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“Killer Acquisitions” Reexamined: Economic Hyperbole in the Age of Populist Antitrust

Jonathan M. Barnett*

Major competition regulators, and substantial portions of the scholarly community, have rapidly adopted the view that “killer acquisitions” and “kill zones” constitute significant sources of competitive risk arising from incumbent acquisitions of emerging firms in digital markets. Based on this view, policymakers in the United States, European Union, and other jurisdictions have advocated for, and in some cases have taken, substantial changes to merger review policies that would erect significant obstacles to incumbent/startup acquisitions. A review of the relevant body of evidence finds that these widely-held views concerning incumbent/startup acquisitions rest on meager support, confined to ambiguous evidence drawn from a small portion of the total universe of acquisitions in the pharmaceutical market and theoretical models of acquisition transactions in information technology markets. Moreover, the emergent regulatory and scholarly consensus fails to take into account the rich body of evidence showing the critical function played by incumbent/startup acquisitions in supplying a monetization mechanism that induces venture-capital investment and promotes startup entry in technology markets. The prospect of an acquisition transaction in the case of technical and commercial success generally promotes innovation and competition by providing a transactional device that expands startups’ access to the capital inputs required to undertake R&D and the commercialization services required to convert R&D outputs into commercially viable products. At the same time, these acquisitions enable incumbents to access the specialized innovation capacities of smaller firms. Proposed changes to merger review standards would disrupt these efficient transactional mechanisms and are likely to have counterproductive effects on competitive conditions in innovation markets.

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I. INTRODUCTION.....	41
II. KILLER ACQUISITIONS AND KILL ZONES: MODELS AND EVIDENCE.....	49
A. Killer Acquisitions: Theory.....	50
B. Killer Acquisitions: Evidence.....	52
i. CEM Study (1989-2010).....	54
ii. Does the CEM Study Provide a Sound Basis for Antitrust Policy?.....	55
iii. Is There Evidence of Killer Acquisitions Outside Pharmaceuticals?.....	61
a. Israel Competition Authority Study.....	61
b. Charles River Associates Study.....	62
c. Other Studies.....	63
C. Kill Zones: Theory and Evidence.....	64
i. Prado and Bauer Study.....	67
ii. Jin, Leccese, and Wagman Study.....	68
iii. Evaluation.....	69
III. EFFICIENCY RATIONALES FOR INCUMBENT/STARTUP ACQUISITIONS IN TECHNOLOGY MARKETS.....	70
A. Specialization and the Cooperation Imperative in Innovation Markets.....	73
B. How Incumbent Acquisitions of Emerging Firms Promote Competition.....	77
i. Platform/Complementor Symbiosis: Google’s “G Suite”.....	78
ii. Innovator/Producer Symbiosis: Biotech and “Big Pharma”.....	83
IV. ERROR-COST ANALYSIS OF MERGER REVIEW POLICY.....	85
A. Merger Review Policy Changes.....	86
i. United States.....	86
ii. European Union.....	89
B. Merger Challenges.....	91
i. Meta/Within Unlimited.....	92
ii. Facebook/Giphy.....	94
C. The Anticompetitive Effects of Antitrust-by-Hypothesis.....	97
i. Effects of Proposed Changes to Merger Review Policies.....	98
ii. Objection: Alternatives to Monetization by Acquisition.....	102
iii. Addressing Killer Acquisition Risk Through Intellectual Property Rights.....	104
V. CONCLUSION.....	107

I. INTRODUCTION

Originating in the halls of academia, the “killer acquisition” theory has rapidly attracted intense interest among scholars, regulators and other policymakers who have raised concerns about the purported ability of large technology firms to acquire or preserve market power through acquisitions of emerging firms. Killer acquisition theory identifies circumstances in which an incumbent acquires a startup that poses a competitive threat and then shuts it down after the acquisition is consummated. In a milder variant of this scenario, an incumbent acquires a startup that poses a competitive threat and incorporates the startup’s technology into its product and service ecosystem. Competition regulators, legislators, and influential “expert” committees have drawn attention to the large number of acquisitions by the five largest technology platforms (a total of 855 acquisitions by Google, Amazon, Facebook, Apple and Microsoft (“GAFAM”) since the inception of each firm through August 2020¹) and the few regulatory challenges to those acquisitions. These policymakers and commentators assert that incumbent acquisitions of emerging firms often pose a high risk of competitive harm and advocate substantial changes to antitrust and competition laws and policies to address this risk.² These concerns were reflected in President Biden’s Executive Order issued in July 2021, which referred to “the challenges posed by . . . the rise of the dominant Internet platforms, especially as these stem from serial mergers, the acquisition of nascent competitors”³ In the European Union (EU), Margarethe Vestager, the Commissioner for Competition, flatly asserted in a 2019

¹ Geoffrey Parker, Georgios Petropoulos & Marshall Van Alstyne, *Platform Mergers and Antitrust*, 30 IND. & CORP. CHANGE 1307, 1311 (2021).

² See, e.g., Stigler Comm. on Digit. Platforms, STIGLER CENTER FINAL REPORT 111 (2019) [hereinafter STIGLER REPORT], <https://perma.cc/2WDG-U32R> (“The behavior that may be of greatest concern to the many policymakers studying powerful digital businesses is their acquisition of potential competitors”); Jacques Crémer, Yves-Alexandre de Montjoye & Heike Schweitzer, EUR. COMM’N, COMPETITION POLICY FOR THE DIGITAL ERA FINAL REPORT 111 (2019) [hereinafter CREMER REPORT], <https://perma.cc/G3BP-FFVF> (“Concerns may [] arise notably when such acquisitions result in a strengthening of dominance . . . e.g., by eliminating a competitive threat and/or by raising barriers to entry for other (potential) competitors, thus further reducing the risk of attacks on a strongly entrenched market position from the fringe”); Jason Furman, DIGIT. COMPETITION EXPERT PANEL, UNLOCKING DIGITAL COMPETITION 95 (2019) (U.K.) [hereinafter FURMAN REPORT], <https://perma.cc/TQ3B-UFVY> (“[D]igital mergers are also more likely to involve theories of harm which relate to elimination of potential competitors or harming innovation”).

³ Exec. Order No. 14,036, 86 Fed. Reg. 36987 (July 9, 2021).

speech that “bigger businesses buy [small innovators] in order to kill them.”⁴

In a short period of time, much of the regulatory and scholarly communities have adopted the view that killer acquisitions (and related “kill zone” effects⁵) occur with sufficient regularity to pose a material risk to competitive conditions in technology markets,⁶ notwithstanding the limited empirical evidence for this assertion. In May 2019, the head of the Bureau of Competition at the Federal Trade Commission (FTC) stated “I am not aware of good economic evidence that there is a unique and widespread ‘nascent’ or ‘start-up’ acquisition issue in the tech industry. I have seen various commentators claim that the various tech firms make lots of acquisitions. But, in itself, that provides little useful information.”⁷ Yet, in September 2019, the same official observed that “established firms may seek to acquire nascent or potential competitors poised to challenge their market position,” while acknowledging that startups may sometimes rely on acquisitions to achieve a profitable exit.⁸ In 2020 and 2021, several influential entities recognized killer acquisitions as a significant antitrust risk. The President’s Council of Economic Advisors described the growing concern that “dominant platforms are harming competition by buying too many smaller firms, such as start-ups funded with venture capital.”⁹ The influential report issued by the US House of Representatives Antitrust Subcommittee stated that “Big Tech” firms ac-

⁴ Stephen Smith & Matthew Hunt, *Killer Acquisitions and Data Access or Divestment as a Merger Remedy*, BRISTOWS (May 14, 2019), <https://perma.cc/X4RB-GR8Q>.

⁵ The kill zone effect refers to the hypothesis that repeated acquisitions by platform incumbents in a particular market segment, or the dominance of a platform incumbent in a particular market segment, discourages entry by potential challengers in that segment. For discussion, see *infra* notes 82–101 and accompanying text.

⁶ See, e.g., Fed. Trade Comm’n, Office of Commissioner Rohit Chopra, Dissenting Statement of Commissioner Rohit Chopra Regarding the Publication of Vertical Merger Guidelines, Commission File No. P810034 (June 30, 2020) at 2. (“Killer apps quickly become killer acquisitions”); Mark A. Lemley & Andrew McCreary, *Exit Strategy*, 101 B.U. L. REV. 1, 8, 10 (2021). (“[I]t also shouldn’t be a surprise that many of those technologies [acquired by incumbents from startups] are quietly shut down a few years after acquisition” and “[i]ncumbents pay . . . even for technologies they don’t use because eliminating potential competitors keeps their profits high”).

⁷ D. Bruce Hoffman, Director, F.T.C. Bureau of Competition, Remarks at GCR Live Antitrust in the Digital Economy, Antitrust in the Digital Economy: A Snapshot of FTC Issues at 5 (May 2019).

⁸ D. Bruce Hoffman, Director, F.T.C. Bureau of Competition, Prepared Statement of the F.T.C., Competition in Digital Technology Markets: Examining Acquisitions of Nascent or Potential Competitors by Digital Platforms at 4 (Sept. 24, 2019).

⁹ Economic Report of the President Together with the Annual Report of the Council of Economic Advisors (Feb. 2020), at 219.

quire emerging companies for purposes of shutting them down to suppress competition.¹⁰ The European Commission expressed concern over “acquisitions of nascent, innovative companies by strong incumbents . . . sometimes called ‘killer acquisitions,’ implying that incumbents are acquiring the targets solely to discontinue and thus effectively ‘kill’ their innovation project to pre-empt future competition.”¹¹

Reflecting these widespread concerns, regulators and legislators have taken or proposed various actions to increase the scrutiny of startup acquisitions by incumbent platforms and the ability of regulators to block such acquisitions. In early 2020, the FTC issued orders requiring each of the GAFAM entities to supply the agency with information on all acquisitions consummated since 2010 that had fallen below the statutory reporting threshold (and therefore might not have been previously examined by regulators).¹² Also in 2020, the Organization for Economic Cooperation and Development (OECD) released a report recognizing killer acquisitions as a significant risk to competitive markets, suggesting that agencies increase scrutiny of these transactions and proposing that agencies and courts relax probative standards to preempt incumbent acquisitions of nascent competitors.¹³ The Chief Economist of the European Commission’s Department of Competition (DG Comp),¹⁴ the influential Furman, Stigler, and Crémer expert reports,¹⁵ the OECD report,¹⁶ and various scholarly commentators¹⁷ have proposed

¹⁰ Subcomm. on Antitrust, H. Comm. on the Judiciary, 117th Cong., Investigation of Competition in Digital Markets, Majority Staff Report and Recommendations (initially released Oct. 2020, final version July 19, 2022) [hereinafter H. Comm. Rep.], at 33, 38.

¹¹ Org. for Econ. Coop. & Dev., Start-ups, Killer Acquisitions and Merger Control – Note by the European Union 2 (2020) (emphasis in original).

¹² *FTC to Examine Past Acquisitions by Large Technology Companies*, F.T.C. (Feb. 11, 2020), <https://perma.cc/J2Q6-7AP5>.

¹³ ORG. FOR ECON. COOP. AND DEV., *Start-Ups, Killer Acquisitions and Merger Control*, (2020) [hereinafter OECD REPORT], <https://perma.cc/4C7V-ZSMV>.

¹⁴ Janith Aranze, *DG Comp Chief Economist: Reverse Burden of Proof to Catch Killer Acquisitions*, GLOBAL COMP. REV. (Nov. 20, 2018), <https://perma.cc/8K8S-YC7H>.

¹⁵ See *infra* Tbl. 3 and notes 190–197.

¹⁶ OECD REPORT, *supra* note 13, at Foreword (arguing for a rebuttable presumption in “nascent acquisitions by dominant incumbents”).

¹⁷ Lemley, *supra* note 6, at 97 (proposing that dominant firms should be presumptively blocked from acquiring “directly competitive” startups, unless the startup would not be viable as a stand-alone entity and there are no other viable acquirors); Parker et al., *supra* note 1, at 1328–30 (proposing shifting burden of proof to acquiror where the acquiror is a large platform undertaking a horizontal acquisition); Steven C. Salop, Note, *Potential Competition and Antitrust Analysis: Monopoly Profits Exceed Duopoly Profits*, OECD Roundtable on the Concept of Potential Competition, June 10, 2021, at 12–16,

shifting the burden of proof to the acquiror in transactions involving the acquisition of an emerging firm by a dominant platform. In the US, the House Antitrust Subcommittee report recommended legislation to establish a “presumption against acquisitions of startups by dominant firms.”¹⁸ The FTC has reaffirmed its seldom-exercised power to unravel consummated mergers,¹⁹ and, in July 2023, together with the Department of Justice (DOJ), issued draft revised merger guidelines that emphasize the risks posed by incumbent acquisitions of “nascent” competitors.²⁰ In Germany and Austria, competition authorities have altered the reporting thresholds for the merger review process to capture platform acquisitions of smaller emerging firms.²¹ To detour around its own reporting thresholds, the European Commission has invited member states to address the risk posed by killer acquisitions by referring acquisitions to the Commission that would not otherwise be reported but meet a loosely defined standard of competitive harm.²² Under the EU’s newly-enacted Digital Markets Act (DMA), which went into effect in 2023, the largest platforms must report any acquisition “where the merging entities or the target of concentration provide core platform services or any other services in the digital sector or enable the collection of data,” regardless of the size of the target.²³ Proposing an especially interventionist approach, the United Kingdom’s Competition Markets Authority (CMA)

<https://perma.cc/9WWN-4CJQ>. (proposing a presumption against any acquisition of a nascent or potential competitor by a dominant platform, “with a high rebuttal burden”).

¹⁸ H. COMM. REP., *supra* note 10, at 393.

¹⁹ See *infra* note 141 and accompanying text. Following standard usage in antitrust scholarship, “mergers” are understood to mean any type of acquisition (whether or not structured as a merger as the term is typically understood in corporate law).

²⁰ U.S. Dept. of Just. & F.T.C., Draft Merger Guidelines 20–21 (July 19, 2023) [hereinafter Draft Merger Guidelines].

²¹ Germany and Austria have adopted transaction-value based reporting thresholds that capture acquisitions in which the transaction value substantially exceeds the target’s revenues. For Germany, see Camille Paulhac, Michael S. Wise, Juliette Hua & Mary Walser, *Revised German Merger Control Thresholds Will Lessen Regulatory Hurdles for Many Cross-Border Deals and Focus Greater Attention on Those with Competitive Implications*, PAUL HASTINGS (Jan. 20, 2021), <https://perma.cc/5L2G-HUX4>; for Austria, see Michael Mayr, *Austria Introduces Significant Changes to its Competition Law*, KLUWER COMPETITION L. BLOG (Sept. 20, 2021), <https://perma.cc/TRW4-SSAD>.

²² COUNCIL REGULATION (EC) 139/2004, 2004 O.J. (L 24) art. 22 (providing that a Member State’s competition authority may refer a transaction to the Commission if it “threatens to significantly affect competition within the territory of the Member State(s) and if it threatens to significantly affect competition within the territory of the Member State(s) making the request”).

²³ COUNCIL REGULATION 2022/1925, 2022 O.J. (L 265); Directives (EU) 2019/1937 and (EU) 2020/1828 (Digital Markets Act), at art. 12.

has stated that it may determine that a “substantial lessening of competition” may arise from an acquisition (and therefore move to block the acquisition) that eliminates “a dynamic competitor that is making efforts towards entry or expansion . . . *even where entry by that entrant is unlikely and may ultimately be unsuccessful.*”²⁴

The rapid emergence of a regulatory consensus, and endorsement by much of the scholarly community and commentary in influential publications, can give the appearance that a particular policy question is settled even in the absence of definitive empirical evidence. In fact, the suddenly predominant view concerning the anticompetitive effects of incumbent/startup acquisitions suffers from two critical vulnerabilities. First, the consensus narrative of emergent or realized market failure in the technology M&A market is hard to reconcile with the inconvenient fact that, during the same period in which platform incumbents have purportedly suppressed competition through predatory acquisitions of small entrants, technology markets have exhibited strong growth in venture capital (VC) investment and startup entry.²⁵ During 2005-2019, the annual number of investments in US-based startups by VC firms increased from 2,995 to over 11,359 per year and the annual dollar amount of VC investment in US-based startups increased from almost \$23 billion per year to \$133.4 billion per year.²⁶ Moreover, as of 2019, approximately two-thirds of US VC investments flowed to relatively smaller emerging companies (at valuations below \$100 million).²⁷ Second, the new conventional wisdom pays insufficient attention to the long-standing and constructive function of incumbent/startup acquisitions in robust technology ecosystems, which generally promote outcomes that are favorable as a matter of both innovation and competition policy. There are strong grounds for concern that expanding the power of regulators and courts to preempt the low-probability risk of a killer acquisition—in the language of the CMA, “even where entry by that entrant is unlikely and may ultimately be unsuccessful”²⁸—poses a

²⁴ COMPETITION AND MKTS AUTH., Merger Assessment Guidelines 45 (Mar. 18, 2021) (U.K.) (emphasis added).

²⁵ On the contribution of VC investment to startup entry during this period, see Gary Dushnitsky & D. Daniel Sokol, *Mergers, Antitrust, and the Interplay of Entrepreneurial Activity and the Investments That Fund It*, 24 VAND. J. ENT. & TECH. 255, 267–72 (2022).

²⁶ National Venture Capital Association, NVCA 2020 Yearbook at 24 (Mar. 2020).

²⁷ *Id.*

²⁸ See *supra* note 24.

high-probability risk of endangering the monetization structures that have supported the strong track record of VC investment and startup formation in the world's highest-performing technology markets. That would be a patently anticompetitive result.

Consider three essential facts of the startup ecosystem. First, acquisition by a large firm, and not an IPO, is by far the most common monetization mechanism for VC-backed, US-based startups, representing 92% on average of annual exits during 2004-2019.²⁹ Second, venture capital is the overwhelming source of financing for startups at early to intermediate stages of development preceding an acquisition or IPO.³⁰ Third, a large majority of VC-backed, US-based startups never achieve any exit or achieve an exit but lose money for investors (respectively, 36% and 42% for about 12,000 VC-backed, US-based firms that exited during August 2002 through Q1 2022).³¹ As those figures suggest, VC investment outcomes are extremely skewed: a VC fund (and its investors) rely on exceptional returns from a small minority of firms to achieve an aggregate positive return on the fund's portfolio within a reasonable investment horizon.³²

These harsh realities have a powerful implication: any legal change that increases—even modestly—the risk of not closing an acquisition lowers the likelihood of a successful exit transaction and discourages potential VC investors, who will contemplate shifting capital to other opportunities in which exit options are not similarly constrained. While it may seem to be an elementary observation, some regulators and commentators that call for dramatically increasing obstacles to incumbent/startup acquisitions overlook the fact that capital is a mobile asset that can easily be shifted away from startups altogether. Increasing legal obstacles to platform acquisitions of emerging firms could therefore yield efficiency losses arising from the across-the-board withdrawal of startup financing—reflecting the contraction of VC funding and the difficulty in accessing cost-

²⁹ *Supra* note 26, at 36. For the longer period August 2002-Q1 2020, the figures are similar: out of all exits by VC-backed companies, 96% exited through an acquisition, see Susan E. Woodward, *Irreplaceable Acquisitions: Proposed Platform Legislation and Venture Capital*, SAND HILL ECONOMETRICS (2021), <https://perma.cc/56AB-ARPP>.

³⁰ Lemley, *supra* note 6, at 6.

³¹ Woodward, *supra* note 29. The sample excludes biotech companies. The August 2002 start date is chosen because it was the effective date of the Sarbanes-Oxley Act, which increased the regulatory burden of publicly listed companies.

³² John J. Cochrane, *The Risk and Return of Venture Capital* (Nat'l Bureau of Econ. Rsch., Working Paper No. 8066, 2001).

comparable alternative funding sources—that substantially exceed the efficiency gains attributable to a reduced incidence of killer acquisitions, which do not plausibly reflect anything more than a small (or, outside the life sciences, a potentially nominal) portion of the total universe of incumbent/startup acquisition.

