

Killing Innovation?: Antitrust Implications of Killer Acquisitions

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Killer instinct is a key business asset. Firms live and die by their strategic choices, and the desire to outcompete rivals colors most business decisions. While many firms strive to win market share on their merits, economists have recently identified an anti-competitive practice—killer acquisition—that enables incumbents to maintain market share by burying, rather than beating, rival technologies. In these acquisitions, firms buy competitors to prevent market cannibalization, preserving profits at a price that is right for both the acquirer and the target.

This Article examines suspected killer acquisitions in the pharmaceutical industry, where the practice has been empirically studied, and envisions ways in which antitrust law can address them. Drawing on recent evidence suggesting that few factors are either necessary or sufficient to identify a killer acquisition, this Article argues that neutral to pro-competitive motivations predominate for enough overlapping acquisitions that heightened review is unlikely to prevent killer acquisitions from occurring, while raising costs for all legitimate transactions. This Article also expands on the ongoing debate around killer acquisitions by considering the probable prevalence of killer acquisitions outside the pharmaceutical industry and notes structural factors that promote these acquisitions. Through comparison with another anti-competitive crutch the pharmaceutical industry has been known to lean on—reverse settlements with generic manufacturers—this Article further proposes rule of reason review as the appropriate standard for overlapping acquisitions. While anti-competitive mischief may sneak through under this standard, current evidence does not suggest that firms are getting away with murder, at least where consumer welfare is concerned.

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Introduction

Competition kills, burying rivals and rivalrous goods. The bulk of antitrust law focuses on one dimension of competition—price—and the discipline of rivals with respect to price.¹ However, firms also compete by out-innovating their competitors, shifting the demand curve to increase producer surplus and total welfare.² Consumers benefit too: innovation drives economic growth, improves human health, and enriches daily life.³ However, the long-term dynamic efficiencies wrought by innovation can pose short-term problems for competitors, who at least temporarily lose market share.⁴

Competitive anxiety about innovation often plays out in the context of design changes and “predatory” innovation.⁵ In some cases, a monop-

¹ See Lina M. Khan, Note, *Amazon’s Antitrust Paradox*, 126 YALE L.J. 710, 716 (2017) (“[A]ntitrust doctrine views low consumer prices, alone, to be evidence of sound competition.”).

² See Thomas N. Dahdouh & James F. Mongoven, *The Shape of Things to Come: Innovation Market Analysis in Merger Cases*, 64 ANTITRUST L.J. 405, 409 (1996).

³ See *id.* at 408-10.

⁴ See Herbert J. Hovenkamp, *Antitrust and the Design of Production*, 103 CORNELL L. REV. 1155, 1160, 1174-75 (2018).

⁵ See, e.g., *C.R. Bard, Inc. v. M3 Sys., Inc.*, 157 F.3d 1340, 1382 (Fed. Cir. 1998) (Bryson, J. concurring) (finding enough evidence that Bard modified its biopsy gun to prevent the use of competing replacement needles to support the jury’s finding of an antitrust violation). See generally Stacey Dogan, *The Role of Design Choice in Intellectual Property and Antitrust Law*, 15 COLO. TECH. L.J. 101 (2016) (discussing the economic principles at issue in predatory innovation cases, where courts on rare occasion find antitrust liability based on unilateral design choices).

list re-designs its products to leverage market power in one market to gain a competitive advantage in another, either through bundling⁶ or intentional incompatibility with third-party complements.⁷ In others, a monopolist extends its intellectual property rights over a core product to become the dominant player in the service after-market as new innovations reduce demand for its core product.⁸ For example, a monopolist can introduce and restrict access to a valuable new diagnostic tool⁹ or make it prohibitively expensive for after-market competitors to obtain necessary inputs,¹⁰ using its past and present innovations to create or maintain market power. In highly scrutinized sectors like the pharmaceutical industry, a monopolist may even rely on the intersection of regulatory law and intellectual property law to block competition through incremental innovation.¹¹ Illustratively, pharmaceutical companies sometimes pull existing products from the market and introduce new, patent-protected reformulations shortly before other patents covering the drug expire,¹² a so-called “hard switch.” Hard switches—which force existing patients onto the new drug before generic entry—can make it difficult or impossible for patients to obtain cheaper generic drugs via state automatic drug-substitution laws.¹³

Killer acquisitions, an anti-competitive business strategy recently described by economists Colleen Cunningham, Florian Ederer, and Song

⁶ See, e.g., *United States v. Microsoft Corp.*, 253 F.3d 34 (D.C. Cir. 2001) (holding that Microsoft’s merger of Windows and Internet Explorer constituted an illegal bundling arrangement).

⁷ See, e.g., *Berkey Photo, Inc. v. Eastman Kodak Co.*, 603 F.2d 263 (2d Cir. 1979) (rejecting a competitor’s position that a firm with market power had a duty to pre-disclose new complements).

⁸ See *Eastman Kodak Co. v. Image Tech. Servs., Inc.*, 504 U.S. 451 (1992) (finding an antitrust violation could arise from exclusionary conduct in the after-market for repair parts even when the manufacturer lacked significant market power in the primary equipment market).

⁹ See *Data Gen. Corp. v. Grumman Sys. Support Corp.*, 36 F.3d 1147 (1st Cir. 1994) (holding that refusal to license copyrighted diagnostic software to competing technicians was insufficient evidence to support a monopolization claim).

¹⁰ See *Eastman Kodak Co.*, 504 U.S. at 482-86 (finding that Kodak’s refusal to sell spare parts for its copiers to third-party service organizations, which forced consumers to obtain maintenance services directly from Kodak, could constitute unlawful monopoly maintenance). See generally Carl Shapiro, *Aftermarkets and Consumer Welfare: Making Sense of Kodak*, 63 ANTITRUST L.J. 483 (1995) (discussing the rare possibility of consumer injury in monopolized aftermarkets).

¹¹ See, e.g., Michael A. Carrier & Steve D. Shadowen, *Product Hopping: A New Framework*, 92 NOTRE DAME L. REV. 167, 171-78 (2016) (explaining product hopping in the pharmaceutical industry, a form of life-cycle management in which a drug company reformulates its older product and encourages doctors to preferentially prescribe the reformulated product).

¹² See *New York ex rel. Schneiderman v. Actavis PLC*, 787 F.3d 638, 642 (2d Cir. 2015) (describing Actavis’s attempted withdrawal of its immediate release formulation of Namenda, a drug intended to treat moderate-to-severe Alzheimer’s disease, to force a switch to its new once-daily extended release formulation).

¹³ See *id.* at 649.

Ma¹⁴ that has inspired intense debate in the antitrust community,¹⁵ “complement” these traditional tactics. Instead of leveraging their intellectual property rights to weaken competitors, as firms do in predatory (and non-predatory) innovation cases, firms engaging in killer acquisitions buy competing technologies—and bury them. Killer acquisitions are distinct from traditional acquisitions, in which an innovative new entrant is acquired by an incumbent who then exploits the acquired technology in its own product lines.¹⁶ While traditional acquisitions also eliminate real or potential competitors, they generally maintain competing innovations. Antitrust law to date has focused on the static market structure changes associated with these acquisitions, only condemning acquisitions that result in a substantial increase in market concentration.¹⁷ However, the pro-competitive synergies expected from traditional acquisitions, such as further specialization and subsequent innovation, are largely absent when firms simultaneously seek to kill competitors and competing technologies. Therefore, as others have suggested,¹⁸ antitrust authorities should condemn killer acquisitions—if they can identify them.

But identifying a killer acquisition *ex ante* or *ex post* is not a trivial pursuit. Firms routinely choose to discontinue product lines and development projects; therefore, determining the primary business rationale when a firm acquires and subsequently abandons a technology is an error-prone endeavor. Nevertheless, “pure” killer acquisitions, in which a firm never intended to develop an acquired technology, can be a rational business decision.¹⁹ Specifically, when there is any degree of acquirer-target product overlap, acquirers have stronger incentives to discontinue development than target firms because some of their existing profits will

¹⁴ See Colleen Cunningham, Florian Ederer & Song Ma, *Killer Acquisitions* (unpublished manuscript), <https://papers.ssrn.com/abstract=3241707> (defining killer acquisitions).

¹⁵ See, e.g., James Baker, *Rebalancing the Scales*, FRONTIER ECON., <http://www.frontier-economics.com/uk/en/news-and-articles/articles/article-i6723-rebalancing-the-scales/> (2020); Sebastian Jungermann, “Killer Acquisitions” in *Antitrust Authorities’ Sights: Risk for Innovative Startups?*, ARNOLD & PORTER (Sept. 4, 2019), <https://www.arnoldporter.com/en/perspectives/publications/2019/09/killer-acquisitions-antitrust-authorities-sights> (Sept. 4, 2019); Jacquelyn MacLennan et al., *Innocent Until Proven Guilty – Five Things You Need to Know About Killer Acquisitions*, INFORMA CONNECT: COMPETITION L. (May 3, 2019), <https://informaconnect.com/innocent-until-proven-guilty-five-things-you-need-to-know-about-killer-acquisitions> (May 3, 2019).

