–79 (Harvard 2019); Matias Covarrubias, Germán Gutiérrez, and Thomas Philippon, *From Good to Bad Concentration? U.S. Industries Over the Past 30 Years* *19–23 (NBER Working Paper No 25983, Sep 2019), archived at https://perma.cc/R6NM-T2PC; Chad Syverson, *Macroeconomics and Market Power: Context, Implications, and Open Questions*, 33 J Econ Persp 23, 38 (2019).

[75]   Justus Haucap, Alexander Rasch, and Joel Stiebale, *How Mergers Affect Innovation: Theory and Evidence*, 63 Intl J Indust Org 283, 302 (2019).

[76]   Gordon M. Phillips and Alexei Zhdanov, *R&D and the Incentives from Merger and Acquisition Activity*, 26 Rev Fin Stud 34, 47–49 (2013).

entrants have historically played an important role in market productivity and growth, this trend has started to diminish.[77]

C. Limitations of Contemporary Merger Enforcement

The current state of antitrust merger enforcement makes it very difficult to bring a viable challenge against a startup acquisition, even if the acquirer is highly dominant. Here we briefly discuss some of the principal reasons for this. First, merger enforcement usually relies chiefly on estimates of the price effects that would result immediately following a merger.[78] Put differently, merger analysis is static, generally declining to form predictions about how today's transaction will affect competition tomorrow. Static price effects are estimated using established data on firm characteristics and behavior, such as market shares and pricing activity. But a startup is a new player that usually does not presently have a significant market share. Thus, a static analysis will typically suggest that there is no potential harm, but this may only be because the relevant anticompetitive threat involves diminished future competition.[79]

Relatedly, evaluating potential effects on future competition is necessarily more speculative than the analysis of mergers between established firms, where one can reasonably focus on static effects.[80] This makes it much harder (if not impossible) to rely on rigorous empirical methods to estimate anticompetitive effects. Antitrust facially recognizes the elimination of "potential competition" as a basis for intervention, but in practice this kind of

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[77]   Ryan A. Decker, et al, *Where Has All the Skewness Gone? The Decline in High-Growth (Young) Firms in the U.S.*, 86 Eur Econ Rev 4, 8–11 (2016). See also Ryan A. Decker, et al, *Declining Business Dynamism: What We Know and the Way Forward*, 106 Am Econ Rev: Papers and Proceedings 203, 203–04 (2016) (finding a gradual reduction in "creative destruction"—the process by which new competitors overtake incumbents).

[78]   This consists mainly of "unilateral effects" analysis, which estimates the merger's impact on equilibrium pricing. See, for example, Gregory J. Werden and Luke M. Froeb, *Unilateral Competitive Effects of Horizontal Mergers*, in Paolo Buccirossi, ed, *Handbook of Antitrust Economics* 43, 64–66 (MIT 2008).

[79]   See Shapiro, 61 Intl J Indust Org at 739–40 (cited in note 1).

[80]   Michael L. Katz and Howard A. Shelanski, *Mergers and Innovation*, 74 Antitrust L J 1, 56 (2007) ("Unfortunately, current practice does not handle uncertainty well. . . . [T]he agencies often take an approach of considering a two-year horizon in assessing the effects of entry, with little or no discounting within the horizon and complete discounting of anything beyond.").

claim is quite difficult to bring successfully and is rarely attempted.[81] (The *Mallinckrodt* case was a rare exception.[82])

Second, as noted above, many acquisitions will not be provably horizontal, even if it is quite plausible that the startup would have gone on to enter the acquirer's product market (or vice versa).[83] In that case, an antitrust plaintiff must attack the acquisition as a vertical merger. However, antitrust has grown increasingly hostile toward vertical merger challenges, leaving very little chance of success even if both parties to the merger are large, established incumbents.[84] Combining this with the general dearth of useful data in startup acquisition cases, it is hard to see a viable path to enforcement without some departure from current judicial treatment of vertical mergers.

