COMPETITION AND RISK

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INTRODUCTION

U.S. antitrust enforcement agencies have overlooked a significant competition harm: increasing risk. By risk, I mean the expected value of harm to third parties stemming from an unexpected supply or demand shock. Mergers can increase risk (and reduce resilience) both directly to merging parties' trading partners and to society as a whole. By reducing competition, mergers can influence the odds and importance of key disruptions, such as prescription drug and hospital bed shortages, transportation stoppages, and curtailed credit. There is now powerful evidence that negative shocks to individual firms can harm their trading partners and cascade through society more broadly. But until recently, the agencies ignored risk effects in merger review entirely.

Risk is a natural concern of the antitrust laws. Shortages and supply disruptions reduce output, increase prices, and limit customer choice. For these reasons mergers that increase risk can and often should be blocked under the Clayton Act. To show how the agencies should weigh risk effects, I analyze when and to what degree mergers are likely to change risk. Important factors include market power, customer exposure, firm size, economic centrality, and differentiated production techniques.

The relationship between competition and risk should lead the antitrust agencies to change merger policy in three main ways. First, the agencies should move to block mergers projected to increase risk significantly even when that is a merger's main or only predicted anticompetitive effect. Mergers that threaten to eliminate firms with idiosyncratic production techniques—production mavericks—are especially concerning on these grounds. Second, the agencies should consider risk when evaluating purported cost-cutting efficiencies, such as closing redundant factories, because achieving such efficiencies may in some cases increase risk. Finally, when exercising investigative and enforcement

discretion, the agencies should focus on those mergers that would likely increase systemic risk by creating especially large or economically central firms.

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In 2015, the first- and third-largest manufacturers of generic prescription drugs in the United States, Teva and Allergan Generics, merged in a $40.5 billion deal that left Teva with more than a fifth of U.S. generic drug sales in its hands.[1] The combined company sold more than 720 drugs, a portfolio more than 50% larger than either party pre-merger, and far larger than the distant third competitor.[2] The FTC scrutinized the deal for compliance with the Clayton Act, and eventually cleared it after the merging parties agreed to divest almost 80 drug lines in which they had substantial competitive overlap.[3]

The merger soon proved disastrous. Teva had funded the acquisition with billions of dollars in debt, and when generic drug prices declined shortly after the deal closed, the merged company had to take drastic action to avoid bankruptcy.[4] It announced plans to close half of the combined firms' factories, slash drug production, and raise prices on many of its remaining therapies.[5]

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[1] *See Statement of the Federal Trade Commission in the Matter of Teva Pharmaceuticals Industries Ltd. and Allergan PLC*, FED. TRADE COMM'N (July 27, 2016), https://www.ftc.gov/system/files/documents/public_statements/973673/160727tevaallergan-statement.pdf [hereinafter *FTC Teva-Allergan Statement*], at 1-2; Lisa Beilfuss, *Teva, Allergan Get FTC Approval for Generics Purchase*, WALL ST. J. (July 27, 2016), https://www.wsj.com/articles/teva-allergan-get-ftc-approval-for-generics-purchase-1469647293.

[2] *See* John Kwoka, *Merger Remedies: An Incentives/Constraints Framework*, 62 ANTITRUST BULL. 367, 378 (2017).

[3] *See FTC Teva-Allergan Statement*, *supra* note 1, at 1.

[4] Prices likely fell because a generic drug cartel including Teva and Allergan fell apart at around this time. *See* Amanda Starc & Thomas G. Wollmann, *Does Entry Remedy Collusion? Evidence from the Generic Prescription Drug Cartel* (Becker-Friedman Institute Working Paper No. 2022-49, 2022), https://bfi.uchicago.edu/wp-content/uploads/2022/04/BFI_WP_2022-49.pdf; Emily Cuddy, *Competition and Collusion in the Generic Drug Market* (working paper 2020), https://static1.squarespace.com/static/5f57bfb37f569217dfb7996b/t/5fcfc9214e616b4e3eb04212/1607452967911/cuddy_JMP.pdf.