¹⁶ Illustratively, Facebook maintained and grew Instagram after acquiring the competing social media network. See Yoni Heisler, *Once Mocked, Facebook’s \$1 Billion Acquisition of Instagram Was a Stroke of Genius*, BGR (Dec. 29, 2016, 11:26PM), <https://bgr.com/2016/12/29/facebook-instagram-acquisition-1-billion-genius/>. Similarly, Amazon integrated Diapers.com into its platform after ending its price war through acquisition. See Khan, *supra* note 1, at 768-74.

¹⁷ See DOJ-F.T.C Antitrust Guidelines for the Licensing of Intellectual Property § 5.7.

¹⁸ See MacLennan et al., *supra* note 15.

¹⁹ See Cunningham et al., *supra* note 14, at 1-2.

be cannibalized by the substitute product.²⁰ Accordingly, the profit-protection benefits accruing to a monopolist from acquiring property rights to prevent entry will sometimes substantially exceed the benefits to the monopolist of introducing the new innovation, as well as the value of the new innovation to the prospective new entrant.²¹

However, the rational conditions for acquiring to kill depend on the probability of project success, the expected profits for the acquirer with and without acquisition, the development gains for both the new entrant and the acquirer, the new project's development costs, and the project's liquidation value.²² Firms considering acquisitions may only know some of these values, or make decisions based on uncertain or incorrect valuations. For example, in the pharmaceutical industry, determining the probability of project success, even in late-stage clinical trials, is at best an imperfect science.²³ Moreover, information asymmetries and psychological errors may cause the new entrant and incumbent to estimate critical parameters differently, distorting the circumstances in which a killer acquisition appears rational to both parties. Therefore, attempts by courts and antitrust agencies to determine if specific acquirers could rationally acquire new technologies just to kill them may not shed much light on the party-perceived economics of the transaction, let alone their true motivations.

This Article argues that difficulties identifying killer acquisitions caution against increased scrutiny of overlapping acquisitions. Part I briefly discusses an influential recent working paper on potential killer acquisitions in the pharmaceutical industry. Part II considers incumbent motivations for pharmaceutical acquisitions, focusing on cases of overlap in innovation markets where neither the acquirer nor the target markets a product. Without condoning killer acquisitions, Part III argues that neutral or pro-competitive motivations predominate for enough overlapping acquisitions that heightened review is unlikely to increase social welfare. Additionally, because courts lack experience with killer acquisitions, as well as obvious means of identifying them, Part III advocates for rule of

²⁰ See *id.* at 2.

²¹ Because new entrants often rely on outside funding and do not have established infrastructure, research and development (R&D) and start-up costs may be higher for new entrants than incumbents, reducing the expected payoff for a new technology. See Joseph H. Golec & John A. Vernon, *Financial Risk in the Biotechnology Industry* 6 (Nat'l Bureau of Econ. Research, Working Paper No. 13604, 2007) ("The presence of capital market imperfections for R&D finance imparts a cost advantage to internally-generated funds over external debt and equity; thus, even holding constant financial risk and the required rate of return on new equity issues, biotech firms with no cash flows are at a financing disadvantage.").

²² See Cunningham et al., *supra* note 14, at 9-21.

²³ See Andrew Joseph, *How Well Can You Predict the Outcome of Clinical Trials? Not as Well as You May Think*, STAT (Jan. 22, 2018), <https://www.statnews.com/2018/01/22/clinical-trials-forecasting-outcomes/>.

reason review of overlapping acquisitions. Finally, Part IV considers the probable prevalence of killer acquisitions outside the pharmaceutical industry and notes structural factors that promote these acquisitions.

I. Killer Acquisitions in the Pharmaceutical Industry

To explore occurrences of killer acquisitions in the pharmaceutical industry, economists Colleen Cunningham, Florian Ederer, and Song Ma assembled a comprehensive database of more than 16,000 pharmaceutical drug projects.²⁴ Using this data set, Cunningham and co-authors identified overlapping acquisitions in which the acquirer purchased a development candidate (overlapping drug) in the same therapeutic market with the same mechanism of action as an FDA-approved drug already owned by the acquirer.²⁵ The authors then tracked development events (e.g., advancing to later stage clinical trials) and determined that overlapping drugs were 3.7% less likely to have a development event post-acquisition than drugs acquired by companies without a similar drug in their product portfolio and 5.7% less likely to have a development event post-acquisition than non-acquired projects.²⁶ Additionally, the authors identified competition, defined as the number of drugs marketed or under development in the same therapeutic market and acting through the same mechanism of action, as an important predictor of development prospects for an overlapping project.²⁷ In a high competition environment, the change in development rate was insignificant and economically negligible, while the absolute probability of a subsequent development event dropped by 6.5% in low competition environments.²⁸ Furthermore, the authors discovered that post-acquisition terminations were concentrated among overlapping projects acquired by firms with patents with more than five years of term remaining, consistent with the profit shielding expected when an incumbent can maintain its market power for many years to come.²⁹ However, the absolute odds of a development event were low for all developmental candidates, and no single transaction feature was both necessary and sufficient to identify a killer acquisition.³⁰

²⁴ See Cunningham et al., *supra* note 14, at 3.

²⁵ See *id.*

²⁶ See *id.* at 30.

²⁷ See *id.* at 35-36.

²⁸ See *id.*

²⁹ See *id.* at 36-37.

³⁰ See *id.* at 40, 47, 66 tbl.2, 68 tbl.4.

II. Rationales for Killing an Overlapping Drug Post-Acquisition

Despite cannibalization concerns, colorable pro-competitive (or at least neutral) justifications exist for acquiring a drug that overlaps with a firm's existent FDA-approved product, even if the drug is far from patent expiry and faces limited competition. Illustratively, the mechanisms of action used in the Cunningham, Ederer, and Ma study to identify cases of overlap are not mutation-specific, meaning that two drugs targeting the same enzyme and having the same net effect (e.g., inhibition) may not treat the same patients. Accordingly, purchasing the second drug could expand the acquirer's market, rather than cannibalize sales. For example, Vertex Pharmaceuticals markets two combination therapies (Orkambi™ and Symdeko™) for treating cystic fibrosis containing the same CFTR potentiator but different CFTR correctors.³¹ The two therapies are approved for some overlapping patient populations but also have distinct age group and indication approvals within the broad umbrella of cystic fibrosis.³² Personalized medicine is still in its infancy, and definitively ruling out differential population effects following Phase I safety trials, when many drugs are acquired,³³ would be a fool's errand based on current scientific knowledge and typical trial power.

Market expansion, not cannibalization, may also occur when the FDA-approved drug has side effects that preclude its use in certain patient groups.³⁴ In these cases, the drugs, while overlapping in terms of indication and broadly defined mechanism of action, occupy partially independent markets. Additionally, an incumbent might pursue an overlapping drug for combination therapies or non-overlapping indications if the "substitute" is easier to formulate, results in fewer side effects, or appears to be eligible for longer patent and regulatory exclusivity than the drug it nominally replaces.³⁵

³¹ See *Research and Pipeline*, Vertex Pharmaceuticals Inc. (2020), <https://www.vrtx.com/research-development/pipeline/> (describing therapies within Vertex's cystic fibrosis program); see also *CFTR Modulator Therapies*, CYSTIC FIBROSIS FOUND., <https://www.cff.org/Life-With-CF/Treatments-and-Therapies/Medications/CFTR-Modulator-Therapies/> (explaining the mechanism of action for the components of Orkambi™ and Symdeko™).

³² See *FDA Approves New CFTR Modulator Treatment for Cystic Fibrosis*, CYSTIC FIBROSIS FOUND. (Feb. 12, 2018), <https://www.cff.org/News/News-Archive/2018/FDA-Approves-New-CFTR-Modulator-Treatment-for-Cystic-Fibrosis/>.

³³ See Cunningham et al., *supra* note 14, at 37-38, 71 tbl.7.

³⁴ Cf. Mandy Oaklander, *New Hope for Depression*, TIME (July 27, 2017), <https://time.com/magazine/us/4876068/august-7th-2017-vol-190-no-6-u-s/> (discussing the potential market for new antidepressant medications with reduced adverse side effects relative to available treatments).