In sum, current enforcement policy demands more precise economic evidence than can typically be supplied in cases involving startup acquisitions. While there is good reason to believe that persistent acquisitions by dominant incumbents may produce harmful effects in the aggregate, it is often difficult to establish this in any individual case under the existing standards of merger review.[85]

III. ADMINISTRATION UNDER UNCERTAINTY

The traditional error cost argument implicitly treats the prospect of competitive entry as an external, immutable force that persists independently of a defendant's conduct. But, at minimum, this characterization is inapt when the relevant conduct involves persistent acquisitions of newly formed firms with promising new

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[81]   See Shapiro, 61 Intl J Indust Org at 740–41 (cited in note 1) (discussing the antitrust authorities' reluctance to bring challenges under the potential competition doctrine). Antitrust also permits enforcement against acquisitions of disruptive "maverick" firms. See *Horizontal Merger Guidelines* at *3–4 (cited in note 2). But, here too, such challenges are difficult to win and rarely attempted.

[82]   See notes 47–50 and accompanying text.

[83]   See Part II.A.1.

[84]   A recent high-profile example involves the Department of Justice's unsuccessful attempt to block AT&T's acquisition of Time Warner. *United States v AT&T Inc*, 916 F3d 1029, 1047 (DC Cir 2019); Salop, 127 Yale L J at 1963 (cited in note 45) ("[V]ertical merger enforcement . . . has been infrequent, and remedies have been limited."). See also D. Daniel Sokol, *Vertical Mergers and Entrepreneurial Exit*, 70 Fla L Rev 1357, 1369–70 (2018) (arguing against broad antitrust intervention in vertical startup acquisitions).

[85]   See, for example, Terrell McSweeny and Brian O'Dea, *Data, Innovation, and Potential Competition in Digital Markets—Looking Beyond Short-Term Price Effects in Merger Analysis*, Antitrust Chronicle 7, 11 (Competition Policy International, Feb 2018), archived at https://perma.cc/BY3K-C49K ("Looking at each acquisition individually under Section 7 of the Clayton Act is likely to miss the forest for the trees.").

technologies. Innovative new entrants will not challenge dominant incumbents—or aid smaller rivals in doing so—if they can always reap larger profits by simply being acquired by market leaders. Thus, nonintervention in startup acquisitions cannot be justified by allusions to the prospect of competitive entry. On the contrary, the more importance one places on entry as a mechanism by which markets self-correct, the more uneasy one should feel about a pattern in which dominant incumbents regularly acquire the most promising startups that come along.

It is instructive to consider Professor Joseph Schumpeter's well-known discussion of "creative destruction," the dynamic process by which new technologies and new rivals persistently upturn the status quo over time.[86] Schumpeter states that

> [e]conomists are at long last emerging from the stage in which price competition was all they saw. As soon as quality competition and sales effort are admitted into the sacred precincts of theory, the price variable is ousted from its dominant position. . . . [I]n capitalist reality as distinguished from its textbook picture, it is not [price] competition which counts but the competition from the new commodity, the new technology, the new source of supply, the new type of organization (the largest-scale unit of control for instance)—competition which commands a decisive cost or quality advantage and which strikes not at the margins of the profits and the outputs of the existing firms but at their foundations and their very lives.[87]

Schumpeter thus emphasized the prospect of new competition and innovation as playing a key role in fostering economic efficiency over time. In the same spirit as those who believe antitrust should persistently err on the side of nonintervention, he argued that an apparent deficiency in static competition does not imply that the market will perform poorly over the long run.[88] But, as he stressed, this requires that a leading incumbent view the prospect of innovative new firms as an existential threat—not a transactional opportunity with which to extend its lead over

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[86]   Joseph A. Schumpeter, *Capitalism, Socialism and Democracy* 81–86 (George Allen & Unwin 5th ed 1976).

[87]   Id at 84.

[88]   Id at 85 ("The businessman feels himself to be in a competitive situation even if he is alone in his field. . . . In many cases, though not in all, this will in the long run enforce behavior very similar to the perfectly competitive pattern.").

smaller rivals.[89] However, we have little reason to expect this if such acquisitions are virtually never subjected to meaningful antitrust scrutiny.

As emphasized in the last Section, a serious challenge is that startup acquisitions present significant uncertainties and are therefore less amenable to empirical forecasting than conventional mergers.[90] This means that hypothetical intervention would have to be predicated on less precise economic evidence than courts usually demand, creating some risk of false positives. But that does not mean that such a policy could not improve upon on the status quo.