[5] *Teva Pharmaceutical Industries Ltd at JPMorgan Healthcare Conference*, THOMPSON REUTERS (Jan. 8, 2018) http://phx.corporate-ir.net/External.File?t=1&item=VHlwZT0yfFBhcmVudElEPTUyNjcwNDV8Q2hpbGRJRD02ODY0OTg=, at 3 ("Today we have 80 [manufacturing] sites in total . . . we will be moving from these 80 towards a more sustainable level that will probably [be] around half the number of sites in [the] longer term."); *Teva Pharmaceutical Industries Ltd Earnings Call*, THOMPSON REUTERS (May 3, 2018) http://phx.corporate-ir.net/External.File?t=1&item=VHlwZT0yfFBhcmVudElEPTUyNzA3OTR8Q2hpbGRJRD02OTMzNTE=, at 9 (Among less profitable products for the firm, "[a]bout 80% of the products

These exits have real consequences for consumers. According to the U.S. Government Accountability Office, a decrease in suppliers over the prior two years is the single most important variable in explaining drug shortages, which in turn typically lead to significant price increases.[6] Prior shortages have also been associated with increased mortality for patients who must receive alternative medicines.[7] Among the drugs Teva stopped producing in 2019 was a sedative used to manage patients on ventilators, which went into shortage soon after Covid-19 struck the United States, and a pediatric oncology drug with no known substitutes that physicians were forced to ration for lack of supply.[8]

Even today, almost a decade after the merger, Teva continues to stagger under its debt burden. In 2023, the company announced a new round of

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we will get out of . . . and about 20% of the products, we will see an increase in price on."). These changes are continuing apace. *See Pivot to Growth*, TEVA (May 18, 2023), https://s24.q4cdn.com/720828402/files/doc_presentations/2023/May/Teva-Investor-Day-presentation_May-18_V_Final.pdf, at 23 (investor presentation); Daniel Gilbert, *How Troubles at a Factory in India Led to a U.S. Cancer-Drug Shortage*, WASH. POST (June 27, 2023), https://www.washingtonpost.com/business/2023/06/27/cancer-drug-shortage-generics/.

[6] U.S. GOV'T ACCOUNTABILITY OFFICE, GAO-16-595, DRUG SHORTAGES: CERTAIN FACTORS ARE STRONGLY ASSOCIATED WITH THIS PERSISTENT PUBLIC HEALTH CHALLENGE 37 (2016), https://www.gao.gov/assets/680/678281.pdf; ANDREW W. MULCAHY ET AL., IMPACT OF DRUG SHORTAGES ON CONSUMER COSTS 26, RAND CORP. (May 2023), https://aspe.hhs.gov/sites/default/files/documents/491a33fe0dcbbaa520a2ed28e81ab88d/mulcahy-drug-shortages.pdf (finding that generic drugs in shortage experienced a median 14.6% price increase in the month after the onset of the shortage).

[7] *See* Emily Vail et al., *Association Between US Norepinephrine Shortage and Mortality Among Patients with Septic Shock*, 317 JAMA 1433, 1433 (2017) ("Among patients with septic shock in US hospitals affected by the 2011 norepinephrine shortage, the most commonly administered alternative vasopressor was phenylephrine. Patients admitted to these hospitals during times of shortage had higher in-hospital mortality."); Jonathan Minh Phuong et al., *The Impacts of Medication Shortages on Patient Outcomes: A Scoping Review*, 14 PLOS ONE E1, 4 (2019) ("Clinical outcomes due to medication shortages were reported in 38 studies . . . Mortality was reported in 16 studies. Of these, ten reported increased mortality." (citations omitted)).

[8] Ed Silverman, *A New Covid-19 Problem: Shortages of Medicines Needed for Placing Patients on Ventilators*, STAT (Mar. 31, 2020), https://www.statnews.com/pharmalot/2020/03/31/a-new-covid-19-problem-shortages-of-medicines-needed-for-placing-patients-on-ventilators/; Owen Dyer, *US Paediatric Oncologists Are Forced to Prioritise Patients for Vincristine Treatment as Supplies Run Short*, 367 BMJ E1 (2019) (quoting one physician as stating that the drug in shortage, "[v]incristine[,] is our water. It's our bread and butter. I can't think of a disease in childhood cancer that doesn't use vincristine. There is no substitute that can be recommended. You either have to skip a dose or give a lower dose—or beg, borrow, or plead"); *see also id.* (tracing the shortage to Teva's decision to cease production).

manufacturing cuts, along with plans to permanently reduce the number of generic drugs it will produce in the future.[9]

Permitting this merger was reasonable under the agencies' 2010 Horizontal Merger Guidelines, which gave significant credence to merger-specific cost-cutting efficiencies and was most concerned with mergers that further concentrate uncompetitive markets.[10] The FTC did its job scrupulously, requiring the manufacturers to divest many drug lines in which they directly competed or were likely to compete in the near future.[11] And Teva could point to substantial cost-saving efficiencies that were highly valued by the agencies, such as shutting down separate factories making similar goods.[12]