³⁵ Cf. Monique Carter & Saima Khan, *Novel-Novel Fixed-Dose Combination Therapies*, 18 NATURE REVIEWS DRUG DISCOVERY 413, 413 (2019) (highlighting potential benefits of fixed-dose combinations comprising investigational drugs in the treatment of multifactorial diseases).

In fact, around 92 to 95% of overlapping pharmaceutical acquisitions do not appear to be motivated purely by a desire to kill competing innovations,³⁶ a fraction that might be even higher when overlap exists solely within innovation markets. To highlight the potential pitfalls of too broadly construing the scope of potential killer acquisitions for antitrust purposes, the subparts below consider four possible reasons why a firm may acquire and subsequently terminate an overlapping development project beyond mistake: (1) optimal intra-project selection; (2) class-based drug problems; (3) killing competition; and (4) resource redeployment.

A. Optimal Intra-Project Selection

First, in cases of innovation market overlap, a firm may acquire an overlapping drug as a backup or alternative to their internal development candidate. Backup acquisition may be especially likely if the internal drug shows therapeutic promise in early-stage (Phase I) clinical trials but is difficult to manufacture or associated with side effects rooted in the drug's chemical structure. Under those circumstances, the firm might evaluate the relative prospects of its internal drug and the acquired drug, only advancing the more promising drug.³⁷ If the internal drug was deemed more promising and ultimately obtained approval, the acquirer would likely elect to abandon the acquired backup, at least for the indication it was initially developed for. While this outcome hurts competition if the backup also would have obtained FDA approval in a but-for world, it may be neutral to socially beneficial if the drug was insufficiently safe or effective to obtain approval.

Optimal intra-project selection is partially a “market for lemons” story. If the acquirer had perfect information regarding the acquired drug, it would presumably be able to predict *ex ante* whether its internal drug or the acquired drug was the better clinical candidate. In that case, the acquirer would only acquire an overlapping drug if it believed the overlapping drug better than its own. Cunningham and co-authors' observation that a firm with a FDA-approved drug is 23.4% less likely to continue developing an overlapping project may be consistent with firms being only slightly better than chance at forecasting whether an external

³⁶ See Cunningham et al., *supra* note 15, at 47. Cunningham, Ederer, and Ma considered four alternative interpretations for “killer” acquisitions when a firm already markets an overlapping FDA-approved drug: asymmetric information; optimal project selection in a multi-project acquisition; human capital redeployment; salvage acquisitions; and technology redeployment. *See id.* at 42-46.

³⁷ Whether the acquirer could determine the more promising drug at the due diligence stage, prior to acquisition, is unclear. As Cunningham and co-authors note, an acquiring firm will typically possess less information about the quality of an acquired drug than the target firm. *See id.* at 42.

drug represents a marketable advance.³⁸ Given that acquired single-project targets, where the acquirer likely engaged in due diligence for the overlapping drug, are only 12.1% less likely to have a development event,³⁹ acquirers may be accurately assessing relative merits—when they consider them. However, acquirers of single-project targets bid against non-overlapping firms that are independently valuing the same technology, in contrast to multi-project targets where valuations depend on the pipeline projects each bidder feels best positioned to exploit. Therefore, firms may be equally capable of evaluating technologies in multi-project and single-project transactions, with single-project killer acquisitions merely being costlier to execute and thus less likely to occur.

B. Class-Based Drug Problems

Second, an acquirer may decide to terminate development of both the overlapping drug and its substitute due to class-based drug problems.⁴⁰ When a firm takes ownership of an overlapping project, it gains access to additional data about the therapeutic efficacy and potential side effects of a drug similar to its own. Combining insights gained from its own clinical trials with another firm's proprietary data, the acquirer may conclude that both drugs exhibit adverse side effects related to their mechanism of action. Alternatively, given a broader combined pool of patient data, the acquirer may re-analyze clinical trial results with higher statistical power and determine that the observed therapeutic efficacy was a false positive.⁴¹ The firm might then abandon development of both projects, reducing clinical trial expenditures and potentially increasing consumer welfare by moving patients to safer or more effective therapies.

C. Killing Competition

Third and worst, an acquirer with an early-stage overlapping project may be attempting to bury the competition without competing on the merits. Even though neither drug has market share yet, clinical candi-

³⁸ See *id.* at 3.

³⁹ See *id.* at 68 tbl.4.

⁴⁰ See *Lessons to Learn from the COX-2 Saga*, HARV. HEALTH PUB. (Mar. 2014), https://www.health.harvard.edu/newsletter_article/lessons-to-learn-from-the-cox-2-saga (considering the adverse side effects associated with Vioxx, a COX-2 inhibitor that doubled patients' risk of heart attack and stroke, which were shared by some other class members and resulted in the voluntary recall of two drugs).

⁴¹ Cf. Li et al., *Discontinued Drugs for the Treatment of Cardiovascular Disease from 2016 to 2018*, 20 INT. J. MOLECULAR SCI. art. 4513, tbl.1 (2019) (listing two signal transduction modulators for treating cardiovascular disease that were discontinued in Phase II or III for efficacy reasons, along with one signal transduction modulator discontinued at Phase I for "strategic" reasons).

dates compete for clinical trial participants and trial sites,⁴² which may affect profits by delaying FDA approval. However, a successful acquired overlapping project does not inherently create a two-product oligopoly for the acquirer. Instead, development choices, as well as the inherent efficacy of the drug candidates, may lead to zero, one, or two marketed drugs.⁴³ Accordingly, the acquirer's killer intent should be reduced relative to a firm with an FDA-approved product. The supracompetitive profits killer acquisitions protect are only speculative at the acquisition stage and may never materialize—or only materialize due to the acquisition of a better drug. But given the uncertainty surrounding clinical development, acquiring to kill could appear rational, particularly if firms overestimate their odds of obtaining approval.

D. Asset Redeployment

Fourth, human capital and technology redeployment could explain some overlapping acquisitions. To assess this alternative when the acquirer already markets an overlapping drug, Cunningham and co-authors considered the chemical similarity of acquired drugs to pre- and post-acquisition products of the acquirer to probe technology redeployment, finding that drugs developed by acquirers in the five years post-drug acquisition were not more similar to the acquired drug than those developed in the preceding five years.⁴⁴ However, unless the chemical structure of the acquired drug was previously unknown, or the method of synthesizing the drug's core structure was unduly burdensome without the target's trade secrets, it is not clear why technology redeployment would result in more structural similarity post-acquisition, at least in the context of small molecule drugs, as the acquirer would already possess the necessary knowledge and expertise to produce similar drugs pre-acquisition.⁴⁵ For small molecule overlapping acquisitions, acquirers already have a similar

⁴² See Luke Gelinas et al., *When Clinical Trials Compete: Prioritising Study Recruitment*, 43 J. MED. ETHICS 803, 804-05 (2017).

⁴³ See Cunningham et al., *supra* note 14, at 10-11 (explaining the product market choices of an acquirer in the authors' theoretical framework).

⁴⁴ For context, the global similarity mean of 0.133 determined by Cunningham and co-authors, *id.* at 43-44, indicates minimal derivative innovation, as lower similarity implies higher novelty. By contrast, Krieger et al. determined that almost all drug candidates entering Phase I clinical trials have maximum similarity scores greater than 0.2 relative to prior drug candidates, with most falling in the 0.3 to 0.6 range. See Joshua L. Krieger et al., *Missing Novelty in Drug Development* 6 (Nat'l Bureau of Econ. Research, Working Paper No. 24595, 2019).

⁴⁵ To the extent the target firm possessed patents covering a genus of compounds structurally similar to the acquired drug, acquisition may provide the acquirer more freedom to operate with respect to the acquired drug scaffold, or its own. However, the acquirer may also avoid developing drugs resembling publicly disclosed compounds due to patentability or patent term concerns. See Benjamin N. Roin, *Unpatentable Drugs and the Standards of Patentability*, 87 TEX. L. REV. 503, 549-51 (2009).

drug in their portfolio, which may or may not be chemically similar to the acquired drug.⁴⁶ Unless an acquirer believed that both drugs were inadequate but salvageable with minor structural modifications, or that modifying the scaffold would result in different biological activity, the acquirer possesses few incentives to continue developing similar molecules. However, redeployment may be more plausible when biotechnology firms are acquired because production know-how and other trade secrets are more valuable in protein-based therapeutic development and manufacturing.⁴⁷

Nevertheless, the acquirer may gain valuable negative trade secrets related to scaffolds that *do not* work when acquiring a target firm developing drugs in the same therapeutic area, an essentially unobservable asset. The importance of negative know-how, which often relates to compounds that never became drug candidates, on acquisition decisions is difficult to assess empirically. However, given the high value with associated rapid market entry, negative trade secrets might be worth millions to the acquirer.⁴⁸

To explore human capital redeployment, Cunningham and co-authors further considered inventor mobility and productivity post-acquisition.⁴⁹ They determined that only 22% of pre-acquisition inventors moved to the acquirer post-acquisition and did not find evidence that retained inventors became more productive.⁵⁰ While their speculation is plausible that acquisition-as-hiring “might not be as common in pharmaceuticals as in other industries,” given the low number of revenue-generating products per firm and the relatively long life-cycles of those products, their original hypothesis that “human capital underpinning overlapping projects would be useful for the acquiring firm” is suspect.⁵¹ Specifically, the underlying human capital they consider is the synthetic chemists who develop overlapping drugs, not the clinicians or clinical trial

⁴⁶ See Cunningham et al., *supra* note 14, at 3 (noting that projects were considered to be overlapping if they were in the same therapeutic class and relied on the same mechanism of action).