Importantly, the uncertainties cut in both directions. The current policy, which permits virtually all startup acquisitions by dominant incumbents, is also making errors: some portion of these transactions will inevitably lead to a but-for reduction in future competition, even if this result was not rigorously quantifiable ex ante. As such, it would be naïve to suggest that antitrust is currently avoiding errors simply because almost none of the relevant acquisitions are expressly litigated. If anything, this merely signals that current antitrust standards are too onerous to be administered in practice. This reflects a failure to acknowledge the distinct economic and practical difficulties that distinguish startup acquisitions from more conventional mergers between established incumbents. Current policy simultaneously (a) makes no effort to confront the uncertainties in a practicable way, and (b) gives no weight to the broader incentive problems that may arise if leading incumbents can rely on persistent acquisitions to modulate the future course of competition.

Realistically, *any* antitrust policy toward startup acquisitions (including one of inaction) is bound to make errors in some percentage of cases. But, as we have argued above, in this context there is no good reason to maintain the traditional view that false positives are more problematic than false negatives. A better approach is to acknowledge that this area involves unavoidable uncertainties, but also significant potential harms, and to develop

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[89]   Id at 85–86. See also Phillips and Zhdanov, 26 Rev Fin Stud at 35 (cited in note 76) ("Large firms may find it optimal to buy other firms to gain access to successful innovations instead of investing in R&D themselves.").

[90]   See Part II.C.

standards that strike a reasonable balance between administrability and the risk of judicial error.[91] Consistent with this, the courts have occasionally cautioned that antitrust standards ought not to demand such a degree of economic precision that they become impracticable. For instance, in *Barry Wright Corp v ITT Grinnell Corp*,[92] the court noted that "[r]ules that seek to embody every economic complexity and qualification may well, through the vagaries of administration, prove counter-productive, undercutting the very economic ends they seek to serve."[93]

A final point is that uncertainty as to competitive effects does not preclude a determination that a defendant has acted in violation of the antitrust laws. A dominant incumbent may itself be uncertain as to whether its acquisition will act to bolster its market power in the future.[94] If even the major players in the industry are uncertain as to the transaction's eventual effect on competition, then one may regard such effect as essentially probabilistic. And yet the chance of softening competition may nevertheless be the primary impetus for the acquisition. However, as the Supreme Court has recently emphasized, conduct aimed at eliminating an uncertain chance at greater competition may be an antitrust violation.[95] The same logic suggests that a dominant firm may violate the antitrust laws when its acquisition is motivated by the possibility of excluding rivals from a technology that could prove to have significant commercial value.[96]

A.   Indicia of Potential Harm

If antitrust were to pursue a more administrable policy toward startup acquisitions, what kind of evidence might it rely on?

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[91]   Commenting on startup acquisitions by dominant technology firms, Nobel laureate Professor Jean Tirole recently remarked that "[t]he suppression of competition in the absence of data is hard to prove. My guess is that we should err on the side of competition, while recognizing that we will make mistakes in the process." Allison Schrager, *A Nobel-Winning Economist's Guide to Taming Tech Monopolies* (Quartz, June 27, 2018), archived at https://perma.cc/ZB2P-SHRY.

[92]   724 F2d 227 (1st Cir 1983).

[93]   Id at 234.

[94]   Shapiro, 61 Intl J Indust Org at 740 (cited in note 1) (noting that even the acquired firm is unsure about how its technology will evolve into the future).

[95]   See *Federal Trade Commission v Actavis, Inc*, 570 US 136, 156–57 (2013) (asserting that the defendants' settlement agreement "likely seeks to prevent the risk of competition. And, as we have said, that consequence constitutes the relevant anticompetitive harm.").

[96]   A large acquisition price for a startup with small (or zero) market share may be a reasonable signal that the dominant acquirer thinks the startup technology could have significant commercial value. See discussion in Part III.A.

Here we focus on three relevant criteria: (a) the market power of the acquirer and the concentration of its product market; (b) the commercial significance of the startup technology and its potential utility to the acquirer and its rivals; and (c) the acquirer's past practices involving similar acquisitions, such as whether previously acquired technologies were licensed to rival incumbents. Although we will focus on these general sources of evidence, in practice it is of course important to consider any case-specific factors that may be germane to the analysis of competitive effects. Further, for brevity, we will focus on the more challenging case in which the acquisition is not provably horizontal.[97]

The market power of the acquirer is an important factor for determining whether the acquisition may serve to exclude rivals from using the startup technology. If the acquirer is inclined to license the technology to rivals ex post, then it is much less likely that the transaction will undermine competition in the future. However, all else being equal, the more dominant the acquirer, the less likely it is to engage in such licensing voluntarily. In particular, once its market advantage over rivals becomes sufficiently large, it becomes more profitable to exclude rivals than to license them.[98] This reflects that, when rivals are permitted to use the startup technology, there are countervailing effects: their products improve in some relevant way, which is profit enhancing. But this necessarily reduces the technological gap between the leader and its rivals, which makes competition more intense, and this effect is profit reducing.[99] The latter effect outweighs the former when the acquirer is sufficiently dominant. As such, a conservative evidentiary threshold would require that the acquirer be highly dominant as a necessary condition for intervention.