Given these high stakes, it is imperative to rigorously examine evidence concerning the killer acquisition hypothesis, the role of incumbent/startup acquisitions in technology markets, and the mix of adverse and positive effects on competitive conditions likely to arise from expanding the scope of regulatory and judicial intervention to preempt potential killer acquisitions. To execute this task, this paper critically examines empirical and other “real-world” evidence relating to killer acquisition theory, rather than relying on stylized theoretical models, “hot docs” evidence that can easily be construed out of context, or “snapshot” anecdotal observations. This analysis finds that killer acquisition and related kill zone theories (and therefore policy proposals based on those theories) rest on meager evidentiary foundations. Empirical evidence of killer acquisitions appears to be confined to ambiguous findings in a limited portion of the biopharmaceutical market and virtually none at all in the information and communications technology (ICT) markets in which regulators and some commentators have most frequently expressed concerns over killer acquisitions. Widely-referenced evidence for the kill zone effect derives from a specialized sample of exceptionally high-value acquisitions, while studies that use much larger samples of incumbent/startup transactions over multi-decade periods have failed to find evidence consistent with this theory. These fragile factual foundations do not merit the confidence with which some policymakers and commentators have recommended making (and, in the case of the FTC and the EU, have already made) substantial changes to merger review policies. Stated simply, the current state of knowledge concerning the reliability of hypothetical models of killer acquisitions and kill zone effects suggests that taking regulatory action on this basis is unsound as a matter of public policy and would risk causing significant harm to the innovation economy in general and to startups in particular.

Analytically speaking, it is not satisfactory merely to find that killer acquisition and kill zone theories provide an unconvincing account of incumbent/startup acquisitions in technology markets (at least outside certain segments of the pharmaceutical market). The mismatch between theoretical and real-world

markets demands an alternative explanation for the fact that incumbents in current and past technology markets regularly acquire emerging companies. This paper also takes up that task. Drawing on a well-developed body of empirical findings in the business management literature, I argue that incumbent/startup acquisitions supply an efficient solution to two “mirror image” transactional dilemmas that can impede the innovation and commercialization process. First, large firms have difficulty devising a compensation structure that preserves the “high-powered” incentives that are necessary to induce innovators to undertake the costs and risks involved in the development of a new technology that challenges, rather than merely refines, existing technologies. Second, small firms tend to have difficulty acquiring the capital, physical plant, and other infrastructure that is often necessary to convert a new technology into a technically and commercially viable product. Acquisition of an emerging firm by an incumbent efficiently combines the technology inputs supplied by the former with the commercialization capacities supplied by the latter. Viewed more broadly, incumbent/startup acquisitions are one of several mechanisms—encompassing licensing, joint ventures, equity investments, and other business relationships—through which differently specialized firms in technology markets generate value through combinations of innovation and non-innovation assets. Any regulatory intervention that truncates this choice set of organizational forms may compel firms to structure the innovation and commercialization process in a manner that is less than maximally efficient, resulting in some combination of higher prices, reduced output, and delayed innovation than would otherwise be the case.

US antitrust policy was once characterized by an “inhospitality” approach that rushed to condemn a business practice as anticompetitive before undertaking any meaningful inquiry into the potentially efficient function it may play in a particular business environment.³³ Legal and economics scholars challenged that approach, finding after careful study that many practices that antitrust law had condemned as being per se illegal (or close to it)—such as tying, exclusive dealing, and resale price maintenance—fulfill efficient functions much of the time and therefore deserve scrutiny under a balancing test.³⁴ In a

³³ Frank H. Easterbrook, *The Limits of Antitrust*, 63 TEX. L. REV. 1, 4–9 (1984).

³⁴ *Id.*

case of willful blindness to decades of economic and legal scholarship (substantially adopted by US case law and reflected in antitrust agencies' guidelines since the late 1970s and early 1980s, respectively³⁵), the new populism that characterizes much recent discussion of antitrust policy among the trade press, an increasing portion of scholarly commentary, and statements and actions by many regulators and legislators, has moved toward reinstating the once-discredited antitrust presumption of "guilty unless proven otherwise." This contribution undertakes the task of showing (again) the welfare costs of this dogmatic approach—in particular, the anticompetitive disincentives to startup entry attributable to factually unfounded regulatory intervention in the technology M&A market—and the welfare gains that can be secured by re-anchoring antitrust decision-making in economic reasoning supported by factual analysis of particular business practices, rather than rigid presumptions that rest on a combination of stylized models, anecdotal observations, and strong rhetoric.

This article is organized as follows. In Part II, I critically review the relevant body of empirical evidence concerning killer acquisitions and kill zone effects. In Part III, I discuss the role that acquisitions and other incumbent/startup relationships play in supporting the formation of, and promoting investment in, emerging firms in technology markets. In Part IV, I describe the changes to merger review policy that have been proposed and, in some cases, undertaken to address the purported risks of killer acquisitions and kill zone effects. I also discuss the error costs that can arise from these policy changes—in particular, risks to the financing and monetization mechanisms that support a robust startup ecosystem—and offer an alternative policy strategy based on intellectual property (IP) law. I briefly conclude.

II. KILLER ACQUISITIONS AND KILL ZONES: MODELS AND EVIDENCE

Antitrust enforcers and scholars often rely on models to identify circumstances in which anticompetitive outcomes are likely to arise. Yet models, which are ultimately only theoretical

³⁵ *Continental T.V., Inc. v. GTE Sylvania Incorporated*, 433 U.S. 36, 59 (1977) (holding that rule of reason standard applies to nonprice vertical restraints); U.S. DEPT. OF JUST., 1982 MERGER GUIDELINES, at 29, <https://perma.cc/TM9L-69TY> (stating that "[i]n the overwhelming majority of cases, the Guidelines will allow firms to achieve available efficiencies through mergers without interference from the Department").

constructions, can only provide a sound basis for antitrust policy to the extent they are shown to provide a reliable account of real-world markets. In this Part, I critically review the principal models of killer acquisitions and kill zone effects in light of relevant evidence on the extent to which those models provide a reliable account of incumbent acquisitions of emerging firms. In general, it appears that theoretical models of killer acquisitions describe at best a small portion of the acquisition universe in the biopharmaceutical industry and a potentially negligible portion of the acquisition universe in the ICT industry. Evidence of kill zone effects appears to be limited to certain exceptionally high-value acquisitions of potential direct competitors, rather than the more common case in which a startup develops a product or service that is complementary to the platform acquiror's existing line of business or enables it to enter new lines of business.

A. Killer Acquisitions: Theory

Concerns that incumbents' acquisitions of emerging companies may pose risks to market competition are not new to antitrust law and policy. The concept of a "nascent competitor" is generally traced back to the DOJ's antitrust litigation against Microsoft in the late 1990s,³⁶ although concerns over potential competition have been addressed in the merger review context at least since the 1960s.³⁷ In the Microsoft suit, the government alleged (and the district court agreed) that certain of Microsoft's business practices were designed to compel exit by Netscape, the pioneer of the internet browser that purportedly threatened Microsoft's leadership in the operating system market (construed for that purpose as part of a broader computing platform market).³⁸ While the Microsoft litigation did not address an acquisition transaction, it has been understood as supporting the notion that a firm can be subject to antitrust liability for taking anticompetitive actions toward an emerging firm that does not

³⁶ John M. Yun, *Are We Dropping the Crystal Ball? Understanding Nascent & Potential Competition in Antitrust*, 104 *MARQUETTE L. REV.* 613, 619 (2021). For the Microsoft case, see *U.S. v. Microsoft Corp.*, 253 F.3d 34 (D.C. Cir. 2001); *U.S. v. Microsoft Corp.*, 84 F.Supp.2d 9 (D.D.C. 1999).

³⁷ For discussion, see Jonathan Jacobson & Christopher Mufarrige, *Acquisitions of "Nascent" Competitors*, *THE ANTITRUST SOURCE* 2–3 (Aug. 2020).

³⁸ *Microsoft*, 84 F. Supp. 2d at 111–12 (stating that "actions that Microsoft took against [Netscape] Navigator hobbled a form of innovation that had shown the potential to depress the applications barrier to entry sufficiently to enable other firms to compete effectively against Microsoft in the market for Intel-compatible PC operating systems").

presently pose a competitive threat but may reasonably do so in the future.

Applied to the merger context, the concept of a nascent competitor has been deployed in recent scholarship, regulatory statements, and enforcement actions to identify two types of transactions that may pose a threat to competition. In the first scenario, an incumbent acquires an emerging firm and, after the acquisition, discontinues the target's technology that competed (or could have been expected to compete) directly with the incumbent's technology. In the second scenario, an incumbent acquires an emerging firm and, after the acquisition, incorporates the target's technology into its existing suite of products and services. In a variant on this scenario, the incumbent concurrently discontinues its own competing technology (or discontinues efforts to develop a competing technology), known as a "reverse killer" acquisition. Both scenarios assume that the incumbent faces few actual or potential competitors in the relevant market and hence exercises some meaningful level of market power. If that is not the case, then there is no plausible ground for antitrust concern since the incumbent's acquisition and post-acquisition actions would be disciplined by competitive forces.

Each acquisition scenario gives rise to different implications as a matter of competition policy. This reflects the fact that the first scenario involves the acquisition of a substitute technology whereas the second scenario (at least in its simpler form) involves the acquisition of a complementary technology. The acquisition of a substitute technology by a dominant firm (which therefore faces no actual or potential competitive threats) is a horizontal combination that has no redeeming value from the perspective of antitrust policy as a matter of static efficiency.³⁹ It should be noted, however, that this diagnosis only necessarily applies in the narrow case of perfect substitutability between the acquiror's and target's products. In all other cases, the acquiror's and the target's products may share some but not all relevant features in common, which means that the target's product stands in a partially horizontal and partially vertical relationship with the acquiror's product. Condemnation of such

³⁹ The welfare implications are more ambiguous as a matter of dynamic efficiency because startups may be incentivized to challenge an incumbent if there remains the "backup" option of being acquired in the event challenging the incumbent is unsuccessful or infeasible, which in turn may place pressure on the incumbent to innovate. On this point, see *infra* note 44.

transactions as necessarily suppressing a competitive threat would be unfounded without closer case-specific inquiry.⁴⁰

In the second scenario, which involves a vertical combination, the presumption is reversed. An incumbent's acquisition of a complementary technology may result in benefits for consumers in the form of increased quality (including increased variety, functionality or convenience) or reduced cost.⁴¹ Critically, acquisition by the incumbent and incorporation of the target's technology into the incumbent's product ecosystem or production and distribution infrastructure may be a precondition for realizing the value embedded in the target's complementary technology (or at least, doing so as efficiently as possible). To be clear, those competitive benefits must be balanced against competitive harms—for example, acquisition of a complementary technology by a dominant firm may support a bundling strategy that frustrates entry by potential competitors that can only feasibly offer stand-alone products. As the Microsoft case illustrated, however, the entry-deterrence effects of a technological bundle (in that case, the Internet Explorer browser plus the Windows operating system) may be outweighed by the pricing and functionality gains that the bundle confers on users (for example, Microsoft's bundle delivered to users an integrated browser technology at an incremental price of zero, compared to the positive price charged by Netscape for the browser as a stand-alone product).

B. Killer Acquisitions: Evidence

Scholarly discussions of killer acquisitions principally rely on stylized models that reflect certain assumptions that may be plausible but, without specific evidence, cannot be presumed to characterize any particular real-world market, let alone incumbent acquisitions of emerging firms in general. Some legal scholars presumptively attribute anticompetitive intent when-

⁴⁰ On this point, see Kristen C. Limarzi & Harry R. S. Phillips, "Killer Acquisitions," *Big Tech, and Section 2: A Solution in Search of a Problem*, CPI ANTITRUST CHRONICLE 3–4 (May 2020). For related observations, see Kevin A. Bryan & Erik Hovenkamp, *Startup Acquisitions, Error Costs, and Antitrust Policy*, 87 U. CHI. L. REV. 331, 340 (2020) [hereinafter Bryan & Hovenkamp, *Startup Acquisitions*] (noting that a case in which the FTC blocked a dominant firm's acquisition of a sole competing product "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 acquiror. In practice, matters are rarely this clear-cut").

⁴¹ This point is consistent with evidence on the motivations behind many acquisitions undertaken by the GAFAM entities, which often seek to acquire complementary functionalities, see Parker, *supra* note 1, at 1311–16. For further discussion, see *infra* Part III.B.

ever a dominant platform apparently elects to terminate the product or service of an acquired firm without meaningfully addressing the possibility that any such termination may arise in connection with integration of the target's technology into the acquiror's product ecosystem, may reflect an "acqui-hire" transaction, or may indicate a commercial or technical post-acquisition failure.⁴² In this Section, I review empirical evidence on the extent to which killer acquisition theory provides a reliable account of incumbent/startup acquisitions in technology markets. Given the confidence with which regulators and some commentators have adopted these theories as a basis for policy action, it is surprising to discover that evidentiary support for the killer acquisition thesis is limited and, outside the biopharmaceutical industry, relies principally on speculative generalizations or anecdotal observations.⁴³

⁴² See, e.g., Lemley, *supra* note 6, at 63–64. The authors claim that killer acquisitions are a "prominent practice among big tech firms" and then cite to news articles mentioning three such transactions. Yet the sources indicate that two of these transactions were not plausibly motivated by a suppression rationale and one transaction appears to have had precisely the opposite effect. One transaction was an acqui-hire (of three founders for total compensation of \$15 million)—that is, the acquisition was used as a vehicle for acquiring talent. See Ingrid Lunden, *After Facebook Acqui-Hired Branch Media in 2014, Founders Shutter Branch (and Potluck)*, TECHCRUNCH (June 3, 2015), <https://perma.cc/7YZU-KUEQ>. In another transaction, the acquiror closed the target's site but concurrently integrated the technology's recommendation functionality into its own site and retained some of the target's personnel. See Josh Constine, *Facebook Buys and Shuts Down Shopping Site TheFind to Boost Commerce In Ads*, TECHCRUNCH (Mar. 13, 2015), <https://perma.cc/532D-7YVJ>. The last transaction involves a merger of two mature companies (Oracle's acquisition of Sun Microsystems), after which Oracle reportedly "released a plethora of products and advanced numerous projects derived from the Sun acquisition. See Paul Krill, *A Year Later: Has Oracle Ruined or Saved Sun?*, INFOWORLD (Feb. 10, 2011), <https://perma.cc/ZAYG-QMER>. For similarly speculative claims, see Tim Wu & Stuart A. Thompson, *The Roots of Big Tech Run Disturbingly Deep*, N.Y. TIMES: PRIVACY PROJECT (June 7, 2019), <https://perma.cc/P8AP-ZS2J> (claiming that "Facebook has purchased and then shut down 39 companies" and that "[m]any of these shutterings may represent the simple purchase of talent, but others may have been designed to eliminate future competition," but providing no evidence to support any such anticompetitive objectives).

⁴³ For similar conclusions based on a review of the evidence concerning purported killer acquisitions by digital platforms, see Yun, *supra* note 36, at 645 ("At best, the evidence is mixed, and more work needs to be done—as none of the studies use a control group such as an examination of acquisitions by technology companies outside of the big five . . . or track the progress of contemporaneous rivals to the acquired nascent or potential competitor"); David Deller et al., *Competition and Innovation in Digital Markets*, at § 5.3 (BEIS Research Paper No. 2021/040) ("[w]hile killer acquisitions are possible in digital markets, existing evidence suggests they are rare, although this will depend on the precise criteria used to define killer acquisitions").

i. CEM Study (1989-2010)

Widespread concerns over the risks to competition purportedly raised by incumbents' acquisition activity rely heavily on a study by Colleen Cunningham, Florian Ederer, and Song Ma (the "CEM" study).⁴⁴ Using a large sample consisting of more than 16,000 drug projects initiated during 1989-2010 and then acquired by another firm, the study sought to infer the motivations behind acquisitions involving "overlapping" drugs, defined as an acquisition in which at least one of the target's drug development projects overlaps with one of the acquiror's drugs or drug development projects. "Overlap" has a precise technical sense in the study, meaning that both drugs use the same "mechanism of action" in the same therapeutic class.⁴⁵

The study found that acquisitions involving overlapping drugs were 3.7% less likely to result in at least one "development event" (for example, progressing to later-stage clinical trials) after the acquisition, compared to drug projects acquired by companies that did not have an overlapping project.⁴⁶ Additionally, the study found that terminations of acquired projects following an acquisition tended to occur more frequently in the case of projects that had been acquired by firms with patents covering the acquiror's overlapping project that were far from expiration (suggesting that the acquiror had an incentive to remove a competitor that could threaten its patent-protected market position).

In the aggregate, the study's findings are presented as evidence that a small but significant portion (approximately 5.3% to 7.4%) of acquisitions in the pharmaceutical industry are motivated by an intent to suppress a drug project that poses a competitive threat to one of the acquiror's drugs or drug projects.⁴⁷ While the probability of a development event is low for all acquired projects, it is lower by a small but significant amount for acquired projects with overlap. Specifically, while there is a 17.5% probability of a post-acquisition development event in the case of acquired projects without overlap, that figure falls to

⁴⁴ Colleen Cunningham, Florian Ederer & Song Ma, *Killer Acquisitions*, 29 J. POL. ECON. 649 (2021).

⁴⁵ As defined in the study, the therapeutic class "is the disease or condition the therapy targets." The mechanism of action is the "biological interaction involved in the drug achieving its desired end, including both the molecular target . . . and the intended effect," *see id.* at 671.

⁴⁶ *Id.* at 674.

⁴⁷ *Id.* at 692.

13.4% in the case of acquired projects with overlap.⁴⁸ The study estimates that these findings imply that approximately 13 drug projects would continue development each year if killer acquisitions were banned (and, presumably, could be perfectly detected).⁴⁹ As is sometimes overlooked in descriptions of the study's findings, however, the study also notes that the net welfare effects of killer acquisitions remain ambiguous because "acquisitions may increase ex ante incentives for the creation of new drug projects but also distort the direction of innovation."⁵⁰

ii. Does the CEM Study Provide a Sound Basis for Antitrust Policy?

The CEM study was posted as a working paper to the SSRN platform in September 2018 and published in the *Journal of Political Economy* in May 2021. As of September 10, 2023, the paper had been cited 585 times in the scholarly literature (according to Google Scholar) and downloaded over 11,000 times on the SSRN database. Even prior to publication, the working paper had been widely referenced, including in influential reports released by the OECD,⁵¹ the US House Judiciary Committee⁵², and the Stigler, Furman, and Crémer expert committees.⁵³ While the findings set forth in the CEM study are restricted to the pharmaceutical industry, it is often referenced as support for the broader proposition that killer acquisitions are prevalent in platform technology markets and pose a material risk to competitive

⁴⁸ *Id.* at 691–92.

⁴⁹ *Id.* at 693. This calculation relies on the assumption that, absent the acquisition, the target would have developed its project independently at the same rate as non-acquired projects (*see* Cunningham et al., *supra* note 44, at 693), but does not provide any justification for making this assumption (which is contestable since the sample of non-acquired projects presumably includes a lower percentage of overlapping projects). The development rate for non-acquired projects (19.9%) is higher than the post-acquisition development rate for non-overlapping and overlapping projects (17.5% and 13.4%, respectively). *See* Cunningham et al., *supra* note 44, at 691–92. On this point, *see* Geoffrey A. Manne, Samuel Bowman & Dirk Auer, *Technology Mergers and the Market for Corporate Control*, 86 MISSOURI L. REV. 1047, 1098–99 (2022); Amy Madl, *Killing Innovation?: Antitrust Implications of Killer Acquisitions*, 38 YALE J. REG. BULL. 28, 45 (2020).

⁵⁰ *See* Cunningham, *supra* note 44, at 654–55 and, for further discussion, at 695–96. Relatedly, the CEM study notes that "the existence of the acquisition exit option may be valuable enough [to the entrepreneur] to increase ex ante innovation incentives," *see id.* at 663 n.19.

⁵¹ OECD Report, *supra* note 13, at 9, 13, 17.

⁵² H. COMM. REP., *supra* note 10, at 6.

⁵³ STIGLER REPORT, *supra* note 2, at 16–17; FURMAN REPORT, *supra* note 2, at 49; CREMER REPORT, *supra* note 2, at 116–17.

conditions generally. It is now commonly asserted in regulatory discussion, scholarly commentary, and the trade press that leading platforms use acquisitions to suppress competitive threats. According to a participant, a 2019 conference organized by DG Comp (an EU competition regulator) “left attendees with the impression that incumbent digital firms are systematically eliminating future innovation competition by acquiring and ‘killing’ promising incipient companies.”⁵⁴ Reflecting this exaggerated chain of inferences sometimes drawn from the CEM study, it has sometimes been referenced in support of policy proposals or enforcement actions—accompanied by the colorful rhetoric of killer acquisitions, kill zones, and “buy-or-bury scheme[s]”⁵⁵—to unwind long-consummated acquisitions or to impose strict limitations on incumbent/startup acquisitions in technology markets.

These normative positions extend well beyond the evidence set forth in the CEM study. As a basis for policymaking, that evidence is limited in at least five respects.