⁴⁷ See W. Nicholson Price II & Arti K. Rai, *Manufacturing Barriers to Biologics Competition and Innovation*, 101 IOWA L. REV. 1023, 1032-36 (2016) (describing unique challenges associated with manufacturing biologics). In contrast to small molecule drugs like aspirin, biologics are large and structurally complex drugs produced by living cells. See *id.* at 1026.

⁴⁸ To date, priority review vouchers, which entitle the holder to priority review from the FDA, have sold for \$68 to \$350 million, with six vouchers sold in 2017 for known sale prices between \$110 and \$130 million. See David Ridley, PriorityReviewVouchers.com, <http://priorityreviewvoucher.org> (2018). For drugs evaluated under priority review, the FDA aims to provide a decision in six months, rather than the ten-month goal for standard review. Priority Review, U.S. Food & Drug Admin. (Jan. 4, 2018), <https://www.fda.gov/patients/fast-track-breakthrough-therapy-accelerated-approval-priority-review/priority-review>.

⁴⁹ See Cunningham et al., *supra* note 14, at 44-45. However, acquisition-as-hiring might be harder to rule out as an alternative explanation for overlapping acquisitions in other industries, including the tech industry.

⁵⁰ See *id.* at 45.

⁵¹ See *id.* at 44.

managers involved in further commercialization efforts. Because synthetic chemists specialize in early-stage development, a stage that all studied projects had cleared, it is not obvious that this human capital is being “redeployed.” Moreover, synthetic chemists with expertise related to the overlapping drug would possess higher-than-average utility only if the acquiring firm wanted to develop yet another developmental candidate for the same indication with the same mechanism of action. Given the potential market cannibalization inherent in further development efforts, any human capital motivation likely hinges on later-stage employees, who are harder to track than inventors and represent another source of empirical uncertainty.

III. Antitrust Implications of Pharmaceutical Killer Acquisitions

Most acquisitions, including intellectual property acquisitions, do not violate federal antitrust laws.⁵² However, some acquisitions with anti-competitive effects violate Section 7 of the Clayton Act,⁵³ as well as Sections 1 and 2 of the Sherman Act.⁵⁴ While Section 7 of the Clayton Act, which is directly concerned with mergers, appears to be the most direct tool for discouraging anti-competitive acquisitions, Section 7 is largely enforced through pre-acquisition review by the Federal Trade Commission (FTC) rather than case law.⁵⁵ Section III.A below discusses how killer acquisitions fit within the existing Clayton Act framework. Section III.B considers killer acquisitions as a form of monopoly maintenance subject to condemnation under Section 2 of the Sherman Act.

⁵² See *Mergers*, FED. TRADE COMMISSION, <https://www.ftc.gov/tips-advice/competition-guidance/guide-antitrust-laws/mergers> (noting that 95% of merger filings considered by the FTC and Department of Justice annually present no competitive issues). While pharmaceutical acquisitions often include the transfer of property and technical know-how in addition to patent rights, the most valuable part of the sale is generally the patents covering the clinical candidate. As Cunningham et al. note, “[t]he pharmaceutical industry is almost exclusively project-driven with strong project-specific intellectual property rights protection, in contrast to many other industries in which startups are valued more for their human capital.” See Cunningham et al., *supra* note 14, at 44.

⁵³ 15 U.S.C. §§ 12-27 (2018); 29 U.S.C. §§ 52-53 (2018) (original version at ch. 323, §7, 38 Stat. 730, 731-32 (1914)). The Clayton Act supplements the Sherman Act and attempts to curb anti-competitive conduct, such as price discrimination and mergers and acquisitions that reduce competition, before such conduct affects competition on the merits.

⁵⁴ 15 U.S.C. §§ 1-7 (original version at 26 Stat. 209 (1890)). The Sherman Act broadly condemns anticompetitive horizontal agreements between competitors, as well as unilateral conduct that monopolizes or attempts to monopolize a market.

⁵⁵ See CHRISTOPHER R. LESLIE, ANTITRUST LAW AND INTELLECTUAL PROPERTY RIGHTS: CASES AND MATERIALS 34-35 (2011) (“Relatively little case law exists on mergers—and no Supreme Court cases have been decided in the last thirty years—because when the government challenges a merger, the parties often abandon the deal.”).

A. Killer Acquisitions Below the Antitrust Review Threshold

Section 7 of the Clayton Act condemns mergers and acquisitions (M&A) that substantially restrict competition or promote monopolization.⁵⁶ In addition, the Hart-Scott-Rodino Act requires merging parties above a certain size to provide advanced notice to the Antitrust Division of the Department of Justice and the FTC before merging.⁵⁷ Pre-merger notice enables antitrust agencies to challenge mergers, often resulting in abandonment or voluntary modification of the merger by the parties.⁵⁸ Enforcement priorities thus play an outsized role in M&A, enabling the FTC and Antitrust Division to mitigate some harmful conduct without changing the law as written or interpreted by the federal courts.

However, sub-\$200 million acquisitions are typically not reviewed by the FTC,⁵⁹ so low budget anti-competitive acquisitions generally escape antitrust scrutiny unless the FTC intervenes post-acquisition. But even if the FTC steps in, anti-competitive harm often goes unrepaired, with courts notoriously hesitant to unwind consummated mergers.⁶⁰ While private plaintiffs satisfying standing requirements can challenge mergers and acquisitions, few well-resourced private parties are incentivized to oppose killer acquisitions, which leave the target firm, the acquirer, and all other incumbents better off. Because any well-capitalized private party that wanted to enter the field (*i.e.*, a non-incumbent) would presumably outbid the overlapping acquirer given the limited range of rational acquire-to-kill prices, potential entrants are also unlikely to challenge acquisitions in court. As a result, private enforcement mechanisms may be ill-equipped to save or resuscitate overlapping projects.

One response to killer acquisitions then would be to lower the threshold for pre-acquisition review of overlapping acquisitions, allowing

⁵⁶ Clayton Act § 7.

⁵⁷ See LESLIE, *supra* note 55, at 34.

⁵⁸ See *id.* at 35.

⁵⁹ See Cunningham et al., *supra* note 14, at 40 & n.40, 41.

⁶⁰ See David Edmon, *The Utah Statement: A Bulwark Against Private Power*, AM. PROSPECT (Dec. 19, 2019), <https://prospect.org/economy/the-utah-statement-bulwark-against-private-power-antitrust/> (“[B]oth judges and the federal government are very reluctant to unwind a merger even if evidence emerges that the settlement failed to protect competition.”); see also Daniel A. Crane, *Rethinking Merger Efficiencies*, 110 MICH. L. REV. 347, 383 (2011) (“It is possible (although difficult) to force parties to unwind an anticompetitive merger if they begin to exercise anticompetitive power because of the merger.”); John Stigi & Alejandro Moreno, *California Court of Appeal Refuses to Permit an Action for Rescission of a Strategic Transaction, Holding That a Board Has No Duty Under California Law to Include a “Fiduciary Out.”*, SHEPPARDMULLIN (Aug. 22, 2011), <https://www.corporatesecuritieslawblog.com/2011/08/california-court-of-appeal-refuses-to-permit-an-action-for-rescission-of-a-strategic-transaction-holding-that-a-board-has-no-duty-under-california-law-to-include-a-fiduciary-out/> (“This decision by the California Court of Appeal confirms that courts are reluctant to ‘unscramble the eggs’ after a strategic transaction closes, especially where the consequences of returning the target company to the *status quo ante* threatens the very survival of the target company.”).

the federal government, as the most likely antitrust enforcer, to step in earlier to police abusive conduct.⁶¹ Cunningham, Ederer, and Ma discovered that many acquisition prices for overlapping drugs clustered directly below the threshold for antitrust review, in contrast with non-overlapping projects, which were less clustered.⁶² Moreover, the authors determined that eventual product launch rates were lower, and discontinuation rates higher, for just below-threshold acquisitions.⁶³

But below-threshold acquisition prices may simply reflect expectations regarding product success and acquirer-target gaming to increase the odds of a successful acquisition, limiting the utility of a lower review threshold as a method of policing killer acquisitions. After all, an acquirer must pay a target firm an acquisition price equal to or greater than the expected project payoff if the target firm continued development of its product.⁶⁴ For valuations around the threshold, overlapping acquirers and targets may be more wary of antitrust review, even in legitimate acquisitions, than nonoverlapping acquirers, due to the higher potential for delay and deal rejection. To facilitate these deals, targets may be willing to take a slight pay cut to avoid review, causing clustering. This gaming is consistent with the acquisition size distributions reported by Cunningham, Ederer, and Ma, with no overlapping deals valued directly above the threshold.⁶⁵ Additionally, the acquirer must outbid other potential buyers. In a low-competition market where duopolist profits are available to a successful new entrant, other large firms without overlapping projects should place a high relative value on the overlapping project.