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[97]   If the acquisition is indeed provably horizontal, the most important consideration is whether the acquirer's market power is sufficient to infer that the elimination of a new rival will have an appreciable impact on future competition. See Shapiro, 61 Intl J Indust Org at 741 (cited in note 1) ("As a general principle, the greater and more durable is the market power of an incumbent firm, the larger is the payoff from preventing that firm from acquiring the smaller firms that, if left to grow on their own, would become its strongest challengers."). Also, any evidence that the acquirer is unlikely to utilize the acquired technology would support a finding that the acquisition is intended to quash a new competitor. See Cunningham, Ederer, and Ma, *Killer Acquisitions* at *41–42 (cited in note 46) (proposing that antitrust should evaluate whether an acquisition is intended merely to "kill" a prospective rival).

[98]   Bryan and Hovenkamp, *Antitrust Limits on Startup Acquisitions* at *7–8 & n 6 (cited in note 8).

[99]   Id.

Another relevant factor concerns the commercial significance of the startup technology. This determines the potential extent to which the startup's innovation may influence competition, depending on how the relevant technology rights are allocated. In some cases, it may be relatively apparent that the technology has significant value. However, in other cases, a court may lack the expertise to make such an assessment. Under such circumstances, the transaction value—the acquisition price or the market value of the startup—may provide a reasonable proxy. Intuitively, if the startup is a relatively small company with relatively few sales to its name, then a very high acquisition price may reasonably suggest that the startup technology has significant promise. For that reason, the European Commission has recently promulgated a proposal for a transaction value threshold to substitute for more conventional metrics such as market share or revenues.[100]

A third relevant factor is any established pattern of acquisitions (and subsequent refusals to license rivals) by the dominant firm. In an antitrust challenge to a subsequent acquisition, such a pattern may bear on the likelihood that the presently disputed transaction would act to exclude rivals from accessing the technology in question. In fact, such a pattern might support an antitrust claim brought under Section 2 of the Sherman Act,[101] which prohibits monopolization practices, rather than invoking the usual merger statutes.[102] In particular, this sort of pattern may signal a broader exclusionary strategy in which persistent acquisitions are used to restrain rivals' access to new technologies.[103]

B. Remedies

We close by briefly discussing remedies.[104] An obvious possibility is to pursue an injunction via the usual premerger review process applied to traditional mergers, wherein prospective combinations must be reported to the antitrust authorities if they

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[100] See Catriona Hatton, David Gabathuler, and Alexandre Lichy, *Digital Markets and Merger Control in the EU: Evolution, Not Revolution?*, Antitrust Chronicle 29, 30–32 (Competition Policy International, Feb 2018), archived at https://perma.cc/5GGV-LKC3.

[101] 26 Stat 209 (1890), codified as amended at 15 USC §§ 1–7.

[102] See Sherman Antitrust Act § 2, 26 Stat at 209, codified as amended at 15 USC § 2.

[103] Consider McSweeny and O'Dea, Antitrust Chronicle at 11–12 (cited in note 85) (discussing potential reliance on Section 2 to challenge horizontal acquisitions by incumbents with substantial market power).

[104] See also Bryan and Hovenkamp, *Antitrust Limits on Startup Acquisitions* at *13–14 (cited in note 8) (evaluating alternative remedies in a model of startup acquisitions by a dominant incumbent).

meet certain statutory criteria.[105] An antitrust authority may then challenge the transaction before it occurs. As discussed above, transaction value could provide a useful such criterion, given that the usual ones do not apply well to startups.