First, the study’s evidence is drawn solely from the pharmaceutical industry and, as such, may not necessarily describe acquisition activity in other technology markets. In pharmaceutical markets, intellectual-property, regulatory, and technological constraints mean that there are often limited avenues to “design around” a patented drug. This is in part because patent protection is almost universally used to protect pharmaceutical products and generally viewed as being more easily enforceable as compared to products in ICT markets.⁵⁶ Given these considerations, acquiring a target’s drug project can sometimes (but not always, as discussed below⁵⁷) reasonably be expected to foreclose entry by competitors in the relevant therapeutic segment within

⁵⁴ David Perez de Lamo, *Preserving Innovation Competition in the Digital Era: “Killer Acquisitions,”* CPI EUROPE COLUMN (July 2019), at 2, <https://perma.cc/9CAK-D5MW>.

⁵⁵ *FTC Alleges Facebook Resorted to Illegal Buy-or-Bury Scheme to Crush Competition After String of Failed Attempts to Innovate*, F.T.C. (Aug. 19, 2021), <https://perma.cc/L8EA-4QJJ>.

⁵⁶ This has been known since at least the landmark “Cohen et al.” and “Levin et al.” survey studies, which found that the pharmaceutical and chemical industries exhibited the strongest reliance on the patent system as a value-appropriation mechanism. See Wesley M. Cohen, Richard R. Nelson & John P. Walsh, *Protecting Their Intellectual Assets: Appropriability Conditions and Why U.S. Manufacturing Firms Patent (or Not)*, (Nat’l Bureau of Econ. Rsch., Working Paper Series No. 7552, 2000); Richard C. Levin, Alvin K. Klevorick, Richard R. Nelson & Sidney G. Winter, *Appropriating the Returns from Industrial Research & Development*, 3 BROOKINGS PAPERS ON ECON. ACTIVITY 783 (1987).

⁵⁷ See *infra* notes 63–64 and accompanying text.

the remaining patent term.⁵⁸ By contrast, in technology markets outside pharmaceuticals (especially software⁵⁹), patent protection is often difficult to enforce or reasonably circumvented through “design-around” products. This means that acquisition of a target’s technology may not reasonably be expected to preclude entry by other firms who can develop differentiated products that outcompete on quality, price, or other product features. There should therefore be greater caution in assuming that an incumbent/startup acquisition in an ICT market is a value-destroying strategy designed to suppress a competitive threat from a substitute product (since any such strategy would be unlikely to succeed), as distinguished from a value-enhancing strategy designed to add a complementary application to the incumbent’s platform (as discussed in more detail below).⁶⁰

Second, as observed by Amy Madl, the CEM study does not appear to consider whether some overlapping acquisitions may be explained by a hedging strategy.⁶¹ To illustrate, consider the study’s finding that the probability of a post-acquisition development event is about 4% lower in the case of acquisitions involving overlapping drug projects, as compared to non-overlapping projects.⁶² Yet a firm may acquire an overlapping project as a “backup” in the event its internal project fails clinical testing (a high risk given the small percentage of drug development projects that secure regulatory approval and reach market release⁶³), gives rise to adverse side effects, is costly to

⁵⁸ Margaret K. Kyle, *Competition Law, Intellectual Property, and the Pharmaceutical Sector*, 81 ANTITRUST L.J. 1, 2 (2016) (stating that product patents in the pharmaceutical sector are hard to invent around, whereas in other fields, “patent protection is often weaker due to the ease of inventing around or questions of a patent’s validity and enforceability”).

⁵⁹ For survey evidence on this point, see Stuart J.H. Graham, Robert P. Merges, Pam Samuelson & Ted Sichelman, *High Technology Entrepreneurs and the Patent System: Results of the 2008 Berkeley Patent Survey*, 24 BERK. TECH. L.J. 1255 (2009).

⁶⁰ For related views, see Yun, *supra* note 36, at 662 n.140 (“The pharmaceutical industry is a relatively straightforward industry to study, from the perspective of determining substitutability, because there are set categories of pharmaceutical substitutability . . . [t]hus, we can more reliably use functional substitutability to proxy for market-based substitutability— that is, how consumers actually behave. For other differentiated products, including almost all the products from large technology platforms and even retail products, this assessment is not as straightforward.”).

⁶¹ Madl, *supra* note 49, at 35–36.

⁶² Cunningham et al., *supra* note 44, at 692.

⁶³ Ryan Cross, *Drug Development Success Rates Higher than Previously Reported*, C&EN (Feb. 7, 2018), <https://perma.cc/97LF-LFBU> (MIT study used sample of almost 180,000 unique trials of over 21,000 compounds, during Jan. 2000–Oct. 2015, and found that 13.8% of drug development projects moved from Phase I testing to regulatory approval); Fabio Pammolli, Laura Magazzini & Massimo Riccaboni, *The Productivity Crisis*

produce, or is difficult to administer. If the acquiror ultimately observes that the acquired project underperforms on one or more of these parameters relative to its internal project, then it may elect to terminate the acquired project but without having had any firm intent at the time of acquisition to do so (or, in some cases, it may terminate the internal project if the acquired project outperforms). This hedging rationale could explain, at least in part, why higher termination rates are observed in overlapping acquisitions—which provide a “hedge” precisely because they are pursuing a similar therapeutic target as the acquiror—and does not raise any anticompetitive implications. To the contrary, the possibility of hedging the risk of project failure through an acquisition strategy would enhance pharmaceutical firms’ incentives to undertake new drug projects, while the prospect of being acquired for hedging purposes would enhance the incentives of startup founders and investors to do the same.

Third, also as observed by Amy Madl, the acquisition of an overlapping drug does not necessarily imply anticompetitive intent to suppress an actual or potential competitor since overlapping drugs (as defined in the CEM study) do not always operate as economic substitutes for the acquiror’s project and hence, may operate in “partially independent markets.”⁶⁴ Drugs that use the same “mechanism of action” in the same therapeutic market (the criteria used by the study to determine overlap) may exhibit other economically relevant differences that address different patient populations or have other features (for example, delivery mechanism or side effects) that do not appear in the acquiror’s drug or drug project.⁶⁵ Even assuming the acquiror terminates a directly competitive project, the low likelihood of a drug project surviving clinical trials, securing regulatory approval, and reaching market counsels against assuming that a terminated project would have proceeded successfully through testing and approval if it had not been acquired.⁶⁶ Taking into account the low rates of successful drug development through market release (as distinguished from having only one more post-acquisition “development event”),⁶⁷ Madl estimates that the

in Pharmaceutical R&D, 10 NATURE REVS. AND DRUG DISCOVERY, 428, 431, Tbl. 1 (2011) (finding average success rates for drug development projects ranging from 2.38% to 29.77%, depending on the drug category).

⁶⁴ Madl, *supra* note 49, at 34.

⁶⁵ *Id.*

⁶⁶ On this point, see Kent Barnard, *Recapturing the Business Side of Innovation in Antitrust Merger Analysis*, CPI ANTITRUST CHRON., Aug. 2021, at 7–8.

⁶⁷ See *supra* note 63.

number of hypothetical drugs that would otherwise have reached market annually but for killer acquisitions (and would therefore have imposed pricing pressure on acquirors' drugs) may be substantially lower than the estimate of 13 claimed in the CEM study.⁶⁸ Low rates of successful market release, combined with the fact that even acquired overlapping projects may not always pose a direct competitive threat to the acquiror's drug or drug project, may explain why the study finds no difference on average between valuations of overlapping and non-overlapping acquisitions.⁶⁹ This finding departs from the killer acquisition model, which posits that overlapping acquisitions are undertaken to preserve the acquiror's market power by suppressing a directly competitive drug project, for which the acquiror should therefore be willing to pay a premium compared to non-overlapping acquisitions.⁷⁰

Fourth, as observed by several commentators, the CEM study does not fully consider whether termination of an acquired project may be explained in some cases by the acquiror's decision to integrate elements of the acquired project into the internal overlapping project—encompassing product features, clinical data, process know-how, or other commercially valuable intellectual assets—and produce a drug that is superior, or has a higher risk of development success, compared to the acquired or internal overlapping project.⁷¹ In this scenario, the market would potentially lose one potential competitor to the acquiror's product—"potentially" because successful development of either

⁶⁸ Madl, *supra* note 49, at 45 (arguing that the number of overlapping drug projects that were terminated by the acquiror and would otherwise have reached market falls to zero or one annually, taking into account the low success rates in securing regulatory approval and achieving market release for drug projects).

⁶⁹ Manne et al., *supra* note 49, at 1109. On valuation differences in the CEM study, see Cunningham et al., *supra* note 44, at 654.

⁷⁰ Reflecting this assumption, several commentators have argued that high acquisition prices can indicate a killer acquisition, *see, e.g.*, Salop, *supra* note 17, at 14 ("[a] higher bid by the dominant firm could well reflect a market power premium, that is, the value of the dominant firm of using the acquisition to maintain its market power"); Carl Shapiro, *Antitrust in a Time of Populism*, 61 INT'L J. INDUS. ORG. 714, 740 (2018) (arguing that it is not "far-fetched that the dominant incumbent firm, whose market capitalization will fall sharply if successful entry occurs, would pay a premium to acquire the target firm").

⁷¹ Manne et al., *supra* note 49, at 1103–04; Jacqueline Grise, David Burns & Elizabeth Giordano, *The No Kill Zone: The Other Side of Pharma Acquisitions*, CPI ANTITRUST CHRON., May 2020, at 4–5. The CEM study partially addresses, and rejects, this possibility by assessing the "chemical similarity" of acquired drugs to the acquiror's pre- and post-acquisition development projects; however, this methodology does not account for other ways in which elements of an acquired project may be integrated into the acquiror's internal projects. On this point, *see* Madl, *supra* note 49, at 37–38.

project through market release is far from assured—but would enjoy a welfare gain as measured by improved product quality, reduced costs, or accelerated market release. The FTC has previously relied on this type of rationale in approving even a “merger to monopoly” acquisition in a pharmaceutical market.⁷² This possibility provides further reason against assuming that all terminated projects observed by the CEM study necessarily constitute a net harm to competition.

Fifth, when moving from empirical findings to actionable policy recommendations, it is critical to keep in mind that the CEM study, like any empirical study, inherently suffers from hindsight bias since researchers enjoy the analytical luxury of identifying likely killer acquisitions within a large sample of consummated transactions over an extended time period. The study’s methodology provides few tools for regulators or courts, when examining a single new transaction, to identify prospectively whether a particular transaction would later be deemed to fall into the small portion of the total sample of transactions that likely constitute killer acquisitions.⁷³ Absent such a methodology,⁷⁴ diagnostic errors by regulators in identifying killer acquisitions are unavoidable and, since the CEM study finds that approximately 92% to 95% of all acquisitions in the pharmaceutical market are not even arguably killer acquisitions,⁷⁵ would skew strongly toward false-positive errors.⁷⁶ Moreover, given the difficulties in reconstructing hypothetical market developments but for a particular acquisition, uncertainty would also afflict legal challenges to consummated mergers. As discussed subsequently, false-positive enforcement errors (and even a merely enhanced risk of such errors) in merger challenges can cause significant harm to the innovation ecosystem as a whole.

⁷² Grise et al., *supra* note 71, at 5.

⁷³ For extensive discussion of the difficulties in undertaking the counterfactual analysis inherent to assessing whether an incumbent’s acquisition of an emerging company raises a sufficiently high likelihood of competitive harm to warrant challenging the acquisition, see Yun, *supra* note 36, at 636–43; John M. Taladay & Jeffrey S. Oliver, *Analyzing Nascent Competitors Acquisitions Rationally*, CPI COLUMNS, Feb. 2021.

⁷⁴ For a proposed method to identify killer acquisitions based on various criteria, see David Perez de Lamo, *Assessing “Killer Acquisitions”: An Assets and Capabilities-Based View of the Start-Up*, CPI ANTITRUST CHRON., May 2020, at 58.

⁷⁵ These percentages are implied by the percentages of acquisitions that the study estimates as constituting killer acquisition, see Cunningham et al., *supra* note 44, at 692.

⁷⁶ For detailed explanation of this point, see Manne et al., *supra* note 49, at 1087–88.

iii. Is There Evidence of Killer Acquisitions Outside Pharmaceuticals?

The importance of the CEM paper derives from the fact that it has been understood to provide compelling evidence of killer acquisitions in the pharmaceutical market and, as such, to raise significant concerns about the potentially anticompetitive effects of large platforms' acquisitions of emerging firms in ICT markets that extend beyond pharmaceuticals. Building on the CEM study, several researchers have sought to assess the potential existence of killer acquisitions in platform markets that lie outside the life sciences—the context in which commentators and policymakers have most often expressed concerns over the purportedly anticompetitive effects of repeated startup acquisitions by “Big Tech” entities. In stark contrast to widespread assertions in popular and policy commentary that ICT markets are threatened by repeat acquisitions of emerging firms by platform incumbents, researchers have generally failed to find empirical evidence of killer acquisitions in these markets.

a. Israel Competition Authority Study

In a contribution submitted in 2020 to the OECD, the Israel Competition Authority (ICA) surveyed a sample consisting of 21 acquisitions of Israeli startups during 2014-2019 by the GAFAM entities.⁷⁷ Among the transactions for which information was available, eight involved targets that had developed a stand-alone technology and eleven involved targets that had developed a complementary technology for integration into a potential acquiror's existing product/services ecosystem.⁷⁸ In 17 of the 21 transactions, there was no evidence that the acquired technology had been terminated by the acquiror after closing. The remaining four transactions involved the acquisition of personnel (an “acqui-hire”) or an IP rights portfolio,⁷⁹ which does not support a suppression rationale for post-acquisition termination decisions. While the ICA study sample is small, it is nonetheless noteworthy that it failed to find evidence of anticompetitive intent. Ra-

⁷⁷ OECD, START-UPS, KILLER ACQUISITIONS AND MERGER CONTROL—NOTE BY ISRAEL 17 (June 11, 2020) [hereinafter ICA REPORT]. The remainder of this paragraph and the immediately following paragraph refers to information and analysis in this source.

⁷⁸ The total number of transactions that were categorized in this manner is less than the total sample because Google did not satisfy the regulator's request for information in connection with the study.

⁷⁹ ICA REPORT, *supra* note 77, at 8, 10.

ther, the acquisitions in the sample appear to have been motivated principally by an intent to acquire complementary technological assets to enhance the acquiror's competitive position in the relevant market and to do so at a cost and time-to-completion that outperformed developing the technology internally. Critically, the largest portion of the sample consisted of transactions involving a target that necessitated acquisition by a larger firm to monetize its component technology. This finding suggests that those transactions enhanced competitive conditions since they did not suppress an entity that would have survived absent the acquisition while supporting investors' expectations that a successful startup would yield a monetary payoff through acquisition.

b. Charles River Associates Study

In a contribution published in 2020 by Charles River Associates (CRA), the authors used a sample of 409 acquisitions by the GAFAM entities (except Microsoft) during 2009-2020.⁸⁰ The study uses filters designed to identify potential killer acquisitions—in particular, whether the target poses a threat to the acquiror's core business, and the size of the purchase price used as a rough proxy for a “market power premium” (reflecting the assumption that a “killer” acquiror will pay a premium to suppress a threat to its existing monopoly). Out of all transactions in the sample for which relevant information was available to apply the filters (a total of 117 transactions), eleven transactions involve targets that were horizontally or vertically related to the acquiror's core business area and had a purchase price in excess of \$100 million.⁸¹ Even among this small population, almost all the qualifying transactions involve acquisitions for purposes of acquiring new technological capacities, entering new markets, complementing the incumbent's existing products, or acquiring incremental refinements of existing technologies, rather than suppressing technologies that threaten to displace one of the in-

⁸⁰ Oliver Latham, Isabel Tecu & Nikita Bagaria, *Beyond Killer Acquisitions: Are There More Common Potential Competition Issues in Tech Deals and How Can These Be Assessed?*, CPI ANTITRUST CHRON., May 2020, <https://perma.cc/8PE4-7QK9>.

⁸¹ If the purchase price threshold is lowered to \$50 million, then 16 transactions qualified as a potential killer acquisition. If it is further assumed that transactions for which no purchase price was reported by the acquiror fell below the \$50 million threshold (a reasonable assumption in light of “material event” reporting obligations under federal securities laws), then only four percent of the total sample of 409 transactions were potentially killer acquisitions (based on the filters used in the study).

cumbent's existing products.⁸² The CRA study did observe that some acquisitions resulted in the termination of the acquiror platform's existing overlapping technology—a "reverse killer acquisition." This outcome, however, does not necessarily indicate net competitive harm. A reverse killer transaction would yield competitive benefits if integration of the target's innovation into the acquiror's larger product ecosystem was necessary to realize the innovation's value—for example, in the case of a component technology—and, as can be reasonably assumed, the target's technology outperformed the acquiror's overlapping technology.

c. Other Studies

Other studies seek to assess the effects of GAFAM acquisitions on competitive conditions. In a paper published in 2022 by Robert Crandall and Thomas Hazlett, the authors examined 23 GAFAM acquisitions that are often referenced to illustrate concerns over purportedly predatory acquisition strategies. Contrary to this popular characterization, the study finds that all acquisitions resulted in 'benign or ambiguous' effects on competitive conditions (subject to the qualification that outcomes are unknown in a hypothetical "but for" market in which no acquisition had taken place).⁸³ In a working paper released in 2023, Marc Ivaldi, Nicolas Petit, and Selcukhan Unekbas seek to assess empirically whether acquisitions by GAFAM entities in ICT markets result in termination, or integration and "scaling up," of the target's product, or otherwise have anticompetitive effects in the target's market.⁸⁴ To address these questions, the paper uses a sample consisting of 12 GAFAM acquisitions during 2010-2021 and adopts a novel methodology that relies on quantitative and qualitative information disclosed in the US se-

⁸² Two other studies that use comparably sized transactional samples during approximately the same period reach similar results. A study that applies a more descriptive methodology to a sample of 175 companies acquired by GAFAM entities during 2015–2017 identified "only one potential killer merger" in the entire sample, see Axel Gautier & Joe Lamesch, *Mergers in the Digital Economy* 4 (Ctr. for Econ. Stud. and ifo Inst., CESifo Working Paper No. 8056, 2020). A study that analyzed 300 acquisitions by Amazon, Facebook, and Google during 2008–2018 found that most acquisitions involved targets that had developed innovations that were complementary to the relevant platform, indicating that attributing suppressive intent to the acquiror would be implausible, Elena Argentisi et al., *Merger Policy in Digital Markets: An Ex-Post Assessment* (Ctr. for Econ. Stud. and ifo Inst., CESifo Working Paper No. 7985, 2019).

⁸³ Robert W. Crandall & Thomas W. Hazlett, *Antitrust in the Information Economy: Digital Platform Mergers*, 65 J.L. & ECON. S499 (2022).

⁸⁴ Marc Ivaldi, Nicolas Petit & Selcukhan Unekbas, *Killer Acquisitions: Evidence from EC Merger Cases in Digital Industries* (Working Paper, Sept. 5, 2023).

curities filings of acquired entities' competitors. The results are not supportive of the killer acquisition thesis. Following each acquisition, the study finds that competitors continued to view the target or the acquiror as a competitor in the relevant market segment, while data on sales, entry, and innovation (as measured by new product introductions) suggests that, in most cases, competitive conditions remained robust in the market in which the target had operated. While the sample set is small and there are limitations inherent to relying on information disclosed in securities filings, the results raise doubts concerning the reflexive attribution of anticompetitive effects to acquisitions by GAFAM entities in ICT markets.

C. Kill Zones: Theory and Evidence

In a variant on the killer acquisition thesis, some commentators and policymakers have argued that repeated startup acquisitions by incumbent platforms can create a so-called “kill zone”—that is, a market segment into which startups are discouraged from entering. The House Antitrust Subcommittee Report, released initially in October 2020, had described reports that VCs were reluctant to fund startup entrants in market segments already dominated by a GAFAM firm.⁸⁵ The argument was developed more formally in an NBER working paper posted in 2020 by Sai Krishna Kamepalli, Raghuram Rajan and Luigi Zingales (“KRZ”),⁸⁶ who posited the following hypothesis. If incumbent platforms regularly acquire entrant platforms, then developers become reluctant to incur the costs required to write applications for any entrant platform based on the expectation that, once the platform is acquired by the incumbent, they will have to incur the costs involved in adapting their applications to the incumbent's platform. Acquisitions of entrant platforms by an incumbent platform discourage entry by other challengers, who anticipate difficulty eliciting interest from developers in contributing to the pool of applications necessary to attract users. The authors purport that this “kill zone” effect is evidenced by the following finding: an acquisition by Google or Facebook of a software company for at least \$500 million during 2006-2016 was followed within a three-year period by a decline in VC investment (as measured by number of deals or total investment

⁸⁵ H. COMM. REP., *supra* note 10, at 11–12, 27, 36–39.