Nevertheless, suspected killer acquisitions in the pharmaceutical industry appear to concentrate in low competition markets, where the potential profits for competitors should be highest. While Cunningham and co-authors concluded that decreased development rates correlate with greater profit shielding, it would be anomalous if acquirers were consistently able to buy valuable market protection on-the-cheap. Accordingly, the higher likelihood of success for overlapping drugs above the review threshold may reflect qualitative differences in bargaining conditions—likely in the form of a competing, less threshold-sensitive non-overlapping buyer or a highly confident target unwilling to accept a lower

⁶¹ While Cunningham and co-authors provide one standard for assessing overlapping acquisitions in the pharmaceutical industry, heightened review of overlapping acquisitions outside the pharmaceutical industry may be confounded by definitional issues. One (imperfect) option for expanding beyond the pharmaceutical industry might be reliance on patent classification networks. Cf. Laura G. Pedraza-Fariña & Ryan Whalen, *A Network Theory of Patentability*, 87 U. CHI. L. REV. 63 (2020) (assembling a network representation of different areas of technical knowledge based on U.S. patent records).

⁶² See Cunningham et al., *supra* note 14, at 40-41, 64 fig.6.

⁶³ See *id.* at 41, 73 tbl.9.

⁶⁴ See *id.* at 9-11.

⁶⁵ See *id.* at 64 fig.6.

price to increase convenience.⁶⁶ In that case, overlapping acquirers only purchase and bury low-promise projects that could not entice non-overlapping potential entrants to outbid the antitrust review threshold. Clustering, then, may reflect anti-competitive killer acquisitions, but only for drugs with a low likelihood of advancing anyway. Although such conduct lacks virtue, any social welfare gains from lowering the antitrust review threshold for overlapping acquisitions (e.g., signaling value) may be swamped by enforcement and overdeterrence costs for legitimate acquisitions.

B. Killer Acquisitions as Monopoly Maintenance

Killer acquisitions do not fit cleanly in an existing antitrust box. Unlike traditional acquisitions analyzed under Section 7 of the Clayton Act, killer acquisitions affect innovation markets rather than product or service markets, implicating dynamic efficiencies not always considered in normal merger analysis.⁶⁷ Moreover, in contrast to collusive patent acquisitions, which occur in some technology markets, there is no conspiracy at the heart of most killer acquisitions. Instead, the acquirer in a killer acquisition pays a target firm for its intellectual property in order to black out an innovation area—an outcome mutually beneficial to both parties and not, standing alone, an illegal result.⁶⁸

To date, the FTC has largely challenged potential killer acquisitions with significant overlap in product markets, condemning them under traditional acquisition frameworks.⁶⁹ For example, in the 1990s, the FTC challenged the merger of Baxter and Immuno, two firms with fibrin sealants in late-stage clinical trials and no quickly-moving competitors, requiring Baxter to license its prospective product as part of a consent decree.⁷⁰ Similarly, the FTC challenged the proposed combination of Pfizer and Warner-Lambert's respective EGFR-TK inhibitor R&D programs as

⁶⁶ The authors do not report on continuation rates for non-overlapping drugs just above and below the review threshold, so it is not clear if the increased success for above-threshold projects is specific to overlapping drugs. See Cunningham et al., *supra* note 15, *passim*.

⁶⁷ See Tim Wu, *Taking Innovation Seriously: Antitrust Enforcement if Innovation Mattered Most*, 78 ANTITRUST L.J. 313, 316-20 (2012); see also Ronald W. Davis, *Innovation Markets and Merger Enforcement: Current Practice in Perspective*, 71 ANTITRUST L.J. 677, 679-82 (2003) (describing differences between innovation markets and the more traditional product, services, and technology markets usually considered by antitrust authorities).

⁶⁸ See *United States v. Singer Mfg., Co.*, 374 U.S. 174, 189 (1963) (“There is no claim by the Government that it is illegal for one merely to acquire a patent in order to exclude his competitors; or that the owner of a lawfully acquired patent cannot use the patent laws to exclude all infringers of the patent . . .”).

⁶⁹ See Davis, *supra* note 64, at 690-93 (describing twelve FTC enforcement actions related to pharmaceutical innovation markets based on more traditional antitrust theories such as potential competition).

⁷⁰ See *Baxter Int'l, Inc.*, 123 F.T.C. 904 (1997); Davis, *supra* note 64, at 692.

part of a larger merger between Pfizer and Warner-Lambert; at the time, the two firms were believed to be the most advanced in the FDA approval process for EGFR-TK inhibitors for the treatment of solid tumors.⁷¹ As part of its consent order, the FTC required Pfizer to divest its R&D interests to a development partner.⁷²

Among established antitrust violations, killer acquisitions without substantial product market effects most closely resemble another anti-competitive crutch the pharmaceutical industry has been known to lean on: reverse settlements.⁷³ In a reverse settlement, also referred to as a “pay-for-delay” agreement, the plaintiff in a patent litigation suit agrees to pay the defendant to cease infringement for a specified time period and to drop its patent validity challenges.⁷⁴ For pharmaceutical patentees, reverse settlements discourage generic entry because regulatory law allocates a valuable incentive—180 days of market exclusivity—only to the first generic applicant to file an abbreviated new drug application with a Paragraph IV certification challenging the validity of patents covering a brand name drug.⁷⁵ Most generic drug profits accrue during this exclusivity period; after it concludes, other generics can enter the market and lower prices closer to the marginal cost of production.⁷⁶ If the first generic applicant forfeits that exclusivity by settling with the brand name firm, other generic applicants can continue to litigate but risk low or no profits due to free-riding if they prevail.⁷⁷

Like reverse settlements, killer acquisitions in the pharmaceutical industry rely on patent protection and high regulatory entry barriers to forestall competition. In addition, killer acquisitions depend on profit asymmetry between the parties to the transaction, where the expected profit loss to one firm exceeds the new entrant’s expected profits. Moreover, both killer acquisitions and reverse settlements rely on a legal entitlement controlled by the new entrant. While the legal entitlement underlying reverse settlements is a 180-day market exclusivity period for the first Paragraph IV filers under the Hatch-Waxman Act,⁷⁸ killer acquisitions are made possible by patent exclusivity and regulatory requirements. Specifically, no other firm can directly rely on the clinical trial data generated by the target firm to reduce development costs or accelerate approval for a design-around drug; the differences in chemical structure

⁷¹ Pfizer Inc., F.T.C. Docket No. C-3957 (2000); Davis, *supra* note 64, at 692.

⁷² Pfizer Inc., F.T.C. Docket No. C-3957 (2000); Davis, *supra* note 64, at 692.

⁷³ See generally C. Scott Hemphill, *Paying for Delay: Pharmaceutical Patent Settlement as a Regulatory Design Problem*, 81 N.Y.U.L. REV. 1553 (2006).

⁷⁴ See *FTC v. Actavis*, 570 U.S. 136, 140-41 (2013) (defining reverse settlements).

⁷⁵ See Hemphill, *supra* note 70, at 1560.

⁷⁶ See *id.* at 1560; see also *Actavis*, 570 U.S. at 144.

⁷⁷ See Hemphill, *supra* note 70, at 1560-61.

⁷⁸ See *id.*

necessary to side-step patents force the potential entrant to conduct clinical trials from the ground up. The blocking patent's power is thus amplified by FDA regulations.