A downside of premerger review is that, because it is administered prospectively, it requires active monitoring by the antitrust authorities, which is costly. Further, the antitrust concerns, such as the likelihood that rivals will be excluded from using the startup technology, may not be apparent or provable until after the acquisition goes through. As such, a retrospective remedy could prove invaluable as a supplementary option.[106] The most logical option is a compulsory licensing requirement, as this will mitigate the exclusion concern without requiring that the merger be formally unwound.[107] Of course, this remedy also has some downsides, such as the requirement that a court prescribe a price for the compulsory licensing transaction.

However, such determinations are already required in other areas of law, such as the calculations of "ongoing royalties" in patent infringement cases.[108] Further, one way to avoid judicial price setting is to hold an auction in which rivals place bids for a small number of licenses to the relevant technology. For example, this approach was initially proposed in *Massachusetts v Microsoft Corp*[109] near the turn of the century.[110] An additional benefit of compulsory licensing is that the impact of erroneous intervention is less pronounced. If intervention is not warranted—say, because the acquirer would have licensed rivals voluntarily—then a

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[105] In the United States, the reporting requirements are codified in the Hart-Scott-Rodino Act, Pub L No 94-435, 90 Stat 1383 (1976), codified in various sections of Title 15. The reporting requirements are codified in 15 USC § 18a.

[106] The two options are not mutually exclusive, however.

[107] See, for example, Katz and Shelanski, 74 Antitrust L J at 61 (cited in note 80) ("When intellectual property rights are sufficiently strong that licensing is feasible, it can be used in fashioning a remedy to a proposed merger.").

[108] An ongoing royalty is an alternative to a patent injunction in which the defendant can continue selling the infringing article, provided it pays a court-specified royalty rate. See, for example, Christopher B. Seaman, *Ongoing Royalties in Patent Cases After* eBay*: An Empirical Assessment and Proposed Framework*, 23 Tex Intel Prop L J 203, 216 (2015). See also Mark A. Lemley and Carl Shapiro*, A Simple Approach to Setting Reasonable Royalties for Standard-Essential Patents*, 28 Berkeley Tech L J 1135, 1139–60 (2013) (proposing a royalty-setting process that courts and arbitrators could use in disputes over standard-essential patents).

[109] 373 F3d 1199 (DC Cir 2004).

[110] Id at 1206–07 (noting that several plaintiff states had initially proposed an auction of licensing rights to third-party firms).

preemptive injunction would block an acquisition that should have been allowed, but compulsory licensing would not.[111]

CONCLUSION

Current antitrust practice very rarely limits startups' acquisitions by leading incumbents despite substantial worry among practitioners and the press about potential harms. We note that antitrust, particularly in the form influenced by the Chicago School, prefers to err by letting too much anticompetitive behavior persist rather than by banning efficiency-enhancing behavior mistakenly interpreted as anticompetitive. This "error cost" weighting derives from the belief that market power attracts entry, that this contestability limits the persistence of market power, and hence that the cost of false negatives is small.

The flaw in this analysis is twofold and particularly germane for startup acquisitions. First, upon acquiring market power, a large literature in game-theoretic industrial organization has shown credible actions a firm can take to deter entry even when profits are high. In the case of startup acquisitions, the action is immediate: the purchase or exclusive license of a novel technology by the leading incumbent means that laggards find it more difficult to catch up. Second, beyond deterring entry, these actions often have direct costs. In laissez-faire, startups produce inventions purchased by the leading incumbent even when they are only useful to the extent that buying it prevents other incumbents from catching up and becoming a stronger competitor. Further, startup R&D projects are diverted toward those that help the leading incumbent pull further ahead, rather than toward those that maximize welfare inclusive of their effect on competition. Remedies include compulsory industry-wide licensing of technologies acquired by strong incumbents with a pattern of restricting the diffusion of acquired technology.

We have no objection to the Chicago School principle that antitrust analysis should function on the basis of rigorous economics. However, this principle ought to extend not only to the deterministic consequence of a given firm's conduct, but also to the relative welfare costs of Type I (false positives) versus Type II (false negatives) errors when the regulator faces uncertainty about that conduct. Traditional error cost analysis that privileges

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[111] See Bryan and Hovenkamp, *Antitrust Limits on Startup Acquisitions* at *12–14 (cited in note 8).

inaction is inappropriate particularly in cases like startup acquisition where the very conduct in question limits the possibility of self-correcting entry. Indeed, we suspect that subjecting error cost logic more broadly to modern game-theoretic analyses of deterrence would identify many further settings where a bias toward nonintervention is inappropriate.