⁸⁶ Sai Krishna Kamepalli, Raghuram Rajan & Luigi Zingales, *Kill Zone* (Nat'l Bureau of Econ. Rsch., Working Paper No. 27146, 2022).

amount) in software companies that operate in the same “space” as the acquired company. This decline is presented both in absolute terms and relative terms by comparison to changes in VC investment following acquisitions of software companies for at least \$500 million by entities other than Google or Facebook during the same period.

The KRZ paper has been referenced as “evidence” for kill zone effects in platform technology markets.⁸⁷ Yet the evidence presented in the KRZ paper is subject to a crucial limitation. The paper relies on a small sample of transactions, consisting of only nine acquisitions by two GAFAM platforms (seven by Google and two by Facebook), in each case involving landmark deals with exceptionally high purchase prices (in excess of \$500 million). This is an unusual research-design choice since a large majority of GAFAM acquisitions involve low purchase prices (78.75% of GAFAM acquisitions during 2010-19 involved purchase prices below \$50 million).⁸⁸ As noted, the paper finds that following acquisitions by Google or Facebook of software companies for more than \$500 million, VC investment, as measured by number of deals or total investment amount, declines. By contrast, in the case of the substantially larger group of acquisitions of software companies for more than \$500 million by entities other than Google or Facebook (178 transactions in total), VC investment holds approximately constant during the same period, when measured by number of deals, and increases when measured by total investment amount.⁸⁹ In concluding that these findings suggest the presence of a kill zone effect in platform-dominated markets, the paper does not appear to consider that the pool of acquirors other than Google or Facebook may include the other three GAFAM entities (Amazon, Apple, and Microsoft).

Data collected from the Zephyr M&A deals database shows that, during 2006-2016, Microsoft and Amazon collectively ac-

⁸⁷ See, e.g., STIGLER REPORT, *supra* note 2, at 9.; CREMER REPORT, *supra* note 2, at 117.

⁸⁸ F.T.C., Non-HSR Reported Acquisitions by Select Technology Platforms, 2010–2019 (Sept. 15, 2021) [hereinafter FTC Report], at 13.

⁸⁹ In the body of the paper, it is stated that “[t]he software industry exhibits a strong downward trend of relative investment in the three years before an acquisition [by entities other than Google or Facebook], a trend that is reversed in the three years after the acquisition, *unlike the continued downtrend when a platform acquires*” (Kampenalli et al., *supra* note 86, at 7, emphasis added). Based on the evidence presented elsewhere in the paper (*see id.*, Figure 2(a)), the italicized portion of the sentence should be clarified to indicate that “the continued downtrend” applies only to acquisitions by Google or Facebook, not *all* platforms as the current wording suggests.

quired seven companies in the software industry for more than \$500 million⁹⁰ and at least eight other large technology firms (Adobe, Cisco, Dell, eBay, IBM, Oracle, SAP, and Yahoo!) together made 46 acquisitions of firms in the software industry that each exceeded the \$500M threshold.⁹¹ Hence, the paper's findings at best show that certain high-value acquisitions in the software industry by Google or Facebook (mostly the former) are followed by reduced VC investment and startup entry, while a larger group of comparably high-value acquisitions in the software industry are followed by increased VC investment and startup entry. That is not especially compelling evidence that the KRZ paper's theoretical model of a kill zone effect provides a reliable account of the typical relationship between acquisitions by large technology platforms and VC investment in general or even the narrower group of high-value acquisitions addressed in the paper.

Moreover, it is not even clear that the KRZ paper's preliminary evidence concerning the effect of a limited sample of Google and Facebook acquisitions supports the kill zone hypothesis. The problem derives from a mismatch between the model and much of the evidence. The model contemplates a transaction in which the incumbent platform acquires an entrant platform that offers a directly competitive substitute product; yet the small sample includes at least four targets (out of nine total)⁹² that offer services that appear to complement, rather than displace, the platform.⁹³ In the case of complementary applications, the

⁹⁰ Qualifying acquisitions were identified based on deal value in excess of \$500 million and references to "software" in the target's business description or NAICS industry classification. Microsoft made five qualifying acquisitions, Amazon made two qualifying acquisitions, and Apple made none. Note that the Kampenalli et al. paper does not define "software" or "software industry" for purposes of its data analysis so there cannot be certainty that I have used the same definition of software as used by Kampenalli et al. in identifying qualifying acquisitions.

⁹¹ Specifically, these qualifying acquisitions include 12 acquisitions by IBM, 13 by Oracle, 9 by Cisco, 4 by Dell, 2 by Yahoo!, 2 by eBay, and 2 by SAP.

⁹² This includes two of the targets designated as substitutes (YouTube, which provides video-sharing services, and Waze, which provides GPS-based mapping services) that were arguably complements to the Google platform when acquired.

⁹³ In a footnote discussion, *see* Kampenalli et al., *supra* note 86, at 5 n.2, the authors argue that the kill zone effect also applies if the entrant supplies a complement. However, this relies on the counterfactual assumption that users are reluctant to incur the costs required to adopt a new application because they are concerned that the platform will acquire it and it will then be necessary to incur adaptation costs. No evidence is provided to support this assumption, which would seem to be counterfactual in social media segments where, following acquisition by a platform, users of the complementary application incur low adaptation costs or enjoy improved quality (due to increased investment by the platform or synergies generated by integration with the platform).

decline in entry and VC investment following platform acquisition of an emerging firm in a particular market segment may reflect the fact that software developers compete to sell a complementary application to Google or Facebook, so that once the platform acquires one application, potential entrants and VC investors anticipate that the platform is unlikely to make another acquisition in that segment and shift resources to other segments. If that is the case, then there is no discouragement of innovation in the aggregate. What commentators describe pejoratively as a "kill zone" effect may often or typically be an efficient reallocation of innovation capital (encompassing financial, intellectual, and human capital) in response to diminishing profit opportunities in a particular market segment but increasing profit opportunities in other technologically or commercially adjacent segments.⁹⁴ That is not a development that supports any presumption of antitrust risk.

i. Prado and Bauer Study

A study by Tiago Prado and Johannes Bauer uses a sample comprising over 32,000 VC investments and 392 startup acquisitions by GAFAM entities during 2010-2020 in 173 market segments (principally, internet and mobile software and services, including mobile commerce), encompassing 70% of all GAFAM acquisitions of startups during this period.⁹⁵ For US-based startups, the study found an average increase of 21.1% in the number of VC investments and an average increase of 30.7% in the total amount of VC funding in a particular market segment during the four quarters following the quarter in which there was an increase in GAFAM acquisitions in that segment.⁹⁶ Controlling for other exit options and certain other factors that may impact VC investment, the study suggests a positive, statistical-

⁹⁴ This reallocation effect is consistent with the results of a study by Pauline Afeldt & Reinhold Kaiser, *Competitors' Reactions to Big Tech Acquisitions: Evidence from Mobile Apps* (DIW, Discussion Paper No. 1987, Dec. 9, 2021). Using a sample of 47 acquisitions during 2015–2019 by GAFAM entities of targets offering mobile applications through the Google Play Store, the study finds that, following an acquisition, developers reduce innovation efforts (as measured by software updates) and entry (as measured by new applications) declines in the affected market segment. However, innovation efforts and entry increase in unaffected market segments, suggesting that a GAFAM acquisition may induce developers to efficiently reallocate innovation resources to market segments in which an acquisition is more likely. The net effects on innovation are ambiguous.

⁹⁵ Tiago S. Prado & Johannes M. Bauer, *Big Tech Platform Acquisitions of Start-Ups and Venture Capital Funding for Innovation*, 59 INFO. ECON. & POL'Y 1, 4–5 (2022).

⁹⁶ *Id.* at 2.

ly significant association between GAFAM acquisitions in any particular industry segment on the one hand and the number of VC investments and total amount of VC funding in that segment on the other hand (although this effect is limited to a relatively short period following an acquisition). As the study concludes: “During the ten-year period covered in our data, there are no detectable systematic negative effects [of big tech start-up acquisitions] on start-up funding.”⁹⁷ Contrary to the kill zone hypothesis, these findings are consistent with the view that GAFAM acquisitions in general elicit VC funding and startup entry by increasing investors’ and founders’ confidence in achieving a positive return through future acquisitions and, in particular, direct VC funds toward segments in which GAFAM entities have shown interest through acquisition activity.

ii. Jin, Leccese, and Wagman Study

To test the empirical force of the killer acquisition and kill zone hypotheses (as well as more general concerns that platform acquisitions exacerbate market concentration and incumbent entrenchment), Ginger Zhe Jin, Mario Leccese, and Liad Wagman use a sample set comprising a total of 5,952 acquisitions in technology markets during 2010-2020 by the GAFAM entities (595 acquisitions), 25 large non-GAFAM technology companies (1,033 acquisitions), the 25 largest private equity firms (1,964 acquisitions), and the 25 most active acquirors not included in the other three acquirer categories (2,360 acquisitions).⁹⁸ The study makes three key findings, none of which favor the killer acquisition or kill zone hypotheses. First, GAFAM acquisitions involve target companies that tend to be younger and more widely distributed across different product markets, which suggests that the acquisitions are being used by acquirors to enter new markets, rather than seeking to protect an acquiror’s position in an existing market (as the killer acquisition thesis contemplates).⁹⁹ Second, GAFAM acquisitions exhibit a tendency to

⁹⁷ *Id.* at 15.

⁹⁸ Ginger Zhe Jin, Mario Leccese & Liad Wagman, *How Do Top Acquirers Compare in Technology Markets? New Evidence from an S&P Taxonomy* 21 (Nat’l Bureau of Econ. Rsch. Working Paper No. 29642, Nov. 2022) (listing number of acquisitions for each acquirer category). For certain purposes, the study’s sample set also includes an additional 35,844 acquisitions undertaken by firms not included in any of the aforementioned acquirer categories (and which encompass firms that do not actively engage in acquisition activity).

⁹⁹ *Id.* at 7, 27–28. In a subsequent study, the same authors, when analyzing a dataset comprising all acquisitions of technology firms during 2010–2020 by public compa-

acquire a single target in a product category that is unrelated to the acquiror's core market, which is then followed by multiple acquisitions of targets in that same product category.¹⁰⁰ This too suggests that acquisitions are being used for the purpose of entering into new markets by assembling a portfolio of complementary technologies through an implicit tournament in which startups compete to be acquired by a platform. Third, acquisitions by a GAFAM entity in a particular sector attract acquisition activity by other GAFAM entities and other types of acquirors in the same sector. Contrary to the kill zone effect, this suggests that GAFAM acquisitions do not deter entry; rather, they signal investment value and induce interest from other acquirors, which presumably enhances VC funds' incentives to invest in the relevant market segment.

iii. Evaluation

In the aggregate, there seems to be limited evidence to support concerns over purported kill zone effects arising from repeated incumbent acquisitions in technology markets.¹⁰¹ The scholarly and regulatory literature has frequently referenced a single study that proposed a theoretical model supported by a

nies listed on North American exchanges, similarly find that the majority of targets fall outside the acquiror's core market, suggesting that acquisitions are being made primarily to enter new markets. See Ginger Zhe Jin, Mario Leccese & Liad Wagman, *M&A and Technological Expansion*, J. ECON. & MGMT. STRATEGY 1 (2023).

¹⁰⁰ Jin et al., *supra* note 98, at 30.

¹⁰¹ For an article reaching a similar conclusion concerning the empirical literature relating to the kill zone hypothesis, see Geoffrey A. Manne, Samuel Bowman & Dirk Auer, *Technology Mergers and the Market for Corporate Control*, 86 MISS. L. REV. 1047, 1065 (2022) (stating, concerning the evidence for kill zones, that "the influence of these ideas in the policy realm is vastly outsized relative to the strength and quality of the research that underlies it"). For a recent working paper that concludes that there is "no systematic evidence" of kill zone effects from acquisitions by GAFAM entities. See Yang Pan & Wei-Ling Song, *Tech Giants and New Entry Threats* (June 2023) (unpublished manuscript) (available at <https://perma.cc/YD9F-GWD8>) (based on dataset comprising acquisitions by GAFAM entities during 2005–2018, finding that deterrence effects on new entry from "tech giant" acquisitions were short-lived and mostly impacted entrants that lacked patents and operated in segments characterized by strong network effects). For a working paper that departs from prevailing empirical findings, see Heli Koski, Otto Kassi & Fabian Braesemann, *Killers on the Road of Emerging Start-Ups—Implications for Market Entry and Venture Capital Financing* (March 16, 2020) (unpublished manuscript) (available at <https://perma.cc/C3MD-8ZEF>) (based on dataset comprising acquisitions by GAFAM entities and IBM in the US and Europe during 2002–2018, finding evidence of a decline in new entry and venture-capital investment after acquisitions in the acquiror's existing product markets). The paper notes that its data on firm entry dates is incomplete (in some cases, it lacks information on a firm's founding year) and "might cause some measurement errors and affect our estimates," see *id.* at 9.

sample set of less than 10 transactions undertaken by only two members of the GAFAM group. Moreover, closer examination of that study identifies evidence that acquisitions by other GAFAM entities and acquisitions by other large technology firms may induce VC investment, which runs counter to the kill zone thesis. The most comprehensive empirical studies, which consider hundreds of transactions and thousands of VC investments, cast significant doubt on the factual reliability of the kill zone model, finding that GAFAM acquisitions generally elicit VC investment and startup entry, as conventional economic theory and business understandings would expect. Based on current knowledge, the kill zone effect appears to be a primarily theoretical construct that has few real-world analogues in ICT markets and, as such, does not provide a sound basis for merger review policy.

III. EFFICIENCY RATIONALES FOR INCUMBENT/STARTUP ACQUISITIONS IN TECHNOLOGY MARKETS

It is sometimes asserted that the wave of acquisitions of emerging firms by the GAFAM entities is an unprecedented and unique event in US economic history.¹⁰² This is not true. Repeated acquisitions of smaller companies by large firms can be observed at least since the late 19th century and tend to arise most intensively during periods of technological innovation, often accompanied by credit booms or inflated stock markets that reduce the cost of making acquisitions and, as a result, generate prices that entice startups to exit through an acquisition (and, in turn, induce the formation of startups in pursuit of a potential acquisition).¹⁰³ During the early decades of the 20th century, a period of especially intensive technological innovation reflected by electrification and the invention of the airplane, radio, and automobile (and an economic boom period and increasing equity market valuations until 1929), leading technology firms such as Alcoa, AT&T, Du Pont, General Electric, and RCA regularly acquired smaller firms with promising technologies, which were then developed by the acquiror and incorporated into its product portfo-

¹⁰² See, e.g., Lemley & McCreary, *supra* note 6, at 26 (stating that wave of acquisitions by large technology platforms is “on a scale never before seen”).

¹⁰³ On the link between merger waves and capital liquidity, see Jarrad Harford, *What Drives Merger Waves?*, 77 J. FIN. ECON. 529 (2005); on the link between merger waves and irrational overvaluation of acquiror and target equity, see Andrei Shleifer & Robert W. Vishny, *Stock Market Driven Acquisitions*, 70 J. FIN. ECON. 295 (2003).

lio.¹⁰⁴ The intense level of acquisition activity by current leading technology firms—a group that includes both GAFAM and non-GAFAM entities—can be observed since 2000 through the present, another period of intense technological innovation growing out of the adoption of the civilian internet in the late 1990s and the launch of mobile communications in the early 2000s (and both before and after the 2007-08 crash, accompanied by a credit and stock market boom). As shown in the Table below, both leading GAFAM and non-GAFAM entities have engaged in robust levels of acquisition activity in technology markets, when measured on a per-year basis, with shifts in the composition of the most active acquirors reflecting changes of market leadership. In the case of GAFAM entities, data collected by the FTC show that most acquisitions by these entities during 2010-2019 involved low acquisition prices, suggesting that the targets were small firms (of 616 acquisitions by GAFAM entities above \$1 million, 90% involved purchase prices below \$50 million).¹⁰⁵

Table 1. Acquisitions by Selected Leading Incumbents in ICT Markets (2000-2020)

Years	Acquiror	Number of Firms Acquired	Acquisitions/Year
2000-2009	Intel	26	2.6
2000-2009	Yahoo!	40	4
2000-2009	Oracle	38	3.8
2000-2009	Cisco	85	8.5
2000-2009	IBM	89	8.9
2000-2009	Microsoft	75	7.5

¹⁰⁴ JONATHAN M. BARNETT, *INNOVATORS, FIRMS, AND MARKETS: THE ORGANIZATIONAL LOGIC OF INTELLECTUAL PROPERTY* 95 (2021); David C. Mowery, *The Boundaries of the U.S. Firm in R&D*, in *COORDINATION AND INFORMATION: HISTORICAL PERSPECTIVES ON THE ORGANIZATION OF ENTERPRISE* 156–57 (eds. Naomi R. Lamoreaux & Daniel M.G. Raff, 1995). On RCA in particular, see Jonathan M. Barnett, *The Anti-Commons Revisited*, 29 *HARV. J.L. & TECH.* 179, 179–182 (2015).

¹⁰⁵ FTC Report, *supra* note 88, at 13.

2004-2009	Facebook	1	.17
2000-2009	Apple	13	1.3
2000-2009	Google	35	3.5
2000-2009	Amazon	11	1.1
2010-2020	Intel	59	5.4
2010-2020	Yahoo!	56	5.1
2010-2020	Oracle	73	6.6
2010-2020	Cisco	64	5.8
2010-2020	IBM	86	7.8
2010-2020	Microsoft	92	8.4
2010-2020	Alphabet/Google	167	15.2
2010-2020	Meta/Facebook	77	7
2010-2020	Amazon	70	6.4
2010-2020	Apple	87	7.9

Source: Zephyr M&A database. Restricted to consummated acquisitions resulting in 100% ownership of target.

Note: Acquisitions/year for Facebook based on number of years following the firm's founding in 2004.

The ubiquity and persistence of incumbent/startup acquisitions in technology markets over extended periods of time (and extending beyond the GAFAM entities) suggest that this practice promotes an efficient purpose. In this Part, I argue that incumbents in technology markets regularly acquire emerging firms, and emerging firms regularly seek to be acquired by incumbents, principally because this constitutes an efficient mechanism for executing the innovation and commercialization process. Unlike the killer acquisition and kill zone hypotheses, this argument rests on a well-developed body of empirical evi-

dence that extends across a broad range of technology industries and covers a time period from the 1980s through the present. Rather than representing a presumptively anticompetitive strategy to extinguish competitive threats, incumbent/startup acquisitions are best construed as part of a broader set of transactional mechanisms that firms use to efficiently execute the innovation and commercialization process in response to competitive forces.

A. Specialization and the Cooperation Imperative in Innovation Markets

Generally speaking, the development of a new technology comprises a multi-step process encompassing innovation, prototyping and testing, and, if successfully executed, production and distribution. For the most part, smaller and less integrated firms tend to excel in the innovation activities that develop new technologies, whereas larger and more integrated firms tend to excel in the production and distribution activities that embed new technologies in commercially viable products.¹⁰⁶ This general tendency can be derived from differences in the incentive and cost structures that characterize each entity type.

The management and economics literature has observed that large integrated firms tend to have difficulty sustaining the "high-powered incentives" that are necessary to support innovation, especially the most "radical" forms of innovation that challenge, rather than merely refine, existing technologies.¹⁰⁷ This

¹⁰⁶ See, e.g., Todd R. Zenger & Sergio G. Lazzarini, *Compensating for Innovation: Do Small Firms Offer High-Powered Incentives That Lure Talent and Motivate Effort?*, 25 *MANAGERIAL & DECISION ECON.* 329, 329 (2004) (stating that "[e]mpirical research on innovation and firm size confirms that despite large firms' apparent advantages in scale and access to complementary assets and capabilities . . . small firms are more efficient at innovation, particularly radical forms of innovation"); Bo Carlsson et al., *Knowledge Creation, Entrepreneurship and Economic Growth: A Historical Review*, 18 *INDUS. & CORP. CHANGE* 1193, 1223 (2009) ("[S]mall firms simply do certain things (such as certain types of innovation) better than large firms. As a result, through division of labor between small and large firms, the efficiency of the economy is increased").