Nevertheless, for reasons similar to those outlined by the Supreme Court in the most authoritative decision on reverse settlements to date, *FTC v. Actavis*, 570 U.S. 136 (2013),⁷⁹ per se illegality is overkill for overlapping pharmaceutical acquisitions. Instead, courts and antitrust agencies should engage in rule-of-reason analysis to balance the potential pro-competitive and anti-competitive effects of overlapping acquisitions with killer potential, as discussed in Section III.B.ii below. Moreover, Section III.B.ii argues that courts should take more than a “quick look”⁸⁰ before condemning overlapping acquisitions due to the ambiguous welfare effects of even intentional killer acquisitions.

i. Consumer Harm and Killer Acquisitions

While the motivations underlying killer acquisitions are not new, courts have limited experience evaluating their anti-competitive potential, cautioning against adoption of a per se rule, or even abbreviated rule-of-reason (quick look) review. In *Actavis*, the Supreme Court reiterated that “abandonment of ‘the rule of reason’ in favor of presumptive rules (or a ‘quick look’ approach) is appropriate only where ‘an observer with even a rudimentary understanding of economics could conclude that the arrangements in question have an anti-competitive effect on customers and markets.’”⁸¹ The Court held that reverse settlements in which a pharmaceutical company pays a generic manufacturer as part of a patent infringement case did not clear this high bar because “the likelihood of a reverse payment bringing about anticompetitive effects depends upon its size, its scale in relation to the payor's anticipated future litigation costs, its independence from other services for which it might represent payment, and the lack of any other convincing justification.”⁸² Furthermore, the Supreme Court chose not to adopt an industry-specific antitrust approach even for the relatively unique pharmaceutical industry, stating that “[t]he existence and degree of any anticompetitive consequence may also vary as among industries” so “the FTC must prove its case as in other rule-of-reason cases.”⁸³ The Court reached this conclusion despite not-

⁷⁹ See *Actavis*, 570 U.S. at 158-60.

⁸⁰ See *id.* at 158-60 (briefly summarizing the “quick look” approach to antitrust review, which shifts the burden to the defendant to demonstrate procompetitive effects, and appropriate applications of this approach).

⁸¹ See *id.* at 159 (quoting *California Dental Ass'n v. FTC*, 526 U.S. 756, 770 (1999)).

⁸² *Id.*

⁸³ *Id.* at 159. However, as some scholars have noted, antitrust law in practice is often industry-specific. See Mark A. Lemley, *Industry-Specific Antitrust Policy for Innovation*, 2011 COLUM.

ing that “most if not all reverse payment settlement agreements arise in the context of pharmaceutical drug regulation.”⁸⁴

As discussed in Part II, overlapping acquisitions often involve colorable pro-competitive justifications, and most are not purely motivated by killer intent. Moreover, per se condemnation appears to be particularly inappropriate when the acquirer’s overlapping project is also under development. Drug discovery, after all, is a risky business, and an internal project will not produce any revenue until the FDA approves it. Entry into clinical trials is no guarantee of success, even for drugs that companies want to launch.⁸⁵

Cunningham and co-authors estimated that about thirteen additional drug projects per year would continue development if acquisitions of overlapping projects were banned and all overlapping projects had the same development likelihood as non-acquired projects.⁸⁶ In view of the low success rate for clinical candidates entering Phase I clinical trials, only a handful of the thirteen additional drug projects—as few as zero or one—would mature into marketed drugs capable of constraining the incumbent’s use (or abuse) of market power. In fact, given the low purchase prices for many prospective acquisitions, which presumably reflect market valuations of overlapping drugs, most killer acquisitions in the pharmaceutical industry likely impose no direct harm on consumers.⁸⁷

Moreover, not all FDA-approved drugs are created equal from a social welfare perspective, and many overlapping projects would exhibit similar therapeutic efficacy to approved treatments. In fact, many overlapping drugs would likely qualify as “me-too drugs,” a controversial subset of pharmaceutical innovation. While me-too drugs can be more effective than similar treatments in a subset of patients,⁸⁸ me-too drugs rarely

BUS. L. REV. 637, 648-51 (2011) (“This industry specificity results from the nature of antitrust, which—far more than patent law—is concerned with the particular economic characteristics of both the practice being regulated and the market in which the practice occurs.”).

⁸⁴ See *Actavis*, 570 U.S. at 141.

⁸⁵ Mark Kessel & Frederick S. Frank, *A Better Prescription for Drug-Development Financing*, 25 NATURE BIOTECHNOLOGY 859, 860 (2007).

⁸⁶ See Cunningham et al., *supra* note 14, at 49.

⁸⁷ As Cunningham et al. note, the effects of killer acquisitions on ex ante innovation incentives are difficult to tease out. See Cunningham et al., *supra* note 14, at 50-51. However, killer acquisitions—like all acquisitions—likely increase the odds of a profitable exit for smaller target firms. Moreover, if killer acquisitions provide earlier-than-average (Phase I) liquidation events, they may make it easier for smaller firms to access venture capital, which is notoriously focused on quick returns. See P. Lehoux et al., *How Does Venture Capital Operate in Medical Innovation?*, 2 BMJ INNOVATIONS 111, 112-14 (2016).

⁸⁸ Cf. Albert I. Wertheimer, Thomas M. Santella & Nichole M. Chaney, *The World Health Organization’s Essential Medicines List: An Endorsement of Incremental Innovation and Follow-On Research*, 17 J. PHARMACEUTICAL MARKETING & MGMT. 25, 29–30 (2011) (estimating that 81% of the medicines deemed essential by the WHO in 2003 were me-too products).

impose substantial price constraints,⁸⁹ although they can create more bargaining leverage for healthcare payors.⁹⁰ Nevertheless, critics contend that “the billions of dollars spent marketing me-too products could be spent in better ways, such as developing orphan drugs for rare diseases [because] these products add little to physicians’ arsenal, while driving up the costs of health care.”⁹¹ Me-too drugs, in other words, may be an expensive and ineffective method of controlling drug prices, albeit one that requires little intervention on the part of the federal government.

Allocative criticisms of me-too drugs are only justified if pharmaceutical companies are not funding all projects with expected positive returns, an assumption that is empirically disputed. Under one view of R&D expenditures, pharmaceutical companies direct their limited budgets to clinical candidates that promise the highest risk-adjusted reward at the lowest cost.⁹² If this view reflects reality, some potentially profitable drugs are not being developed. In that case, resources that would have been devoted to an overlapping drug could be reallocated to other potentially consumer-welfare enhancing drugs following project termination. However, some scholars believe that pharmaceutical companies already pursue all profitable projects.⁹³ Under this view, the loss of one developmental candidate due to a killer acquisition will not be compensated by new drug funding because all alternative profitable projects are adequately funded.⁹⁴

The empirical evidence is inconclusive. In the context of the Orphan Drug Act, which provides a package of regulatory and tax incentives to encourage the development of drugs for conditions affecting small patient populations, R&D spending as measured through tax returns remained relatively flat over a period of years while orphan drug credit claims dramatically increased.⁹⁵ Tax records suggest that firms reallocated R&D

⁸⁹ See Thomas H. Lee, “Me-Too” Products—Friend or Foe?, 350 NEW ENG. J. MED. 211, 211-12 (2004).

⁹⁰ Illustratively, competition between Gilead and AbbVie in the hepatitis C market resulted in more discounts and rebates for healthcare payors. See John LaMattina, *Impact of ‘Me-Too’ Drugs on Health Care Costs*, FORBES (Jan. 19, 2015, 8:33 AM EST), <https://www.forbes.com/sites/johnlamattina/2015/01/19/impact-of-me-too-drugs-on-health-care-costs/#44615ffd1c36>.

⁹¹ Lee, *supra* note 90, at 211. These critics typically criticize me-too innovation as incremental at best and expensive in any case.

⁹² See Sean Nicholson, *Financing Research and Development*, in THE OXFORD HANDBOOK OF THE ECONOMICS OF THE BIOPHARMACEUTICAL INDUSTRY 47, 61 (Patricia M. Danzon & Sean Nicholson eds., 2012).

⁹³ See Roin, *supra* note 45, at 551.

⁹⁴ See *id.* (“The R&D side of the pharmaceutical industry is highly competitive, and firms should be expected to pursue all drug candidates with anticipated net positive returns, not just the drugs with the highest anticipated net returns.”) (citations omitted).