¹⁰⁷ For the classic source, see Oliver E. Williamson, *THE ECONOMIC INSTITUTIONS OF CAPITALISM* 131–62 (1985); Oliver E. Williamson, *The Incentive Limits of Firms: A Comparative Institutional Assessment of Bureaucracy*, *ECON. INCENTIVES: PROCEEDINGS OF A CONF. HELD BY THE INT'L ECON. ASS'N* 211–15 (Bela Balassa & Herbert Giersch eds., 1986). For the relevant empirical literature, see Beatriz Fores & Cesar Camison, *Does Incremental and Radical Innovation Performance Depend on Different Types of Knowledge Accumulation Capabilities and Organizational Sizes?*, 69 *J. BUS. RSCH.* 831, 836 (2016); Panos Desyllas & Alan Hughes, *Sourcing Technological Knowledge Through Corporate Acquisitions: Evidence from An International Sample of High Technology Firms*, 18 *J. HIGH TECH. MGMT. RSCH.* 157, 159–60 (2008).

underperformance is often attributed to the difficulty faced by a large firm in measuring employees' inventive contributions and designing an incentive structure that adequately compensates innovative employees for bearing the risks of project failure by allocating to them a commensurate portion of the economic gains in the case of project success. As a result, pay does not reflect the employee's investment in innovation, which is therefore not especially forthcoming. There are two principal reasons behind this dilemma.

First, it is difficult to identify objective criteria for measuring an employee's contribution to a particular innovation and then ascertaining the value contributed by any such innovation to the firm's performance.¹⁰⁸ Second, even if a firm could overcome these measurement difficulties, it may still be unable to adequately reward the innovator-employee due to institutional norms that cap the maximum compensation that can be offered to any individual employee.¹⁰⁹ As a result, potential employee-innovators shift to non-innovation activities or lower-risk incremental innovation activities, or exit the firm to start an independent venture where they can capture more fully the gains generated in the case of commercial success. Under any of these outcomes, the firm suffers from a lack of innovation or favors innovation projects that make incremental improvements to, rather than challenging, existing technologies.

To avoid this outcome, larger and more established firms seek to acquire innovations, or knowledge about potential innovations, through relationships with smaller and younger firms that tend to excel in innovation and, especially, the most disruptive forms of innovation.¹¹⁰ The incentive structure and competitive posture of smaller firms explain why they tend to outperform in this area.¹¹¹ Unlike a large-firm employee, the founder of a small firm can capture a significant portion of the gains aris-

¹⁰⁸ Zenger & Lazzarini, *supra* note 106, at 331–32.

¹⁰⁹ Todd R. Zenger & William S. Hesterly, *The Disaggregation of Corporations: Selective Intervention, High-Powered Incentives and Molecular Units*, 8 *ORG. SCI.* 209, 212–13 (1997).

¹¹⁰ See Zenger & Lazzarini, *supra* note 107, at 331–32.

¹¹¹ On small firms' propensity to favor disruptive innovation, and large firms' propensity to favor incremental innovation, see William J. Baumol, *Education for Innovation: Entrepreneurial Breakthroughs Versus Corporate Incremental Improvements* (Nat'l Bureau of Econ. Rsch., Working Paper No. 10578, June 2004); Ashish Arora & Robert P. Merges, *Specialized Supply Firms, Property Rights and Firm Boundaries*, 13 *INDUS. & CORP. CHANGE* 451 (2004). On the classic historical study of radical innovations developed by small firms and individual inventors, see JOHN JEWKES, DAVID SAWERS & RICHARD STILLERMAN, *THE SOURCES OF INVENTION* (2d ed. 1969).

ing from a successful innovation (after sharing some of those gains with investors) and hence is willing to invest resources in achieving that outcome (so long as the founder is also willing to bear the risks and costs of project failure). Moreover, a small-firm entrant has incentives to displace existing technology since that is likely its only feasible avenue for challenging an incumbent, which can imitate (assuming no secure IP protections) and outperform an entrant that develops an incremental improvement to the incumbent's technology. By contrast, incumbent management may be reluctant to develop novel technologies that cannibalize cash flow from the firm's existing products, and instead favors incremental cost and quality improvements that sustain demand for those products.¹¹²

A well-developed empirical literature, comprising both qualitative and quantitative analysis, supports these propositions across a wide range of technology markets. An empirical study of 6,106 high-tech acquisitions during 1984-2000 found that transactions involving private targets (which tend to be smaller) are most often undertaken by acquirors that have low research productivity (as indicated by patenting rates and R&D intensity), suggesting that acquisitions are used by larger firms to mitigate innovation shortfalls.¹¹³ Similarly, an empirical study of 652 acquisitions by European firms during 1997-2003 found that acquisitions of small-firm targets are typically motivated by acquirors' interests in securing complementary technologies and IP rights, whereas acquisitions of large-firm targets are more typically motivated by an interest in acquiring non-technological assets.¹¹⁴ Another study, using a sample consisting of 11,288 firms during 1984-2006, finds that incumbents in certain industries rely on acquisitions as a substitute for internal R&D, while smaller firms increase R&D activity when the relevant industry exhibits increased acquisition activity.¹¹⁵ In contrast to killer acquisition and kill zone theories, these findings suggest that the

¹¹² For the classic sources, see CLAYTON M. CHRISTENSEN, *THE INNOVATOR'S DILEMMA* (2000); Kenneth J. Arrow, *Economic Welfare and the Allocation of Resources to Invention*, *THE RATE AND DIRECTION OF ECONOMIC ACTIVITY* (Richard R. Nelson ed., 1962).

¹¹³ Desyllas & Hughes, *supra* note 107, at 168. R&D intensity refers to R&D expenditures per company sales; patenting intensity refers to the number of patents granted per R&D expenditures.

¹¹⁴ Christoph Grimpe & Katrin Hussinger, *Market and Technology Access Through Firm Acquisitions: Beyond One Size Fits All* (Leibniz Centre for Euro. Econ. Rsch., ZEW Discussion Paper No. 08-037, 2008).

¹¹⁵ Gordon M. Phillips & Alexei Zhdanov, *R&D and the Incentives from Merger and Acquisition Activity*, 26 *REV. FIN. STUD.* 34, 47-49 (2013).

combination of VC financing and incumbent acquisitions of emerging firms implement an efficient allocation of R&D and commercialization functions among small and large firms, respectively.

The relationships between large firms and smaller firms not only mitigate large firms' underperformance as innovators but concurrently mitigate small firms' underperformance in converting innovations into commercially viable products and services. Smaller and younger firms tend to have a disadvantage at the commercialization stage of the innovation cycle because they typically do not have in place an existing production and distribution infrastructure, and bear a higher cost of accessing capital and technical expertise, as compared to larger and more established firms.¹¹⁶ Put differently: larger and more established firms tend to incur lower costs in securing and maintaining the complementary assets and capacities that are required to convert an innovation into a technically and commercially viable product that can be manufactured and distributed on a mass scale.¹¹⁷ John Chambers, the former CEO of Cisco, described this point concerning Crescendo, an emerging firm that Cisco acquired: "We took Crescendo's networking product, and within 18 months we had a \$500 million run rate. No small company can go from \$10 million to \$500 million in 18 months. They just can't scale. But we could scale because of our distribution, financial, and manufacturing strengths."¹¹⁸

As Chambers' comment illustrates, larger firms will tend to have a stronger capacity to bring new products to market at a lower cost, shorter timeline, and higher likelihood of success as compared to smaller firms. The magnitude and speed of growth following a large-firm acquisition can be remarkable: if Chambers' numbers are accurate, then the acquiror multiplied the target's revenues by 50 times during a period of 18 months.

¹¹⁶ Frank T. Rothmel, *Incumbent's Advantage Through Exploiting Complementary Assets via Interfirm Cooperation*, 22 STRATEGIC MGMT. J. 687 (2001); Gary P. Pisano, *The Governance of Innovation: Vertical Integration and Collaborative Arrangements in the Biotechnology Industry*, 20 RES. POL'Y 237 (1991).

¹¹⁷ The role of complementary assets in cultivating the economic value of innovations is emphasized in the "Profiting from Innovation" framework developed by business management scholars. For a leading source, see Gary P. Pisano & David J. Teece, *How to Capture Value from Innovation: Shaping Intellectual Property and Industry Architecture*, 50 CALIF. MGMT. REV. 278 (2007).

¹¹⁸ Ronald J. Gilson, *Locating Innovation: The Endogeneity of Technology, Organizational Structure, and Financial Contracting*, 110 COLUM. L. REV. 885, 909 n.71 (2010) (citing Gerry Yemen et al., Cisco: Early if Not Elegant (A) 8 (Univ. of Va. Case Study UVA-BP-0446, 2003)).

Even if Chambers' numbers are somewhat exaggerated, the value-increasing effect of an incumbent/startup acquisition would still be remarkable in magnitude and speed. Cisco is not alone in its ability to extract value from less than fully mature target entities. Consider Facebook's acquisition of Instagram (which the FTC and 46 state attorneys general are now seeking to unwind in an antitrust suit against Meta Platforms). Following acquisition in 2012 (at which time Instagram had no revenues), Facebook invested extensive resources in upgrading the application, integrated Instagram into its online ecosystem, and grew Instagram's user base from approximately 30 million users at the time of acquisition to over one billion by 2018.¹¹⁹ Given this track record, it is no surprise that smaller firms would seek to be acquired by large platforms that can offer these powerful commercialization capacities and accelerate monetization of a target's innovation assets.

B. How Incumbent Acquisitions of Emerging Firms Promote Competition

Since the landmark work of Ronald Coase and Oliver Williamson, it has been understood that managers are continuously making changes in the scope of the firm based on an assessment of the relative cost of conducting a particular service in-house ("make") or contracting with third parties for that service ("buy").¹²⁰ This simple principle can account for the entity-specific division of labor observed in a wide range of technology markets. Larger firms source technology inputs, and smaller firms source commercialization services, through external relationships whenever doing so is more efficient than sourcing such inputs or capacities internally. These relationships encompass a range of degrees of "closeness," extending from contractual arrangements, such as joint ventures and alliances, to corporate venture-capital investments, to acquisitions.¹²¹ When situated

¹¹⁹ Jacobson & Mufarrige, *supra* note 37, at 6–7. See also Zhuoxin Li and Ashish Agarwal, *Platform Integration and Demand Spillovers in Complementary Markets: Evidence from Facebook's Integration of Instagram*, 63 *MGMT. SCI.* 3147 (2017) (finding that Facebook's acquisition of Instagram yields value for users through integration into a larger platform and confers positive spillovers for certain applications in the photo-sharing ecosystem).

¹²⁰ Oliver E. Williamson, *Markets and Hierarchies: Analysis and Antitrust Implications* (1975); Ronald Coase, *The Nature of the Firm*, 25 *J.L. & Econ.* 386 (1937).

¹²¹ On this point, see Melissa E. Graebner, Kathleen M. Eisenhardt & Phillip T. Rounady, *Success and Failure in Technology Acquisitions: Lessons for Buyers and Sellers*, 24 *ACAD. MGMT. PERSP.* 73, 75–76 (2010).

within this transactional landscape, incumbent acquisitions of emerging firms are best understood as one of several mechanisms that large and small firms use to efficiently combine each entity's specialized capacities at various stages of the innovation and commercialization sequence, subject to each entity's concerns over retaining some control over the assets that it contributes to the joint undertaking. Aside from collective licensing arrangements,¹²² these interfirm transactions generally do not raise any inherent risk to competitive markets. To the contrary: these transactions exploit the comparative advantages of different types of entities, which ultimately translates into benefits for consumers in the form of new products being delivered to market as efficiently as possible. Any legal intervention that impedes these relationships inherently threatens to reverse these attractive policy outcomes.

i. Platform/Complementor Symbiosis: Google's "G Suite"

From the railroad industry of the late 19th century to network equipment manufacturers in the late 20th century to operating system providers in the early 21st century, a common industry structure can be observed. Namely: a small number of large firms make the massive investments required to provide and maintain the foundational infrastructure (or, in current terminology, "platform") for a particular technology environment, while a large number of small to medium-size firms develop complements that cultivate the value of the platform by enhancing the number or quality of uses for which the platform can be deployed by business users or consumers. In these structures, which transcend industries and historical periods, the platform typically acts as a hub that facilitates the delivery of complementary applications from innovators to the large user base that characterizes a popular platform, which in turn expands or improves the platform's functionalities, resulting in increased uses, users, and usage.

The symbiotic relationship between platforms and complementors has a critical implication. Contrary to the assumption

¹²² These concerns can be managed. Antitrust law has developed certain principles and precautions to mitigate such risks while still enabling parties to harness the substantial transaction-cost savings enabled by these structures. *See, e.g.*, *Broadcast Music, Inc. v. CBS, Inc.*, 441 U.S. 1, 24 (1979) (holding that collective copyright licensing arrangement is not per se illegal as a horizontal agreement, but must be assessed under the rule-of-reason in light of the fact that this arrangement enables a licensing market that would not otherwise be feasible).

that motivates the killer acquisition and kill zone hypotheses, incumbent platforms are repeat-play entities that typically have an incentive to *promote* the development of applications by other firms, not to suppress those firms or deter them from entering.¹²³ Doing otherwise would be self-defeating. Technology markets provide abundant examples where platforms facilitate or subsidize the entry of complementors to promote growth of a technology ecosystem anchored in the platform. In a notable example, Microsoft provided developers with free access to the Windows operating system's application programming interfaces (APIs), enabling third parties to develop a large pool of software programs that enhanced the value of the Windows operating system and enabled Microsoft to outperform its competitor in the nascent personal computer market, Apple's Macintosh.¹²⁴ In other cases, platforms seek to promote the development of complementary applications through closer and longer-term relationships with innovator-firms. These relationships can take the form of corporate venture-capital investments, in which the incumbent takes a non-controlling stake in a startup, or acquisitions, in which the incumbent acquires control of a startup.

Following the logic of the theory of the firm, platforms elect to engage in an acquisition whenever that transactional form can generate operational or other efficiencies that would otherwise not be feasible, or could only be achieved at a higher cost, through contractual relationships with third-party complementors. As has been widely observed, Cisco, one of the world's leading suppliers of network infrastructure, regularly uses acquisitions of smaller firms as its principal mechanism for sourcing technologies that it uses to enter into new product categories or to complement existing products.¹²⁵ Acquisition of complementary applications is critical to maintaining market leadership by acquiring new functionalities, extending existing functionalities, or securing new user bases associated with a particular complementary product or service.¹²⁶ Contrary to the assumption of platform dominance that supports killer acquisition and kill

¹²³ Jonathan M. Barnett, *The Host's Dilemma: Strategic Forfeiture in Platform Markets for Informational Goods*, 124 HARV. L. REV. 1861, 1875–77 (2011).

¹²⁴ *Id.* at 1872–74.

¹²⁵ David Mayer & Martin Kenney, *Economic Action Does Not Take Place in a Vacuum: Understanding Cisco's Acquisition and Development Strategy*, 11 IND. & INNOVATION 299 (2004); Michel Ferrary, *Specialized Organizations and Ambidextrous Clusters in the Open Innovation Paradigm*, 29 EURO. MGMT. J. 181, 185 (2011); Desyllas and Hughes, *supra* note 107.

¹²⁶ *Id.*

zone theories, there is substantial evidence suggesting that even the largest platforms often operate under competitive discipline from other platforms in the same or adjacent markets,¹²⁷ which compels platforms to secure access to technological innovations through internal R&D, acquisitions, or other relationships with external innovation specialists.

Google has repeatedly used acquisitions to build some of the most popular applications in its platform infrastructure, complemented by extensive post-acquisition efforts to integrate the application into the Google ecosystem.¹²⁸ One of Google's most successful projects, the G Suite office productivity application (now branded as Google Workspace), was developed through acquisitions of smaller companies that had developed word processing, spreadsheet, and slide-presentation applications, as well as collaborative features that were not well-developed in the incumbent product, the MS Office suite.

Table 2. Acquired Applications Integrated into Google Office Productivity Suite (2006-2012)

Year of acquisition	Google application	Functionality	Target	Incumbent's competing product
2006	Google Sheets	Online spreadsheet	2Web	MS Excel
2006	Google Docs	Word processing with online editing function	Upstartle	MS Word
2007	Google Slides	Presentation program	Tonic Systems	MS Powerpoint

¹²⁷ Jonathan M. Barnett, *Illusions of Dominance?: Revisiting the Market Power Assumption in Platform Ecosystems*, ANTITRUST L.J. (forthcoming 2024) [hereinafter Barnett, *Illusions of Dominance*].

¹²⁸ For extensive discussion of this strategy, see George T. Geis, *Semi-Organic Growth: Tactics and Strategies Behind Google's Success* (2015).

2007	Google Slides	Presentation program	Zenter	MS Powerpoint
2009	Google Docs	Collaborative editor	AppJet	MS Word
2010	Google Docs	Collaboration tool for word processing software	DocVerse	MS Word
2012	G Suite	Mobile office productivity software	Quick-office	MS Office

Sources: 2Web Technologies Acquired by Google, CRUNCHBASE, <https://perma.cc/VW9M-6C4B> (last visited Oct. 8, 2023); Robert A. Guth, *Google Acquires Word Processor to Jab Microsoft*, WALL ST. J. (Mar. 10, 2006, 12:01 AM), <https://perma.cc/DLN4-NXNE>; Sam Schillace, *We're Expecting*, OFFICIAL GOOGLE BLOG (Apr. 17, 2007), <https://perma.cc/EVF8-Q77K>; Sam Schillace, *More Sharing*, OFFICIAL GOOGLE BLOG (June 19, 2007), <https://perma.cc/L8M6-NFTX>; *Google Purchase Redefines 'Real-Time' Collaboration*, REUTERS (Dec. 7, 2009, 5:53 PM) <https://perma.cc/WGP3-4Z9H>; Jason Kincaid, *Google is Acquiring AppJet, The Company Behind EtherPad*, TECHCRUNCH (Dec. 4, 2009, 11:22 AM), <https://perma.cc/6NMS-ARXS>; Jonathan Rochelle, *Google Docs Welcomes DocVerse*, GOOGLE CLOUD OFFICIAL BLOG (Mar. 5, 2010), <https://perma.cc/E7DX-SBFR>; Alexei Oreskovic, *Google Takes Aim at Microsoft with Acquisition*, REUTERS (Mar. 4, 2010, 5:23 PM), <https://perma.cc/JUH4-AA9P>; Alan Warren, *Google + Quickoffice = Get More Done Anytime, Anywhere*, THE KEYWORD: GOOGLE WORKSPACE (June 5, 2012), <https://perma.cc/HZ4E-23QJ>.

Following the killer acquisition or kill zone theories, it would be objected that Google's acquisitions of the companies from which it developed the various components of its office productivity application suppressed competitive threats that may have challenged its market leadership position. Several considerations disfavor this interpretation and instead support the view that the prospect of being acquired induced innovation by firms that developed value-enhancing complements to the

Google platform. Concurrently, Google was able to develop an office productivity suite more efficiently than it could have accomplished internally, resulting in enhanced competitive conditions that yield benefits for consumers.

First, consistent with standard expectations concerning the innovative competencies of large-firm organizations, Google's internal innovation projects have a high failure rate, including such well-resourced projects as Google Plus (social networking), Google Trips (travel) Google Shopping (e-commerce), and Google Stadia (video gaming).¹²⁹ Hence, although Google is widely regarded as a technology pioneer and expends substantial sums on internal R&D (both in absolute terms and as a relative percentage of company sales¹³⁰), it often relies on acquisitions to harness the innovation capacities of smaller firms. There is no intrinsic reason why using a hybrid innovation strategy, involving both internal R&D, funded directly through company revenues, and external R&D, funded indirectly through acquisitions, raises any antitrust concerns compared to companies that rely principally on internal R&D. To the contrary: a merger review policy that impeded or blocked incumbent/startup acquisitions would discourage startup entry and compel incumbents to source innovations from what are sometimes less-efficient internal R&D environments.

Second, Google bundled these applications not only into an integrated office productivity suite but into a broader ecosystem comprising its existing capacities in cloud-based data storage, search, and email services. Hence, Google not only likely accelerated development of each acquired application through its extensive technical and financial resources but embedded those applications within a rich product environment that none of the acquired companies could have feasibly replicated. If offered as a stand-alone application, each of the components of the Google G suite could not have offered consumers the same ease-of-use when integrated with other complementary productivity applications and therefore might not have achieved substantial adoption since most consumers would likely be unwilling to incur the costs required to assemble a package of components supplied by separate providers.

¹²⁹ Andy Walker, *Killed by Google: Do You Remember These Products and Services*, ANDROID AUTHORITY (Aug. 30 2023), <https://perma.cc/6763-2UJY>.

¹³⁰ In 2022, Alphabet (Google's parent) spent \$39.5 billion on R&D, which represents approximately 12.25% of its revenues. SEC filings, i.e. Alphabet Inc., Annual Report (Form 10-K) (2022), at 31.

Third, Google's acquisition strategy in office productivity software improved competitive conditions by challenging the market leadership of another incumbent. That is: any adverse competitive effect attributable to Google's acquisition strategy in any stand-alone product market (for example, word-processing) may be outweighed substantially by positive competitive effects in the broader ecosystem market (for example, office productivity software). By assembling an integrated bundle of complementary productivity applications, Google could offer a product package that posed a competitive threat to Microsoft's Office suite, which had long enjoyed overwhelming market share, and, as had been argued by the government and accepted by the court in the landmark antitrust litigations against Microsoft in the late 1990s and early 2000s,¹³¹ had been widely assumed to enjoy protection from challengers due to network effects and the costs borne by users to switch to competing applications. To overcome these formidable entry barriers, Google made acquisitions that enabled it to develop an office productivity application that, when embedded within the Google ecosystem of search, email, and storage functionalities, was differentiated from the Microsoft Office suite. According to Statista, as of 2020, Google G suite accounted for an estimated 59.4% of the US office productivity software market, as compared to 40.39% for MS Office and, as of 2022, 50.3% and 45.4%, respectively, of the global market.¹³² Far from suppressing competition, Google's acquisition and bundling strategy yielded a strong rival that diverted substantial market share from MS Office—an outcome that none of the targets acquired by Google could likely have achieved independently.

ii. Innovator/Producer Symbiosis: Biotech and "Big Pharma"

The biotech ecosystem provides one of the most well-documented illustrations of the manner in which complementary relationships between small-firm innovators and large-firm implementers (encompassing corporate venture capital, alliances, and acquisitions) cultivate the efficiencies that arise from the division of labor in technology markets, resulting in a disaggre-

¹³¹ *Microsoft Corp.*, 253 F.3d 34; *U.S. v. Microsoft Corp.*, 87 F.Supp.2d 30 (D.D.C. 2000).

¹³² Market Share of Major Office Suites Technologies in the United States as of October 2020, STATISTA (2020), <https://perma.cc/45FC-KX64>; Market Share of Major Office Productivity Software Worldwide in 2022, STATISTA (2022), perma.cc/7UXV-MZ9K.

gated market environment characterized by a mix of innovation-intensive smaller biotech firms and vertically integrated pharmaceutical firms. The symbiosis between incumbents and innovators in ICT markets tends to take the form of a “circular” platform-complementor relationship in which innovators supply applications that rely on, and enhance the value of, the incumbent’s platform, which in turn provides the scale efficiencies that enable those applications to be delivered to users as efficiently as possible. By contrast, the symbiosis between incumbents and innovators in biopharmaceutical markets tends to take the form of a vertical relationship between, on the one hand, smaller firms that specialize in converting academic research into a drug or other therapeutic product, and larger firms that specialize in the capital-intensive and labor-intensive testing, production, and distribution activities that are required to deliver the drug or therapy efficiently, on a mass scale, and in compliance with extensive regulatory requirements.¹³³ The hundreds of millions of dollars in funding required to undertake the clinical testing, production, and distribution stages of the innovation and commercialization process in the biopharmaceutical sector¹³⁴ cannot be feasibly secured by small firms that specialize in R&D but lack expertise or infrastructure in the downstream stages of the technology supply chain.

Much of the time, this symbiosis takes the form of a contractual relationship between the innovator-firm and a “Big Pharma” partner, which structures the division of labor between the two entities, typically allocating innovation tasks mostly to the smaller firm and commercialization tasks mostly to its large-firm partner. That allocation can be accomplished through a joint venture, a licensing transaction, or a sale of the company or one of the company’s development projects to a larger firm that

¹³³ For representative discussions, see Andrew M. Hess & Frank T. Rothaermel, *When Are Assets Complementary? Star Scientists, Strategic Alliances, and Innovation in the Pharmaceutical Industry*, 32 *STRATEGIC MGMT. J.* 895 (2011); David T. Robinson & Toby E. Stuart, *Financial Contracting in Biotech Strategic Alliances*, 50 *J.L. & ECON.* 559 (2007); Toby E. Stuart, Salih Zeki Ozdemir & Waverly W. Ding, *Vertical Alliance Networks: The Case of University-Biotechnology-Pharmaceutical Alliance Chains*, 36 *RES. POL’Y* 477 (2007); David J. Teece, *Firm Organization, Industrial Structure, and Technological Innovation*, 31 *J. ECON. BEHAV. & ORG.* 193, 216, 218–19 (1996); Weijan Shan, Gordon Walker & Bruce Kogut, *Interfirm Cooperation and Startup Innovation in the Biotechnology Industry*, 15 *STRATEGIC MGMT. J.* 387 (1994); Gary Pisano, *The R&D Boundaries of the Firm*, 35 *ADMIN. SCI. Q.* 153 (1990).

¹³⁴ For extensive analysis of the costs of pharmaceutical innovation, see Joseph A. DiMasi, Henry G. Grabowski & Ronald W. Hansen, *Innovation in the Pharmaceutical Industry: New Estimates of R&D Costs*, 47 *J. HEALTH ECON.* 20 (2016).

has the testing, production, and distribution infrastructure to commercialize it more efficiently. As in ICT markets, acquisition transactions in biopharmaceutical markets enable acquirors to effectively outsource R&D tasks through acquisitions of smaller firms, which in turn secure access to the larger firm's testing, production, and distribution capacities. A study by Matthew Higgins and Daniel Rodrigues of 160 pharmaceutical acquisitions during 1994-2001 found that acquisitions are more likely in the case of acquirers who appear to be exhibiting a decline in internal research productivity (as indicated by the strength of the acquiror's research and product pipeline).¹³⁵ That finding suggests that large-firm acquirors are using these transactions to secure innovation capacities that they cannot replicate internally.¹³⁶ At the same time, these transactions enhance competitive conditions by supporting the profit expectations that elicit VC investment in the startups that deliver the most transformative types of innovation to the biopharmaceutical ecosystem (and, in some cases, mature into larger firms that can challenge incumbents).

IV. ERROR-COST ANALYSIS OF MERGER REVIEW POLICY

Notwithstanding the limited empirical support for the killer acquisition theory and the well-established efficiency rationales for repeat-acquisition strategies by large technology platforms, commentators and policymakers have nonetheless relied on this theory and its variants to advocate (or, in the case of some policymakers, to undertake) actions to address this purportedly material risk to competitive conditions in technology markets. In this Part, I describe the major actions that US and EU policymakers have proposed, or have taken, to increase the scrutiny of, or in some cases block, incumbents' acquisitions of emerging companies in technology markets. I then address the substantial

¹³⁵ Matthew J. Higgins & Daniel Rodrigues, *The Outsourcing of R&D through Acquisitions in the Pharmaceutical Industry*, 80 J. FIN. ECON. 351, 351 (2006).

¹³⁶ The Higgins and Rodrigues study also found that the likelihood that an acquisition would result in a positive return increased when the acquiror had greater information about the acquiror's technology prior to the transaction, as indicated by sales or research experience in the same "therapeutic" segment. *Id.* at 352. Interestingly, whereas the CEM study suggests that overlapping acquisitions are a "risk factor" for anticompetitive intent, the Higgins and Rodrigues study suggests that some overlap between the acquiror and target's projects improves the likelihood of a successful acquisition by reducing the information asymmetry between acquirors and targets. This point illustrates (again) the difficulty in formulating a methodology to distinguish reliably between efficient and inefficient acquisitions at the early stage at which some commentators advocate that regulators intervene in the merger review process.

“downside” risks posed by these actual and proposed policy changes to startup formation and entry in technology markets, weighed against the limited “upside” gains from the deterrence of potential killer acquisitions.

A. Merger Review Policy Changes

In the short time since the CEM study provided limited evidence of potential killer acquisitions in a small portion of the biopharmaceutical industry, commentators, regulators, and legislators in the US, EU, and other jurisdictions have called for substantial changes to merger review policies and procedures that would apply in all markets. As previously discussed,¹³⁷ commentators and policymakers who have adopted the killer acquisition theory have expanded its scope well beyond the evidence set forth in the CEM study, extending it to acquisitions by large platforms of emerging companies across technology markets generally.

i. United States

In the United States, proposed and actual regulatory changes have principally focused on various elements of the regulatory framework implemented through the Hart-Scott-Rodino Antitrust Improvements Act of 1976 (HSR Act).¹³⁸ The HSR Act sets up a framework for the antitrust agencies to elect, during a 30-day waiting period following the report of an acquisition transaction, whether to investigate the transaction prior to closing.¹³⁹ This regime was principally adopted as a substitute for challenges to acquisitions that had already been consummated, which involved significant disruption and associated harms to shareholders, employees, and customers.¹⁴⁰ While the agencies never definitively “clear” a transaction in the HSR process and US antitrust law permits challenges to mergers any time after closing, it has generally been understood that agencies would rarely seek to unscramble a consummated reported transaction

¹³⁷ See *supra* notes 51–55 and accompanying discussion.

¹³⁸ HART-SCOTT-RODINO ANTITRUST IMPROVEMENTS ACT OF 1976, Pub. L. No. 94-435, 90 Stat. 1383 (1976).

¹³⁹ 15 U.S.C. § 18(a). As set forth in this provision, mergers must be reported if they exceed a certain revenue threshold, which is adjusted annually.

¹⁴⁰ See Matthew Jennejohn, *Innovation and the Institutional Design of Merger Control*, 41 J. CORP. L. 167, 185 (2015) (“[p]reemptive merger review was introduced largely with remedial efficacy in mind: post-consummation challenges to anticompetitive transactions suffered from what is known as an ‘unscrambling the egg’ problem”).

since doing so would undermine a principal purpose behind the HSR statute. The agencies' track record since enactment of the HSR has conformed to this principle, resulting in settled expectations concerning the near-finality of a reported acquisition, absent agency action prior to closing.

In 2021, the FTC announced several policy changes that unsettled this understanding. First, the FTC began sending "warning letters" to parties to selected transactions that it reserved the right to challenge such transactions even if the 30-day waiting period had expired and the agency had not made an information request (which indicates the commencement of an investigation).¹⁴¹ While this did not signal a change in the law, the warning letters signaled a movement away from conventional understandings concerning the low likelihood of a post-closing agency challenge. Second, the FTC revived a long-abandoned policy of requiring parties to certain merger consent orders (a settlement that allows a challenged transaction to proceed subject to certain conditions) to seek prior approval from the agency for any future acquisitions within a minimum 10-year time-period, even for acquisitions that had not even passed the reporting threshold.¹⁴² Third, FTC leadership abruptly withdrew revised vertical merger guidelines that had been adopted in 2021 jointly with the DOJ,¹⁴³ and did not adopt any substitute in its place, effectively providing agency leadership with broad discretion to challenge vertical mergers (which are generally understood to raise fewer concerns under conventional antitrust principles¹⁴⁴).

In 2022, the FTC and DOJ announced the launch of a public inquiry to reexamine the existing merger review guidelines.¹⁴⁵ In

¹⁴¹ Holly Vedova, *Adjusting Merger Review to Deal with the Surge in Merger Filings*, F.T.C. (Aug. 3, 2021), <https://perma.cc/J4UV-UXJ6>.

¹⁴² *Statement of the Commission on the Use of Prior Approval Provisions in Merger Orders*, F.T.C. (Oct. 25, 2021), <https://perma.cc/2JTS-A4Q3>; *FTC to Restrict Future Acquisitions for Firms that Pursue Anticompetitive Mergers*, F.T.C. (Oct. 25, 2021), <https://perma.cc/JUZ3-MSQH>.

¹⁴³ *Federal Trade Commission Withdraws Vertical Merger Guidelines and Commentary*, F.T.C. (Sept. 15, 2021), <https://perma.cc/S62E-WZPJ>.

¹⁴⁴ James C. Cooper, Luke M. Froeb, Daniel P. O'Brien & Michael Vita, *Vertical Antitrust Policy as a Problem of Inference*, 23 INT'L J. INDUS. ORG. 639, 648 (2005) ("[T]here is a paucity of support for the proposition that vertical restraints/vertical integration are likely to harm consumers . . . a far greater number of studies found that the use of vertical restraints in this particular context studied improved consumer welfare unambiguously[.]").

¹⁴⁵ U.S. Dept. of Just. & F.T.C., *Justice Department and Federal Trade Commission Seek to Strengthen Enforcement Against Illegal Mergers*, F.T.C. (Jan. 18, 2022), <https://perma.cc/7SVC-9BTW>.

the announcement accompanying this initiative, the agencies specifically mentioned concerns over acquisitions of “nascent competitors, which may be key sources of innovation and competition.”¹⁴⁶ In June 2023, the FTC announced (“with the concurrence” of the DOJ) proposed new rules that would substantially change the HSR merger review process by requiring parties to supply substantial additional information concerning the transactional structure and rationale, the acquiror’s significant shareholders and creditors, the acquiror’s prior acquisitions during the preceding 10 years, and internal analysis of competitive conditions in the acquiror’s and target’s overlapping markets.¹⁴⁷ Estimated by the FTC to impose approximately \$350 million in transaction costs annually,¹⁴⁸ these requirements would extend the typical acquisition timeline and almost certainly reduce the price acquirors are willing to pay, given increased transaction costs and deal uncertainty. In July 2023, the FTC and the DOJ issued revised draft merger guidelines that specifically reference the competitive risks posed by incumbent acquisitions of “nascent” competitors.¹⁴⁹

US legislators have similarly expressed concerns consistent with killer acquisition theory. These speculative assertions have been followed by proposed legislation that would involve significant changes to US merger policy. While none of these proposed bills have made substantial progress, they include provisions that reflect the intellectual influence of killer acquisition theory. A bill proposed in the US Senate in 2021 would prohibit “covered platform operators” (a category that captures the GAFAM entities and up to an additional 13 companies¹⁵⁰) from acquiring any other firm unless the acquiror could show by “clear and convincing” evidence that (1) the target firm is not a competitor, (2) the target firm is not a “nascent or potential” competitor, and (3) the acquisition would not enhance the acquiror’s market position for services related to its existing platform.¹⁵¹ As discussed in more detail subsequently,¹⁵² the likely difficulty in rebutting

¹⁴⁶ *Id.*

¹⁴⁷ *FTC and DOJ Propose Changes to HSR Form for More Effective, Efficient Merger Review*, F.T.C. (June 27, 2023), <https://perma.cc/XF34-J9UZ>.

¹⁴⁸ *Id.*

¹⁴⁹ DRAFT MERGER GUIDELINES, *supra* note 20, at 20–21.

¹⁵⁰ Woodward, *supra* note 29, at 2 (stating that proposed platform legislation in the US Congress covers the GAFAM entities and up to a total of 18 companies).

¹⁵¹ PLATFORM COMPETITION AND OPPORTUNITY ACT OF 2021, S. 3197, 117th Cong. (2021). The companion bill in the House is H.R. 3826, 117th Cong. (1st Sess.).

¹⁵² See *infra* note 198 and accompanying text.

the presumptions reflected in elements (2) and (3) of this test means that this bill (which includes a safe harbor for transactions below \$50 million in consideration) would discourage GAFAM and other large entities from acquiring startups and, as a result, reduce access to the principal monetization mechanism used by startups and investors in those entities. The advocates of the bill, Senators Tom Cotton and Amy Klobuchar, asserted that the legislation was necessary “to prevent monopolistic big tech firms from making killer acquisitions that harm competition and eliminate consumer choice.”¹⁵³ A bill proposed in 2021 by Senator Josh Hawley provided for a ban on acquisitions by companies with a market capitalization in excess of \$100 billion and a presumptive ban on acquisitions by a “dominant digital firm” with a valuation in excess of \$1 million.¹⁵⁴ If adopted, any of these bills would unsettle confidence that a successful innovation could be monetized through acquisition by a leading platform and, as a result, would discourage VC investors from putting capital at stake in a market environment with a substantially truncated range of exit options.

ii. European Union

In 2022, the EU adopted legislation, the Digital Markets Act (DMA), that substantially expands regulators’ powers to preemptively take action to address the increased risks to competition purportedly posed by large technology platforms. Concerning mergers, the DMA (which went into effect in May 2023¹⁵⁵) requires what it calls “gatekeepers” (a category that captures the GAFAM entities¹⁵⁶) to report to the European Commission all acquisitions “where the merging entities or the target of concentration provide core platform services or any other services in the digital sector or enable the collection of data,” regardless of the size of the target.¹⁵⁷ Given that virtually all tar-

¹⁵³ Tom Cotton, *Cotton, Klobuchar Introduce Bipartisan Legislation to Protect Competition and Consumer Choice Online*, TOM COTTON SENATOR FOR ARKANSAS (Nov. 5, 2021), <https://perma.cc/GXA9-LQCU>.

¹⁵⁴ Trust-Busting for the Twenty-First Century Act, S. 1074, 117th Cong. §§ 3–4 (2021).

¹⁵⁵ *Digital Markets Act: Rules for Digital Gatekeepers to Ensure Open Markets Enter into Force*, EUROPEAN COMMISSION (Oct. 31, 2022), <https://perma.cc/DAC3-SY88>.

¹⁵⁶ Mario Mariniello & Catarina Martins, *Which Platforms Will Be Caught By the Digital Markets Act? The ‘Gatekeeper’ Dilemma*, BRUEGEL BLOG (Dec. 14, 2021), <https://perma.cc/A6JP-2XTH>.

¹⁵⁷ Regulation (EU) 2022/1925 of the European Parliament and of the Council of 14 September 2022 on Contestable and Fair Markets in the Digital Sector and amending Directives (EU) 2019/1937 and (EU) 2020/1828 (Digital Markets Act), at Art. 14(1).

gets acquired by technology platforms offer services “in the digital sector” and engage in the collection of at least some user data, this would appear to eliminate any reporting threshold for entities that qualify as gatekeepers, which both increases the costs of acquisition transactions and increases the likelihood that regulators will challenge an acquisition.

A recent decision by the General Court of the EU (involving the acquisition of Grail, a cancer-diagnostics startup, by Illumina, the world’s leading gene-sequencing equipment manufacturer) raises the additional possibility that, given the size of the European market, this reporting threshold would apply to any acquisition by a large technology platform, even if the target does not conduct any business activity in the EU. In 2022, the General Court held that the Commission has the power to review acquisitions that are referred to it by any national competition authority under Article 22 of the EU Merger Regulation (EUMR),¹⁵⁸ even if the acquisition does not meet the reporting threshold of the national authority. In the case of the Illumina/Grail acquisition (which the FTC had undertaken action in early 2021 to stop¹⁵⁹), the target had no revenues in the EU and therefore did not meet the reporting threshold at the EU level or at the level of any member state. Nonetheless, the Commission asserted authority to investigate (and ultimately block) the transaction under a policy announced in 2021, according to which the Commission asserts the authority to review transactions that are referred to it by a member state’s competition authority, so long as the transaction “affects trade between [the] Member States and threatens to significantly affect competition within [the] territory” of the Member State (or States) making the request.¹⁶⁰ As was explained when the policy was first proposed by EU Commissioner Margarethe Vestager in 2020¹⁶¹ and then set forth in a Guidance Paper released by the Commission in 2021,¹⁶² the expanded understanding of the Article 22 referral

¹⁵⁸ Council Regulation (EC) 139/2004 of 20 Jan. 2004, On the Control of Concentration Between Undertakings (The EC Merger Regulation), 2004 O.J. (L 24), art. 22.

¹⁵⁹ Complaint, *Illumina Inc. and GRAIL, Inc.*, F.T.C. Matter/File No. 201 0144, Docket No. 9401 (Mar. 30, 2021).

¹⁶⁰ Commission Notice on Case Referral in Respect of Concentrations, 2005 O.J. (C 56) paras. 42–44.

¹⁶¹ Margarethe Vestager, *The Future of EU Merger Control*, Speech at International Bar Association, EUROPEAN COMMISSION (Sept. 11, 2020), <https://perma.cc/X6D7-JL2M>.