⁹⁵ See U.S. GOV’T ACCOUNTABILITY OFFICE, GAO-18-40, DRUG INDUSTRY: PROFITS, RESEARCH AND DEVELOPMENT SPENDING, AND MERGER AND ACQUISITION DEALS 28 (2017), <https://www.gao.gov/products/GAO-18-40>.

funding in response to the new incentives, rather than increasing total R&D spending due to an expansion in the number of potentially profitable projects.⁹⁶ However, a study by Blume-Kohout and Sood found that the introduction of Medicare Part D increased R&D spending on drugs with large market shares for patients over 65, without reducing the amount invested in other drugs.⁹⁷

Accordingly, the much-discussed assertion that “patient mortality, consumer surplus, and technological spillovers are all likely negatively affected by killer acquisitions” may be too strong.⁹⁸ Based on Cunningham, Ederer, and Ma’s estimates, killer acquisitions bury one or two (likely me-too) drugs that would otherwise enter the market each year. Given how ineffective me-too drugs generally are at constraining drug costs, patients may not be paying much more for their reduced options. Additionally, patient mortality, consumer surplus, and technological spillovers could be positively affected by these burials if the funds that otherwise would have been spent developing and marketing a me-too drug are instead directed to indications with greater unmet need. Although target firms could also redirect funding if they had enough non-committed capital and expertise, making the acquisition wasteful, established incumbents may be better positioned to change direction than originators with small pipelines and smaller war chests.⁹⁹

Between the extremes of rule-of-reason analysis and per se illegality, other options exist for evaluating overlapping acquisitions. However, given the challenges associated with identifying killer intent at the time of acquisition, these options would likely increase the costs of all overlapping acquisitions without substantially reducing the number of killer acquisitions. For example, in 2018, the European Commission’s chief competition economist suggested that shifting the burden of proof onto acquirers to prove the efficiencies of their acquisitions could deter killer acquisitions.¹⁰⁰ But for pharmaceutical acquisitions—particularly acquisitions where overlap occurs purely in innovation markets with no market-

⁹⁶ *See id.*

⁹⁷ See Margaret E. Blume-Kohout & Neeraj Sood, *Market Size and Innovation: Effects of Medicare Part D on Pharmaceutical Research and Development*, 97 J. PUB. ECON. 327, 328, 334-35 (2013).

⁹⁸ See Cunningham et al., *supra* note 14, at 50.

⁹⁹ Most firms originating new drugs originated two or fewer drugs between 1989 and 2010, suggesting that many target firms have small pipelines and potentially few redirect options. See Cunningham et al., *supra* note 14, at 64 fig.5. Moreover, “when a risk appears, biotechnology firm stock valuations (reflecting their underlying intangible assets’ values) suffer even more than pharmaceutical stock prices,” suggesting that certain firm types may be better positioned than others to pivot in response to changing circumstances. See Golec & Vernon, *supra* note 21, at 17.

¹⁰⁰ See Janith Aranze, *DG Comp Chief Economist: Reverse Burden of Proof to Catch Killer Acquisitions*, GLOBAL COMPETITION REV. (Nov. 20, 2018), <https://globalcompetitionreview.com/article/1177095/dg-comp-chief-economist-reverse-burden-of-proof-to-catch-killer-acquisitions>.

ed products—even firms intentionally acquiring to kill may be able to present enough evidence of colorable efficiencies to evade condemnation, while raising compliance costs for all. These compliance costs may be passed onto consumers, imposing a separate harm to consumer welfare.¹⁰¹ Worse, heightened enforcement costs may slow time to market for legitimate acquisitions or prevent some acquisitions altogether, reducing treatment options and potentially affecting patient quality of life. Illustratively, the merger between Pharmacia and Upjohn, two pharmaceutical companies with largely complementary products and geographic reach, was delayed by the FTC due to concerns about the post-merger development of 9-AC, an overlapping drug candidate for treating solid tumors.¹⁰² While the merger went forward on the condition that the combined company divest 9-AC U.S. assets,¹⁰³ 9-AC ultimately showed insufficient efficacy in Phase II clinical trials to justify its continued development.¹⁰⁴

Similarly, declaring lump sum acquisitions by overlapping firms per se illegal while allowing upfront payments with future milestone payments might discourage killer acquisitions through reputation effects; because the possibility of a bad faith milestone miss could cause overlapping targets to apply a higher discount rate to milestone payments, overlapping firms suspected of killer acquisitions should be forced to pay more for every overlapping drug. However, given the low incidence of killer acquisitions and the small chance of any pipeline drug obtaining FDA approval, requiring different acquisition structures may interfere with legitimate acquisitions and dampen ex ante innovation incentives by reducing buyer-side demand in innovation markets. Therefore, barring better methods of identifying acquisitions with killer characteristics, increased enforcement costs and the heightened risk of false negatives (i.e., legitimate overlapping acquisitions not occurring due to errors and increased costs) caution against adopting an intermediate option.

ii. Killer Acquisitions Under the Rule of Reason

Although it may be difficult to prove a killer acquisition or establish anti-competitive effects, killer acquisitions could still face censure under

¹⁰¹ See Dustin Chambers, Courtney Collins & Alan Krause, *How Do Federal Regulations Affect Consumer Prices? An Analysis of the Regressive Effects of Regulation*, 180 PUB. CHOICE 57, 59 (2019) (finding that “growth in federal regulations is associated with higher consumer prices overall”).

¹⁰² See Eleanor J. Morgan, *Innovation and Merger Decisions in the Pharmaceutical Industry*, 19 REV. IND. ORG. 181, 186-87 (2001) (summarizing the responses of American and European anti-trust authorities to the planned merger).

¹⁰³ See *id.*

¹⁰⁴ See generally Chris H. Takimoto & Rebecca Thomas, *The Clinical Development of 9-Aminocamptothecin*, 922 ANNALS N.Y. ACAD. SCI. 224 (2000) (discussing the history of 9-AC, including its ultimate termination by new rights holder IDEC Pharmaceutical Corporation).

traditional rule-of-reason review. Illustratively, the FTC challenged Questcor's (now a subsidiary of Mallinckrodt) acquisition of U.S. development rights to Synacthen Depot, a synthetic competitor to its adrenocorticotrophic hormone drug Acthar, in 2013 for a below-threshold acquisition price.¹⁰⁵ At the time, Acthar was the only FDA-approved adrenocorticotrophic hormone drug in the United States¹⁰⁶ but lacked patent protection,¹⁰⁷ satisfying only one of the primary two criterion (*i.e.*, low market competition and overlapping product far from patent protection) that Cunningham and co-authors identified for killer acquisitions.¹⁰⁸ At the time of acquisition, Synacthen Depot was approved for use in Europe and Canada, but not the United States.¹⁰⁹ However, Questcor "consider[ed] the drugs so similar that it submitted Synacthen information to support its application to the U.S. Food and Drug Administration (FDA) to expand the label indications for Acthar and cited Synacthen studies in its Acthar marketing materials,"¹¹⁰ evincing a high likelihood that Synacthen could obtain FDA approval for Acthar's indications if someone performed the necessary clinical trials.

As the FTC noted in its Complaint, "Questcor claimed that it acquired Synacthen to develop it for new, non-Acthar indications, but given the drugs' similarities, any therapeutic indication that Questcor pursues with Synacthen could have been pursued with Acthar."¹¹¹ Moreover, when Questcor sought exclusive rights to develop, market, and sell Synacthen, it did not include detailed development plans in its offer or conduct extensive due diligence before submitting an offer to Novartis,¹¹² cutting against acquiring to continue given its experience and information advantages with respect to adrenocorticotrophic hormone drugs.

The FTC's Complaint was never litigated, but Retrophin, one of the firms Questcor outbid for Synacthen, filed an antitrust suit alleging the acquisition violated Sections 1 and 2 of the Sherman Act and Section 7 of

¹⁰⁵ See Cunningham, *supra* note 14, at 1.

¹⁰⁶ See Complaint at 8-9, FTC v. Mallinckrodt ARD Inc., No. 1:17-cv-00120 (D.D.C. Jan. 18, 2017).

¹⁰⁷ See Mallinckrodt, Annual Report (Form 10-K) (Sept. 26, 2014), <https://www.sec.gov/Archives/edgar/data/1567892/000156789214000040/mnk10-k92614.htm>. ("Acthar is not subject to patent or other exclusivity, with the exception of IS which was granted orphan drug status from the FDA upon its approval in October 2010. Acthar's commercial durability therefore relies partially upon product formulation trade secrets, confidentiality agreements and trademark and copyright laws.")

¹⁰⁸ Formulation challenges posed a formidable entry barrier for potential generic competitors. *See id.*

¹⁰⁹ See Complaint, *supra* note 107, at 6, 8.

¹¹⁰ *See id.* at 3.

¹¹¹ *Id.* at 12.