¹⁶² Commission Guidance on the Application of the Referral Mechanism Set Out in Article 22 of the Merger Regulation on Certain Categories of Cases, COM (2021) 1959 final (Mar. 26, 2021).

mechanism was intended to enable the Commission to investigate potential killer acquisitions that would otherwise escape regulatory scrutiny under EU-level or national reporting thresholds.¹⁶³

B. Merger Challenges

Contrary to the implications of some recent commentary, US antitrust enforcers have regularly taken into account the potential effects on innovation of mergers in technology markets,¹⁶⁴ as reflected in the Horizontal Merger Guidelines (as revised in 2010)¹⁶⁵ and the 2017 FTC/DOJ Licensing Guidelines.¹⁶⁶ The same is true of EU and UK competition regulators, who have emphasized the importance of taking into account effects on innovation in the merger review process.¹⁶⁷ In both the US and the EU, focus on adverse effects on innovation is especially prevalent concerning antitrust scrutiny of the pharmaceutical markets, where regulators have periodically blocked mergers or ordered divestitures or other remedies to address concerns relating to the exit of a potential competitor following an acquisition.¹⁶⁸ In a broader range of industries encompassing consum-

¹⁶³ This use of the Article 22 referral mechanism departs from its original purpose, which was intended to enable national governments that lacked a merger review apparatus to refer to the Commission transactions that were deemed to pose a risk to competitive conditions in a national market. See Marie-Laure Combet & Maxence Jonvel, *Illumina vs European Commission: the EU General Court Endorses the Commission's New Approach to Article 22 EUMR Following the Capture of Mergers below the Thresholds*, ORRICK ANTITRUST WATCH (July 21, 2022), <https://perma.cc/NVK7-A8CV>.

¹⁶⁴ For similar thoughts, see Manne et al., *supra* note 101, at 1093. For relevant evidence, see Richard J. Gilbert & Hillary Greene, *Merging Innovation into Antitrust Agency Enforcement of the Clayton Act*, 83 GEO. WASH. L. REV. 1919, 1933 (2015) (finding that, during 2004–2014, the FTC and DOJ challenged 250 merger transactions and alleged harms to innovation in 84 of those transactions).

¹⁶⁵ See, e.g., U.S. DEP'T OF JUST. & F.T.C., HORIZONTAL MERGER GUIDELINES (2010), at § 1 ("Enhanced market power can also be manifested in non-price terms and conditions that adversely affect customers, including . . . diminished innovation"), and § 10 ("When evaluating the effects of a merger on innovation, the Agencies consider the ability of the merged firm to conduct research or development more effectively. Such efficiencies may spur innovation but not affect short-term pricing.").

¹⁶⁶ U.S. DEPT. OF JUST. & F.T.C., ANTITRUST GUIDELINES FOR THE LICENSING OF INTELLECTUAL PROPERTY § 3.2.3 (2017) (describing assessment of market power in a "research and development market").

¹⁶⁷ *EU Merger Control and Innovation, Competition Policy Brief*, COMPETITION DIRECTORATE—GENERAL OF THE EUROPEAN COMMISSION (Apr. 2016), <https://perma.cc/KHG5-K84M>. [hereinafter European Commission 2016]; *Merger Assessment Guidelines* (CMA 129), COMPETITION & MARKETS AUTHORITY (Mar. 2021), <https://perma.cc/7UPY-SAJX>.

¹⁶⁸ For discussion of specific enforcement actions by US and EU regulators, see Fiona Carlin, Anthony Gamble, Dan Graulich & Yana Ermak, *More Aggressive Scrutiny of*

er goods and financial services, US antitrust agencies have taken several actions in recent years to block acquisitions by incumbents of smaller targets that were deemed to pose an actual or potential direct competitive threat in various industries.¹⁶⁹ Some of these challenges may have rested on not unduly speculative concerns that the target could achieve subsequent growth independently and posed a reasonable competitive threat to the acquiror. However, two recent actions by the FTC and the CMA to block incumbent acquisitions of emerging firms do not reflect plausible concerns over likely harm to competitive conditions and illustrate the false-positive enforcement errors that can arise from a reflexive assumption that incumbent/startup acquisitions inherently pose a material antitrust risk.

i. Meta/Within Unlimited

In July 2022, the FTC brought suit to block the acquisition by Meta Platforms (Facebook’s parent) of Within Unlimited, the creator of Supernatural, a popular health fitness application for the “metaverse” and other virtual reality environments.¹⁷⁰ The agency asserted that the acquisition, which involved a purchase price of approximately \$400 million, was anticompetitive because Meta could have developed a competing fitness app internally and hence, the acquisition purportedly depressed competition by reducing the number of potential competitors in the market for virtual reality fitness apps.¹⁷¹ This complaint is improbable on two principal grounds and was rejected by the district court¹⁷² (after which the FTC elected not to appeal the court’s ruling to the agency’s internal administrative tribunal¹⁷³).

First, since Supernatural already faces multiple competitors from other applications in the VR fitness category¹⁷⁴ and there

Life Science Deals—But is There a Problem that Needs Solving?, GLOBAL COMP. REV. (Mar. 2022); on the EU specifically, see European Commission 2016, *supra* note 167.

¹⁶⁹ For a list of cases, see Manne et al., *supra* note 49, at 1052–53.

¹⁷⁰ *FTC Seeks to Block Virtual Reality Giant Meta’s Acquisition of Popular App Creator Within*, F.T.C. (July 27, 2022), <https://perma.cc/XVD9-4WAB>.

¹⁷¹ Complaint for a Temporary Restraining Order and Preliminary Injunction pursuant to Section 13(b) of the Federal Trade Commission Act, at 18–20, *F.T.C. v. Meta Platforms, Inc. et al.*, No. 5:22-cv-04325-EJD, (N.D. Cal. July 27, 2022).

¹⁷² Dave Michaels & Jan Wolfe, *FTC Loses Antitrust Challenge to Facebook Parent Meta*, WALL ST. J. (Feb. 1, 2023), <https://perma.cc/45VA-6ZJY>.

¹⁷³ Diane Bartz, *FTC Withdraws from Adjudication in Fight with Meta over Within Deal*, REUTERS (Feb. 10, 2023), <https://perma.cc/EP4H-JESD>.

¹⁷⁴ Reviews of social media fitness sites list multiple competing apps in the VR environment, including (1) Liteboxer VR, FitXR App, OhShape App, and Holofit App. (*see*

do not seem to be any legal or technological barriers to entry into the VR fitness app market, it seems improbable that acquisition of the Supernatural app by Meta, even if it implied that Meta would not develop a VR fitness app internally, could compel exit by existing competitors or foreclose entry by future competitors. This point is even clearer if the market definition is expanded to include other digitally enabled fitness experiences that are available through any of the leading video game systems, such as Nintendo's DS, Switch, and Wii, Microsoft's Xbox or Sony PlayStation, or non-digitally enabled fitness options.¹⁷⁵

Second, the FTC's conclusory assertions of anticompetitive intent overlook the fact that Meta's acquisition of Within is best understood as an attempt to seed adoption of the metaverse, a novel digital environment that requires that users incur significant learning costs, by funding the development of VR applications that could demonstrate the platform's value as compared to other digital media. Notwithstanding the reported tens of billions of dollars that Meta has invested in the development of the metaverse (including both the online digital environment and complementary hardware), it has struggled to achieve substantial user adoption.¹⁷⁶ Far from being an anticompetitive attempt to "conquer" the metaverse and establish a "virtual reality empire," as the agency's hyperbolic rhetoric alleged,¹⁷⁷ Meta's acquisition should most likely be viewed as an attempt to preserve and expand the value of its extensive investment in the metaverse through increased internal development of the Supernatural app and related fitness applications, which would expand product quality for users, increase usage of VR-based fitness apps, and promote development of a VR-based fitness market in the broader digital ecosystem. In any event, the metaverse has still failed to achieve significant user adoption¹⁷⁸

Amber Sayer, *Check out these Fun Fitness Apps for the Best Virtual Reality Workouts*, THE MANUAL (Aug. 17, 2022), <https://perma.cc/TA66-BEMS> or (2) Tripp, *The Thrill of the Fight*, and *Holofit*. See Angela Haupt, *Four Apps to Try if You're New to VR Fitness*, WASH. POST (Nov. 11, 2021), <https://perma.cc/BNE8-P7GX>.

¹⁷⁵ Ryan Bourne, Brad Subramaniam & Rachel Chiu, *The FTC's Bizarre Move Against Meta's Purchase of Within*, CATO AT LIBERTY (July 29, 2022), <https://perma.cc/EUP7-W6CH>.

¹⁷⁶ Christopher Allen, *Why Isn't the Metaverse Catching On?*, FORBES (Dec. 14, 2022), <https://perma.cc/MR2J-GZY3>.

¹⁷⁷ F.T.C., *FTC Seeks to Block Virtual Reality Giant Meta's Acquisition of Popular App Creator Within*, *supra* note 170 (alleging that Meta seeks "to expand virtual reality empire" and is engaged in "a campaign to conquer virtual reality").

¹⁷⁸ See Ed Zitron, *RIP Metaverse: The Metaverse, Zuckerberg's Tech Obsession, Is Officially Dead*, BUSINESS INSIDER (May 8, 2023), <https://perma.cc/68ST-F7MB>; Parmy

and the agency’s fears that Meta would reign over a “virtual reality empire” have not been realized.

No antitrust concerns are inherently raised by a platform owner’s choice to promote adoption of its platform by acquiring complementary applications that attract increased users, rather than developing those applications internally. As discussed previously,¹⁷⁹ that is precisely the manner in which Google built the bundled G suite that delivered a differentiated product that has successfully challenged Microsoft’s leadership in the office productivity software market—a self-evidently competitive outcome. Meta’s strategy is analogous and simply exploits the division of labor principle by outsourcing innovation to emerging firms with complementary applications and then efficiently cultivating the value of those applications by embedding them within a larger services ecosystem. Given the high rate and apparent ease of entry into the complementary VR fitness applications market,¹⁸⁰ there seems to be little potential competitive harm arising from the Meta/Within acquisition.

ii. Facebook/Giphy

Like other regulators, the Competition Markets Authority (CMA) in the UK has expressed concern about the purportedly high risk posed to competitive markets and, in particular, innovation incentives by incumbent/startup acquisitions (or more generally, other acquisitions involving entities with overlapping research pipelines) in technology markets.¹⁸¹ Reflecting the influence of killer acquisition theory, the CMA has adopted a strict approach to incumbent/startup acquisitions that sometimes seems to assume, rather than seeking to empirically demonstrate, that any such acquisition inherently poses a material risk to competitive conditions. This dogmatic approach is reflected by the CMA’s investigation into Facebook (Meta)’s acqui-

Olson, *Zuckerberg’s New Focus Pulls Meta Back from the Brink*, BLOOMBERG (Feb. 1, 2023), <https://perma.cc/R2TT-JSM4>.

¹⁷⁹ See *supra* notes 128–32 and accompanying text.

¹⁸⁰ Julie Carlson and Juan Londono, *The FTC’s Unfair Jab at Meta is a Sharp Blow to the Nascent VR App Market*, INFORMATION TECHNOLOGY & INNOVATION FOUNDATION, July 29, 2022, <https://perma.cc/6RGV-ZZZH> (observing that entry barriers into the VR fitness market appear to be low, as indicated by the “large number of VR fitness app developers and the large number of VR fitness developers more generally” and the “doubling of the number of apps in the last two years in Meta’s Quest VR app store”).

¹⁸¹ Carlin et al., *supra* note 168.

sition of Giphy in 2020 for approximately \$400 million.¹⁸² At the time of the acquisition, Giphy was the world's largest site for locating, sharing, and distributing short (6-15 second) animated videos (using the "GIF" digital images format) and was embedded in various apps and platforms.¹⁸³ The CMA alleged that Giphy enabled the Facebook platform (understood to include WhatsApp and Instagram) to increase its market power in the social media platform market and to remove a competitive threat purportedly posed by Giphy to Facebook in the far larger online display advertising market. After an extensive investigation, the agency ordered Facebook in November 2021 to divest Giphy.¹⁸⁴

The agency's action and the ultimate outcome seem to lack any sound policy basis. It is not clear that Giphy would have been able to grow or even preserve its innovation as a viable commercial enterprise except through a sale to a larger platform that could integrate it into its broader product ecosystem. At the time of the acquisition, Giphy had raised \$150 million in VC funding, earned a modest stream of advertising income, had several million daily users (principally, users who accessed Giphy through one of the major platforms), but was not profitable and faced competition from similar services (including a service that had been acquired by, and was therefore backed by, Google).¹⁸⁵ Most critically, Giphy lacked any foreseeable path to profitability. As David Teece points out, the nature of Giphy's product—short animated videos that users use to personalize messages—are not readily amenable to an advertising-based cross-subsidization strategy (because ads would interfere with the user experience)—ironically, a finding made by the CMA itself when investigating the transaction.¹⁸⁶ Hence, the counterfactual to the acquisition transaction may have been a state of affairs in which the target's product would have been withdrawn

¹⁸² *Facebook, Inc (now Meta Platforms, Inc)/ Giphy, Inc merger inquiry*, COMPETITION & MKTS. AUTH. (June 12, 2020), <https://perma.cc/GA3K-ZCUM>.

¹⁸³ *Completed acquisition by Facebook Inc (now Meta Platforms, Inc) of Giphy, Inc.: Final report on the case remitted to the CMA by the Competition Appeal Tribunal*, COMPETITION & MKTS. AUTH. (Oct. 18, 2022), at 7 ("Giphy is the world's leading provider of GIFs and GIF stickers") and 54 (describing "Giphy's core activities"), <https://perma.cc/J8SS-M5KX>.

¹⁸⁴ *CMA Directs Facebook to Sell Giphy*, COMPETITION & MKTS. AUTH., (Nov. 30, 2021), <https://perma.cc/Y9KP-4NZK>.

¹⁸⁵ David E. Teece, *Towards a Dynamic Competition Approach to Big Tech Merger Enforcement: The Facebook/Giphy Example*, COMPETITION POL'Y INT'L (Dec. 2021), at 15–16.

¹⁸⁶ *Id.*

from the market or would have achieved modest growth at best. Consequently, it is not clear that the acquisition plausibly caused any competitive harm, and it may be far more plausible that the acquisition bolstered Giphy and, given Facebook's resources and ability to cross-subsidize the Giphy service, enabled it to perform more strongly in the social media market, which would appear to constitute a favorable outcome as a matter of competition policy.

It is perhaps most puzzling that the CMA could plausibly conclude that a niche site for selling short animated videos that had not yet achieved profitability and had not yet devised a revenue-positive business model could pose a meaningful competitive threat to Facebook, the overwhelming leader in the social networking market and one of two main competitors in the digital advertising market (although today it faces stiff competition in the former market from TikTok).¹⁸⁷ If regulators can block acquisitions based on speculative predictions of future competitive threats even in adjacent markets, there would seem to be almost no circumstance in which parties to an incumbent/startup acquisition could exclude the possibility of regulatory intervention. This concern is compounded by the CMA's statement that any doubts over competitive harm should be resolved in favor of enforcement, as reflected in the CMA's revised Merger Assessment Guidelines (issued in 2021), which provide that the agency may determine that a "substantial lessening of competition" may arise from an acquisition that eliminates "a dynamic competitor that is making efforts towards entry or expansion . . . *even where entry by that entrant is unlikely and may ultimately be unsuccessful.*"¹⁸⁸ Given the critical function played by incumbent/startup acquisitions in preserving investment incentives in technology markets, this vague standard leaves few limits on regulatory discretion, casts a cloud over virtually all such acquisitions, and counterproductively deters startup entry (or, in the case of the UK, would counterproductively encourage startups to enter in markets other than the UK).

¹⁸⁷ For market shares in digital advertising, see Statista, Companies with largest share of digital advertising revenue worldwide in 2023 (showing 39% market share for Google and 18% for Facebook); for market shares in social networking, see Statista, Most popular social networks as of October 2023, ranked by number of monthly active users (in millions) (showing 3.03 billion users for Facebook, which ranked first, and 1.21 billion users for TikTok, which is ranked fifth).

¹⁸⁸ Competition & Mkts. Auth., Merger Assessment Guidelines, 2021, CMA129, at 45 (UK).

C. The Anticompetitive Effects of Antitrust-by-Hypothesis

Generally speaking, competition law has addressed merger transactions through a balancing analysis (corresponding to the rule of reason test under US antitrust law¹⁸⁹ and “assessment of effects” analysis under EU competition law¹⁹⁰) that weighs evidence concerning the competitive gains and harms reasonably attributable to a particular transaction. This reflects the view that most combinations do not pose competitive harm but rather, are a means to achieve economies of scale, technical or operational synergies, or other legitimate business objectives. Policy proposals to preempt killer acquisitions would reverse this presumption, placing the burden of proof on the transacting parties to demonstrate that the acquisition poses no material risk of competitive harm. It is hard to reconcile this policy shift with available evidence that suggests that killer transactions represent at most a small portion of incumbent/startup acquisitions in pharmaceutical markets and apparently a nominal portion in other markets. That is: the policy proposals directed at acquisitions of emerging firms by large technology platforms would apply to a market in which there is currently no empirical evidence that killer acquisitions take place at any meaningful level to warrant antitrust concern. As I discuss in this Part, proposed changes to merger review policy based on largely undemonstrated models of killer acquisitions and kill zones would inevitably give rise to a significant number of costly false-positive enforcement outcomes.¹⁹¹ The prospect of those enforcement errors would deter incumbent/startup acquisitions that play a con-

¹⁸⁹ On the range of tests that courts can apply under the “rule of reason” category, see *California Dental Ass’n v. Fed. Trade Commission*, 526 U.S. 756, 779–81 (1999).

¹⁹⁰ Lisa Kaltenbrunner, *European Union: Abuse of Dominance and Article 102 of the TFEU*, GLOB. COMPETITION REV. (2022).

¹⁹¹ Some commentators have argued that, in the startup acquisition context, false-negative errors are especially costly (and should therefore be weighed more heavily than false-positive errors) because markets can easily “tip” to a highly concentrated market dominated by one or two platforms. See, e.g., STIGLER REPORT, *supra* note 2, at 94 (arguing that false negatives are especially costly in digital markets because “market power of large technology platforms is more enduring”) and 111 (arguing that the cost of false negatives is high due to “the speed at which platforms tip [into monopoly]” and “the irreversibility of tipping”). This argument is subject to two objections. First, this argument overlooks the substantial false-positive enforcement costs that arise from erroneous interventions that impede or block efficient incumbent/startup acquisitions in technology markets. Second, this argument relies on the widespread assumption that digital markets inherently converge on entrenched winner-take-all monopolies that are immune to competitive threats. As I show elsewhere, there are abundant examples where apparently dominant firms in technology markets have rapidly lost market share to an entrant (see Barnett, *Illusions of Dominance*, *supra* note 127).

structive function in preserving the monetization expectations of founders and investors and, as a result, facilitating startup entry in technology markets.¹⁹² I also propose an alternative policy approach through patent law that can mitigate potential risks of inefficient incumbent/startup acquisitions without deterring the far larger population of efficient incumbent/startup acquisitions.

i. Effects of Proposed Changes to Merger Review Policies

Since a large majority of successful startups achieve monetization through a sale to a larger company, rather than an IPO,¹⁹³ any regulatory change that reduces the likelihood of executing these transactions raises the risk of discouraging VC investment that drives startup formation in technology markets. If that discouragement effect is significant (which may be most likely in the case of startups that are too small for an IPO or have developed component innovations that can only be monetized by integration with an existing platform), it would suppress VC investment and inhibit entry by smaller innovators that often have no other sources of comparable financing. These concerns are not hypothetical. In an empirical study that assessed the relationship in 48 countries between VC investment on the one hand and competition laws and takeover legislation on the other hand, it was found that stricter competition and takeover laws that increased the cost of acquisition transactions reduced VC investment (as measured both by number of investments and total amounts invested).¹⁹⁴ In a study that examined market responses to changes in Chinese competition policies that (among other things) limited acquisitions by large

¹⁹² For similar thoughts, see Manne et al., *supra* note 101, at 1062–63; Luis M.B. Cabral, *Merger Policy in Digital Industries* 10 (Ctr. For Policy Rsch., Discussion Paper No. DP14785, 2020); Dushnitsky & Sokol, *supra* note 25; D. Daniel Sokol, *Merger Law for Biotech and Killer Acquisitions*, 72 FLA. L. REV. FORUM 1 (2020); D. Daniel Sokol, *Vertical Mergers and Entrepreneurial Exit*, 70 FLA. L. REV. 1357 (2018). It might be argued that incumbents and startups could capture some of the synergies that would be generated through an acquisition transaction by entering into partnerships or joint ventures, which are often observed in technology markets. Yet these arrangements do not deliver the liquidity that is required by investors in a startup and therefore does not avoid the risk of deterring VC investment in a regime in which regulators can more easily challenge incumbent/startup acquisitions. I am grateful to Matthew Wansley for bringing this alternative structure to my attention.