¹¹² *Id.* at 10-11.

the Clayton Act.¹¹³ In rejecting Questcor's Motion to Dismiss, the district court examined the pled facts under traditional monopolization frameworks and determined that "there [was] no alleged procompetitive aspect to the challenged conduct" and "the necessity of FDA approval under [the] circumstances [did] not render the alleged harm too speculative."¹¹⁴ Questcor later settled with both the FTC and Retrophin.¹¹⁵ The FTC also ordered Questcor to "grant a license to develop Synacthen Depot to treat infantile spasms and nephrotic syndrome to a licensee approved by the Commission,"¹¹⁶ which Questcor did in 2017.¹¹⁷

While traditional antitrust litigation ultimately identified and unwound Questcor's killer acquisition, the firm probably profited from the transaction, with \$1.037 billion in net sales of Acthar in 2015 alone¹¹⁸ compared to net settlement costs in the low \$100 million range. Clinical trials for Synacthen were also delayed by several years, postponing competition and market pressure on Acthar pricing. But Synacthen's facts are exceptional—with sky-high prices on a hard-to-manufacture specialty drug, an overlapping drug long-approved in Europe, and a lost bidding war with a litigious competitor. Bad facts make bad law, and attempting broader pre-acquisition review for overlapping acquisitions to catch the next Synacthen would strain the FTC's limited resources without high odds of uncovering many (or any) transactions as blatantly anti-competitive as Questcor's.¹¹⁹

¹¹³ See *Retrophin, Inc. v. Questcor Pharm., Inc.*, 41 F. Supp. 3d 906, 912 (C.D. Cal. 2014). Synacthen presents the unusual case of an outbid competitor filing a private antitrust action, which may reflect a combination of egregious facts, including an 85,000% price hike for Acthar since 2001, a large and profitable market for a successful new entrant, and the personality of then-Retrophin CEO Martin Shkreli.

¹¹⁴ See *id.* at 913, 915. The district court also noted that Questcor had not met its burden of asserting a business justification for the acquisition. See *id.* at 918.

¹¹⁵ See Dan Mangan, *Mallinckrodt to Pay \$100 million to Settle FTC, State Charges on Antitrust Violations Linked to Martin Shkreli-Backed Lawsuit*, CNBC (Jan. 18, 2017, 6:24 PM EST), <https://www.cnbc.com/2017/01/18/mallinckrodt-reaches-settlement-with-ftc-on-probe-linked-to-martin-shkreli-backed-lawsuit.html>.

¹¹⁶ See *Mallinckrodt Will Pay \$100 Million to Settle FTC, State Charges It Illegally Maintained Its Monopoly of Specialty Drug Used to Treat Infants*, FED. TRADE COMM'N (Jan. 18, 2017), <https://www.ftc.gov/news-events/press-releases/2017/01/mallinckrodt-will-pay-100-million-settle-ftc-state-charges-it>.

¹¹⁷ See *FTC Approves Sublicense for Synacthen Depot Submitted by Mallinckrodt ARD Inc.*, FED. TRADE COMM'N (July 14, 2017) (<https://www.ftc.gov/news-events/press-releases/2017/07/ftc-approves-sublicense-synacthen-depot-submitted-mallinckrodt>).

¹¹⁸ See *Mallinckrodt PLC Reports Financial Results for Fiscal 2015 Fourth Quarter and Full Year*, CISION: PR NEWSWIRE (Nov. 23, 2015) (<https://www.prnewswire.com/news-releases/mallinckrodt-plc-reports-financial-results-for-fiscal-2015-fourth-quarter-and-full-year-300183027.html>).

¹¹⁹ Questcor's acquisition evaded review in part because the licensor Novartis retained some manufacturing rights. See Andrew Pollack, *Questcor Pays \$135 Million to Acquire Rights to a Competitor's Drug*, N.Y. TIMES (June 14, 2013), <https://www.nytimes.com/2013/06/15/business/questcor-pays-135-million-for-rights-to-competitors-drug.html>. In November 2013, the FTC expanded the scope of pharmaceutical li-

IV. Killer Acquisitions Across Industries

While Cunningham, Ederer, and Ma's working paper focuses on the pharmaceutical industry, fear of market cannibalization is not industry-specific. However, killer acquisitions may be more common in the pharmaceutical industry because the regulatory environment makes it effectively impossible to enter the market until an innovative firm's patents covering a drug have expired. In addition, me-too drugs, which function as patent design-arounds in some cases, are very expensive to develop relative to design-arounds in other industries because the bulk of the R&D costs are related to regulatory approval, not early-stage product development. As a result, incumbents weighing a killer acquisition can be more confident than firms in other industries that the deal will not be the first of many in a game of a whack-a-mole.

Furthermore, the profit protection effect may be smaller in faster-moving, service-oriented industries, reducing the number of rational killer acquisitions. For example, in the rapidly evolving tech industry, product life-cycles tend to be shorter, and patents provide less effective protection against competition. Therefore, the profit at risk due to an overlapping technology is likely lower, and the protection against competition less certain and permanent. Additionally, a tech company may be better positioned to integrate at least some aspects of an overlapping technology into its next product iteration, which will not be subjected to protracted pre-launch regulatory review. Tech companies are also more likely to engage in acquisitions to gain access to human capital that they can redeploy to other projects, a phenomenon common enough to earn a nickname: *acqui-hiring*.¹²⁰ Therefore, while many acquisitions in the tech space may be motivated by anti-competitive aims, it is not clear how many tech acquirers intend to bury innovations, rather than innovative competitors. Acquisitions intended to kill competitors, rather than competing innovations, directly implicate market structure concerns and fit

censing transactions subject to pre-merger review to include those in which licensors retain limited manufacturing rights or co-rights, which might drive down acquisition prices. *See* FTC Finalizes Amendments to the Premerger Notification Rules Related to the Transfer of Exclusive Patent Rights in the Pharmaceutical Industry, FED. TRADE COMM'N (Nov. 6, 2013) (<https://www.ftc.gov/news-events/press-releases/2013/11/ftc-finalizes-amendments-premerger-notification-rules-related>). Granting the FTC more power to halt announced but unconsummated mergers below the review threshold could ameliorate some of the harm associated with definitional oversights in the future as Questcor reached the FTC's radar before the "scrambled eggs" stage of M&A.

¹²⁰ *See* Jackson Burke, *Have Job, Will Buy Your Firm: Tech's 'Acqui-Hire' Trend*, CNBC (Nov. 9, 2014, 12:00 PM EST), <https://www.cnbc.com/2014/11/07/have-job-will-buy-your-firm-techs-acqui-hire-trend.html> ("In recent months, some investors and observers have taken aim at 'acqui-hiries' [sic]—wherein a big company buys a start-up for the sake of raiding its talent. Major tech players argue that buying smaller firms helps to blunt the dreaded 'brain drain' effect that sees employees jump ship to other companies—or even become future competitors.").

more cleanly within the classical antitrust canon. Thus, more vigorous enforcement, rather than new frameworks, may be sufficient to mitigate long-term harm to consumers.¹²¹

Nevertheless, technologies that share certain key features with pharmaceuticals—strong intellectual-property protection, long product life-cycles, and low cross-elasticity of demand—may be similarly vulnerable to killer acquisitions. Illustratively, competing standards may promote killer acquisitions as companies jockey to position their technology for standard status. Once a technology is incorporated into a standard, a company's patents covering the standard increase in value, and the value increase persists until the patents expire or the standard is abandoned. Moreover, because switching costs tend to be higher after a standard is adopted, cross-elasticity of demand between substitutes is reduced relative to a but-for world. Similarly, competing technology platforms may motivate killer acquisitions because network effects extend product life-cycles and reduce cross-elasticity of demand. Thus, an acquiring firm can increase the value of its overlapping product by capturing consumers. Arguably, Broadcom's attempted acquisition of Qualcomm, which was blocked due to concerns about the merger's potential effects on U.S.-based development of 5G technologies, fell into this category.¹²²

V. Conclusion

Intentionally killing competing innovations to protect existing product markets runs counter to the goals of both federal intellectual property law and antitrust law. But many overlapping acquisitions are not killer acquisitions, and these acquisitions may promote dynamic efficiency, or at least cause no net harm to consumers. Accordingly, heightened antitrust scrutiny of overlapping transactions—in the form of per se condemnation, quick look review, or reduced administrative review thresholds—would increase transaction costs without producing significant welfare gains for consumers relative to rule-of-reason review. Some anti-competitive mischief may sneak through under the rule of reason, but current evidence does not suggest that many firms are committing murder—at least where social welfare is concerned.

¹²¹ See generally A. Douglas Melamed & Nicolas Petit, *Before "After Consumer Welfare" – A Response to Professor Wu*, Competition Pol'y Int'l 9 (2018), <https://www.competitionpolicyinternational.com/wp-content/uploads/2018/07/North-America-Column-July-Full.pdf> (arguing that the call for abandoning the consumer welfare paradigm in antitrust law rests on a misunderstanding of the law).

¹²² See Josh Horwitz, *Trump Just Blocked What Would Have Been the Largest Tech Acquisition Ever—Because China*, QUARTZ (Mar. 13, 2018), <https://qz.com/1227509/trump-just-blocked-broadcoms-attempt-to-buy-qualcomm-because-china/>.