¹⁹³ See Woodward, *supra* note 29.

¹⁹⁴ Gordon M. Phillips & Alexei Zhdanov, *Venture Capital Investments, Mergers and Competition Laws Around the World* 23, 28–29 (Nat'l Bureau of Econ. Rsch., Working Paper No. 24082, 2017) (using a sample set consisting of 13,000 firms across 181 industry categories).

platforms, it was found that the average number of VC (including corporate VC) investments and new-firm entry declined significantly during the following 12-month period.¹⁹⁵ As this evidence suggests, strengthening merger review policies excessively can raise implicit entry barriers to startups who can only secure VC financing if investors are confident that a successful startup will have the option to monetize its success through an exit-by-acquisition.

To be clear, many commentators who endorse changes to merger review policies to address the risk of killer acquisitions have recognized to various extents these potentially adverse effects on startup monetization and VC funds' investment incentives. These commentators have designed various rebuttable presumptions that are designed to enhance regulators' ability to challenge incumbent/startup acquisitions while still enabling transacting parties to demonstrate an absence of competitive harm. The Table below presents some of these proposals.

Table 3. Selected Proposals to Modify Burden of Proof or Standard of Scrutiny for Incumbent/Startup Acquisitions

Author(s)/Source	Proposed Standard
Areeda & H. Hovenkamp	Presumption against acquisitions by a "monopolist" of "any firm that has the economic capabilities for entry and is a more-than-fanciful possible entrant, unless the acquired firm is no different from many other firms in these respects." ¹⁹⁶
Bryan & E. Hovenkamp	Presumption against acquisitions by dominant platform based on "(a) the market power of the acquiror 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;

¹⁹⁵ Ke Rong, D. Daniel Sokol, Di Zhou & Feng Zhu, *Antitrust Platform Tech Regulation and Competition: Evidence from China* (Working Paper 2023), <https://perma.cc/U2MN-R8KN>.

¹⁹⁶ 3 PHILLIP E. AREEDA & HERBERT HOVENKAMP, *ANTITRUST LAW: AN ANALYSIS OF ANTITRUST PRINCIPLES AND THEIR APPLICATION* ¶ 701d (4th ed. 2013).

	and (c) the acquirer’s past practices involving similar acquisitions, such as whether previously acquired technologies were licensed to rival incumbents.” ¹⁹⁷
Cremer Report	Presumption against acquisitions where (1) the acquiror is a “dominant platform,” (2) the market has “strong positive network effects,” and (3) the target has a rapidly growing user base with “high future market potential”, which could be rebutted by a showing of net competitive benefit. ¹⁹⁸
Furman Report	Presumption against acquisitions by large digital companies, subject to rebuttal by transacting parties based on a showing of net competitive benefits under a “balance of harms” analysis. ¹⁹⁹
Hemphill & Wu	No acquisition by dominant firm of a nascent competitor if the acquisition is “reasonably capable” of maintaining an incumbent’s market power. ²⁰⁰
Lemley & McCreary	No acquisition by dominant firm of directly competitive entrant unless “(1) the startup would not be viable as a freestanding entity and (2) there are no other plausible acquirors.” ²⁰¹
Salop	“[W]hen the dominant firm . . . proposes to acquire a unique potential entrant (or one of only a small number), the law should apply a strong anticompetitive presumption with a high re-

¹⁹⁷ Bryan & Hovenkamp, *Startup Acquisitions*, *supra* note 40, at 52.

¹⁹⁸ CREMER REPORT, *supra* note 2, at 116.

¹⁹⁹ FURMAN REPORT, *supra* note 2, at 99–101.

²⁰⁰ C. Scott Hemphill & Tim Wu, *Nascent Competitors*, 168 U. PA. L. REV. 1879, 1881 (2020).

²⁰¹ Woodward, *supra* note 29, at 85–86.

buttal burden placed on the acquiring firm."²⁰²

Stigler Report

Presumption that dominant firm cannot acquire a directly competitive entrant, which acquiror could rebut by a showing of net competitive benefit.²⁰³

As a practical matter, the fine distinctions among these various proposals are probably immaterial. These proposals' vaguely worded standards (how is a "unique potential entrant" or a "more-than-fanciful possible entrant" to be identified?) or simply the fact that the burden of proof would rest with the transacting parties (especially if, as one proposal contemplates, "subject to a high rebuttal burden") may give rise to a level of uncertainty that exerts a significant "chilling effect" on undertaking acquisitions of emerging companies by entities that are deemed to be a "dominant" firm that would be subject to these demanding standards. Alternatively, the legally elevated risk of not closing may lead transacting parties to demand exceptionally high break-up fees (payable in the case of certain regulatory challenges) that may endanger the economic viability of an acquisition²⁰⁴ or to reduce the purchase price for what would effectively be a legally encumbered asset. Under any of these scenarios, startups that can most efficiently monetize R&D through an acquisition transaction (which currently encompasses the vast majority of VC-backed startups that achieve any exit, which in turn constitute a minority of all VC-backed startups²⁰⁵) would be precluded from doing so. In anticipation of that outcome, risk capital would shift away from startups and toward other investment opportunities.

The risk of a "deal killer" effect is highest in acquisitions involving small to moderate deal values (which characterizes most VC-backed firms²⁰⁶) since it would not be cost-justified to expend the resources necessary to navigate the merger review process,

²⁰² Salop, *supra* note 17, at 16.

²⁰³ STIGLER REPORT, *supra* note 2, at 111.

²⁰⁴ Richard Hall & Daniel K. Zach, *Antitrust Developments in M&A*, 55 REV. SEC. & COMMODITIES REG. 123 (June 2022).

²⁰⁵ See *infra* notes 200–03.

²⁰⁶ Woodward, *supra* note 29, at 7 (out of 7,247 VC-backed startups acquired during August 2002 through Q1 2022, the median and average deal values were \$13 million and \$67 million, respectively).

including the diligence, negotiation, and other costs (including risks of disclosure of confidential information) involved in an acquisition transaction. By effectively shutting down the most commonly used monetization mechanism for technology startups, proposals that require the transacting parties in incumbent/startup acquisitions to defeat a presumption of illegality (and certainly, more draconian proposals to block the largest platforms from making such acquisitions²⁰⁷) would effectively shut down startups' key sources of financing. It is important to appreciate that VC firms already take on high risk when investing in a startup. In a study by Sand Hill Econometrics of all exits by approximately 12,000 VC-backed, US-based firms (excluding biotech firms) during August 2002 through Q1 2022, it was found that 36% of those firms failed completely, 61% were acquired and 4% did an IPO.²⁰⁸ Moreover, 42% of the acquired companies were sold at values that lost money for investors.²⁰⁹ This implies that VC investors lost money in 61% of the firms in which they invested during this two-decade period.²¹⁰ In this challenging investment environment, policy changes that reduce the likelihood of a successful exit necessarily drive capital away from startups that typically lack any comparable financing source. Given the low (and possibly extremely low) incidence of killer acquisitions, any of the proposed policy changes to merger review standards would exert an across-the-board chilling effect on startup financing that would almost certainly fail a cost-benefit test as a matter of competition and innovation policy.

ii. Objection: Alternatives to Monetization by Acquisition

It may nonetheless be objected that the error costs of limiting exit-by-acquisition would be offset by the fact that emerging firms could still earn returns on innovation through IPOs and subsequent growth as independent entities.²¹¹ This objection is unpersuasive for the simple reason that IPOs are evidently a less efficient mechanism at present for monetizing innovation since startups overwhelmingly choose to exit through a sale to a larger company. There are three reasons why the market has made this choice.

²⁰⁷ See *supra* note 154 and accompanying text.

²⁰⁸ Woodward, *supra* note 29, at 1, 5.

²⁰⁹ *Id.* at 5.

²¹⁰ *Id.* at 6.

²¹¹ For an extended argument on this point, see Lemley & McCreary, *supra* note 6.

First, IPOs are unsuitable for most VC-backed firms that exit by acquisition, which have low valuations that are prone to lead to failure if the firm exits by IPO. The aforementioned study of all exits by US-based, VC-backed firms during August 2002 through Q1 2020 found that about 80% of the firms that exited by acquisition had valuations below \$80 million.²¹² By contrast, more than 80% of the firms that exited by IPO had valuations above \$150 million.²¹³ This difference is not accidental; rather, it reflects awareness of the fact that small firms often fail to survive as stand-alone entities in the public capital markets. Out of all US-based, VC-backed companies (excluding biotech) that did an IPO during August 2002 through Q1 2020, 7% failed after the IPO; however, the failure rate increases significantly when firms have low valuations at the time of the IPO: 31% of firms with a valuation below \$100 million failed after the IPO and 40% of firms with a valuation below \$50 million did so.²¹⁴ While firms can "fail" after an acquisition, this would not typically impact the founders and other selling shareholders so long as all or most of the deal consideration is delivered at closing.

Second, an IPO would not be feasible for a firm that has developed a component technology that can only be monetized through integration into an existing platform. If it is difficult to protect the component technology through the patent system (a likely prospect given legal changes that have substantially weakened patent protections since approximately the mid-2000s, especially in information technology industries²¹⁵), then licensing is probably not feasible and a sale to a large platform (which can monetize the innovation by integrating it within an extended product and services system) may be the only feasible alternative.

Third, even if a startup has a sufficiently high valuation to support an IPO and the startup's technology is commercially and technically viable on a stand-alone basis, an IPO may remain unattractive as compared to exit-by-acquisition due to the legal costs associated with a public listing. Public firms are subject to substantial regulatory burdens, including compliance costs (especially since passage of the Sarbanes-Oxley Act of

²¹² Woodward, *supra* note 29, at 7.

²¹³ *Id.*

²¹⁴ *Id.*

²¹⁵ Jonathan M. Barnett, *Patent Groupthink Unravels*, 34 HARV. J.L. & TECH. 419, 421–24 (2021) [hereinafter Barnett, *Patent Groupthink*].

2002,²¹⁶ although those costs were attenuated by changes in 2007 to relieve certain requirements for smaller firms²¹⁷, legal exposure under federal securities laws, and investment analyst scrutiny.²¹⁸ There are no analogous costs associated with exit-by-acquisition.

Given the clear preference for acquisitions over IPOs, it is unpersuasive to argue that changes to antitrust policy that discourage exit-by-acquisition will induce startups to achieve exit-by-IPO²¹⁹ or could do so without significant costs; rather, prospective investors will likely respond by reducing firm valuations at the time of investment or shifting capital away from funding startups altogether. It is difficult to envision how this outcome is consistent with sound competition or innovation policy.

iii. Addressing Killer Acquisition Risk Through Intellectual Property Rights

Understood most broadly, the recent focus on killer acquisitions reflects a concern that leading platforms can use acquisitions as a strategy to entrench themselves against challengers, either by acquiring and terminating startups that pose a direct competitive threat or, more commonly, by acquiring startups that offer valuable complementary applications that enhance the value of the platform. As I have argued throughout, regulatory concerns over killer acquisitions focus on the mostly speculative costs attributed to incumbent/startup acquisitions but overlook the well-established benefits those transactions confer on the innovation ecosystem as a whole. It may nonetheless be reasonably objected that some startups may choose to sell due to an incumbent's credible threat to imitate the startup's technology, which the startup may have difficulty in overcoming due to the incumbent's greater commercialization and financing capacities, which enable it to implement the technology more efficiently than the startup that developed it. As a result, there is a legitimate concern that a startup may sell at a depressed price that does not reflect its innovation's intrinsic value or may be com-

²¹⁶ SARBANES OXLEY ACT OF 2002, Pub. L. No. 107-204, 116 Stat. 745.

²¹⁷ Xiaohui Gao, Jay Ritter & Zhongyan Zhu, *Where Have All the IPOs Gone?*, 48 J. FIN. & QUANTITATIVE ANALYSIS 1663, 1665 (2013).

²¹⁸ On the various reasons behind the decline in the popularity of IPOs as a startup exit mechanism, see Michael Ewens & Joan Ferre-Mensa, *The Deregulation of the Private Equity Markets and the Decline in IPOs*, 33 REV. FIN. STUD. 5463 (2020); Gao et al., *supra* note 211.

²¹⁹ For an argument of this type, see Lemley & McCreary, *supra* note 6.

pelled to sell even though, absent the incumbent's expropriation threat, the startup would have elected to grow the business independently and, in certain cases, could have done so more efficiently than the incumbent. These considerations can result in an innovation ecosystem in which "too many" startups choose to sell rather than build a company independently, resulting in a market characterized by unnecessarily high levels of concentration, and, given the anticipated expropriation risk posed by incumbents, less innovative than might otherwise have been the case.

All proposals to increase the ability of regulators and courts to investigate and block incumbent acquisitions of emerging firms pose a high risk of false-positive enforcement outcomes, which may unsettle VC investors' expectations that monetization-by-acquisition will remain a feasible exit mechanism. Yet the potential harm to the innovation ecosystem arising from startup founders' individually rational choices to sell to large platforms that pose an expropriation risk can be addressed without making any change in existing merger review policies but instead, enhancing the ability to enforce IP rights in general and patents in particular. For example, an innovator-firm that has developed a component technology, and has protected it with a reasonably secure IP portfolio, can choose freely between selling its technology to a platform that can embed the component in a broader product ecosystem or licensing its technology widely across multiple platforms.

To illustrate, consider Google's acquisition in 2013 of Waze, which had developed an innovative GPS-enabled driver navigation system that reflected real-time data on traffic conditions.²²⁰ With a secure patent portfolio,²²¹ Waze might have instead elected to remain independent and license its technology to a broad range of intermediate users, which in turn may have had favorable competitive effects by lowering entry costs for firms that offer products and services that rely on GPS-enabled navigation technologies.²²² If a startup has a reasonably secure IP portfolio

²²⁰ Ingrid Lunden, *Google Bought Waze for \$1.1B, Giving a Social Data Boost to Its Mapping Business*, TECHCRUNCH (June 11, 2013), <https://perma.cc/M7TG-WMJD>.

²²¹ At the time of the acquisition, it appears that Waze Mobile Ltd. had two patents issued by the USPTO (*see* U.S. Patent No. 7,936,284; U.S. Patent No. 8,271,057) and four pending patent applications at the USPTO or the Patent Cooperation Treaty system at the World Intellectual Property Organization (*see* U.S. Patent No. 8,958,979; U.S. Patent No. 9,389,090; WIPO Pub. No. 2012/135362; U.S. Patent No. 2012/0284755).

²²² This is the monetization structure observed in the smartphone market, in which lead innovators specialize in chip design and rely on patent rights to license standard-

but nonetheless decides to sell to a larger integrated firm, then there is greater confidence that the transaction reflects a decision by startup founders and investors that this exit option provided the most efficient mechanism for cultivating the innovation's value, rather than a "second-best" alternative in light of expropriation risk in a weak-IP environment.

Since the mid-2000s, legal changes in US patent law (and in particular, limitations on the ability to seek an injunction since the Supreme Court's 2006 decision in *eBay Inc. v. MercExchange LLC*²²³) have raised significant obstacles to the enforcement of patents.²²⁴ Injunctions are especially difficult to secure in the case of a patent that covers a technology that constitutes one component of a larger multi-component system—a common occurrence in ICT markets.²²⁵ Without a credible threat to seek an injunction, the small firm's legal recourse is restricted to seeking monetary damages for patent infringement through a lengthy and costly litigation process. A small firm that has developed a component technology stands in an asymmetric bargaining position with an incumbent that has the resources to fund a protracted litigation and has the expertise to replicate the small firm's technology and monetize through its existing production and distribution infrastructure.²²⁶ These are precisely the allegations that have been made by several smaller innovator-firms against platforms such as Google (alleged to have replicated Sonos' audio technology²²⁷), Apple (alleged to have replicated technology from Imagination Technologies, a supplier of graphic chipsets²²⁸), and Amazon (alleged to have replicated certain goods developed and sold by third parties on its site²²⁹).

essential technology inputs to handset and other device producers. For extensive discussion, see Jonathan M. Barnett, *Antitrust Overreach: Undoing Cooperative Standardization in the Digital Economy*, 25 MICH. TECH. L. REV. 163 (2019).

²²³ 547 U.S. 388 (2006).

²²⁴ See Barnett, *Patent Groupthink*, *supra* note 209.

²²⁵ Christopher B. Seaman, *Permanent Injunctions in Patent Litigation after eBay: An Empirical Study*, 101 IOWA L. REV. 1949, 1998 (2016) (in empirical study of patent infringement litigation, observing that "[w]hen a patent is found to cover a small component, district courts rarely grant an injunction").

²²⁶ On this point, see Jonathan M. Barnett & David J. Kappos, *The Case for Enhanced Damages in a No-Injunction Patent System*, 5G AND BEYOND: COMPETITION & INNOVATION POL'Y IN THE INTERNET OF THINGS (Jonathan M. Barnett & Sean O'Connor eds., forthcoming 2023).

²²⁷ Tim Bradshaw, *Sonos Sues Google for Infringing Patents*, FIN. TIMES (Jan. 7, 2020), <https://perma.cc/HEK5-5A7D>.

²²⁸ Ben Lovejoy, *Apple's Supplier Battles Intensify as Imagination Technologies Files Formal Dispute*, 9TO5MAC (May 4, 2017), <https://perma.cc/2N3P-VDYJ> (describing dispute between Imagination Technologies and Apple, which terminated the relationship

Unlike using antitrust law to address potential killer acquisitions, using patent law to deter “excessive” sales of startups to incumbent platforms does not raise the risk of discouraging the large population of efficient incumbent/startup acquisitions. Rather, it will simply expand the range of monetization strategies available to startups by mitigating the uneven playing field between innovator-firms and integrated incumbents when IP rights are difficult to enforce. Strengthening IP rights would also bolster incentives to invest in startup-innovators by expanding the range of options available to maximize the return on R&D investments in the event of technical success, while still maintaining the option of monetization-by-acquisition. Consistent with this proposition, empirical studies have found that startups with more robust patent portfolios are more likely to secure VC investment or are able to do so at a more attractive valuation.²³⁰ If a startup elects to sell to a larger firm, the fact that it holds a robust IP portfolio would provide it with a credible threat to develop its technology independently while at the same time limiting the credibility of the acquiror’s threat to imitate the technology without any meaningful penalty. These two effects would enable a startup-innovator to negotiate more favorable terms with potential incumbents or to decline an offer when remaining independent is expected to maximize the startup’s value, and in turn not only preserve but enhance the incentives of VC firms to supply funding for startups in the future.

V. CONCLUSION

Academic, regulatory, and popular enthusiasm for killer acquisition theory has overlooked both the paucity of evidence for this hypothesized market failure and the abundance of evidence for the constructive role typically played by incumbent/startup acquisitions in successful innovation markets. The largely symbiotic relationship between large firms’ scale economies and smaller firms’ innovation capacities raises the prospect that “nip

with its supplier when it decided to produce internally the chipsets that had been supplied by Imagination, and noting that supplier was constrained by dispute-resolution clause that limited its ability to bring a patent-infringement suit).

²²⁹ Daisuke Wakabayashi, *Prime Leverage: A Retail Giant’s Hold on Tech*, N.Y. TIMES (Dec. 16, 2019), at A1, <https://perma.cc/3PZ6-MJ6P>.

²³⁰ See, e.g., David Hsu & Rosemarie Ziedonis, *Patents as Quality Signals for Entrepreneurial Ventures*, ACAD. MGMT. PROCEEDINGS (2008); Ronald J. Mann & Thomas W. Sager, *Patents, Venture Capital, and Software Start-ups*, 36 RES. POL’Y 193, 206 (2007).

in the bud” regulatory interventions may impose significant false-positive error costs on the broader innovation ecosystem. Specifically, regulatory actions that block, or by anticipation discourage, startup acquisitions without a sufficient factual basis place at risk a vital funding source and exit mechanism that stands at the heart of the startup-driven innovation ecosystem. This concern is especially pressing given the near-absence of empirical evidence for killer acquisitions in any market outside pharmaceuticals (and, even in that market, the evidence is ambiguous). Newly minted theories of anticompetitive acquisitions may have captured the imagination of regulators, some legislators, the press, and portions of the scholarly community. However, taking policy actions based on largely undemonstrated theories runs the risk of unraveling the incentive and funding structures that support technological innovation and, in particular, suppressing the disruptive forms of innovation undertaken by smaller firms. Rather than promoting entry by small-firm innovators that propel robust innovation economies, the proposed and enacted changes to merger review policy may have precisely the opposite effect. In that case, the innovation economy would be the victim of scholarly and regulatory speculation.