Yet as they approved the merger, antitrust officials failed to consider how the deal would affect customers in the event of a shock. As they generally do, the agencies analyzed the merger on the assumption that business as usual would continue indefinitely after the transaction, without considering low probability but highly consequential events.[13] In this case, by reducing spare capacity, concentrating customers' exposure to its idiosyncrasies, and eliminating each firm as a potential competitor to the other in lines that were not divested, the Teva-Allergan combination made shocks to the combined firms more painful for customers and the economy at large. Because Teva suffered an idiosyncratic blow soon after the merger, the deal ultimately harmed customers by subjecting them to shortages, price increases, and reduced competitive choice across the range of the integrated firm's portfolio.

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[9] *See* Ike Swetlitz, *Teva Plans Cuts to Generic Drug Production Amid Shortages*, BLOOMBERG NEWS (May 18, 2023), https://www.bloomberg.com/news/articles/2023-05-18/teva-plans-cuts-to-generic-drug-production-amid-shortages#xj4y7vzkg.

[10] *See* U.S. DEP'T OF JUST. & FED. TRADE COMM'N, 2010 HORIZONTAL MERGER GUIDELINES (2010), at §§ 5.3, 10, https://www.ftc.gov/sites/default/files/attachments/merger-review/100819hmg.pdf [hereinafter 2010 MERGER GUIDELINES].

[11] *See FTC Teva-Allergan Statement*, *supra* note 1, at 1. The FTC even took the unusual step of examining whether the merger would allow the merged firm to act anticompetitively in the future by bundling its products and excluding rivals. *See id*. at 2-3.

[12] *See* Press Release, Teva to Acquire Allergan Generics for $40.5 Billion Creating a Transformative Generics and Specialty Company Well Positioned to Win in Global Healthcare (July 27, 2015), https://www.businesswire.com/news/home/20150727005471/en/Teva-Acquire-Allergan-Generics-40.5-Billion-Creating; 2010 MERGER GUIDELINES, *supra* note 10, at § 10 ("[E]fficiencies resulting from shifting production among facilities formerly owned separately, which enable the merging firms to reduce the incremental cost of production, are more likely to be susceptible to verification and are less likely to result from anticompetitive reductions in output.").

[13] *See* Steven C. Salop & Fiona Scott Morton, *The 2010 HMGs Ten Years Later: Where Do We Go From Here?*, 58 REV. INDUSTRIAL ORG. 81, 96-97 (2021); *see also id*. (discussing a working paper version of this Article).

This example is not unique. As I show in this Article, mergers that increase customer dependency on a single or small number of firms can increase direct risk—risk affecting immediate trading partners—and systemic risk—risk affecting society more broadly. There is substantial evidence that firms transmit negative shocks to customers and to society at large, and that this effect is mediated in part by competition.[14] These effects are larger, on average, when a shocked firm has greater market power, although this result is likely mitigated to some degree because larger firms, and those with market power, are less subject to negative shocks.[15] Firms also face greater risk when they rely on one or a small number of trading partners for a large share of their total purchases or sales across products.[16] (In what follows, I often use "customers" as a shorthand for trading partners, i.e., suppliers, workers, and purchasers.)

Risk is a natural concern under the antitrust laws. Section 7 of the Clayton Act bars mergers when the "effect of such acquisition . . . may be substantially to lessen competition, or to tend to create a monopoly."[17] Like a forecast of increased price or reduced output, a prediction that a merger will increase risk can indicate that the merger will substantially lessen competition.[18] Mergers can increase risk by reducing the ability of the merged firms' customers to diversify and by reducing the incentive to invest in resiliency (i.e., to take measures that will reduce risk). Increased risk can be thought of as an *average* increase in future prices when weighing the consequences of future shocks. Supply shortages are effectively price hikes because they prevent customers from securing goods or services they want either at any price or for less than an exorbitant price.[19] Thus, like other harms caused by competition-suppressing

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[14] *See infra* Sections I.B-I.C.

[15] *See infra* Section I.B.i.

[16] *See infra* Section I.B.ii.

[17] 15 U.S.C. § 18.

[18] *See infra* Part II.

[19] *See, e.g.*, David L. Hummels & Georg Shauer, *Trade as Time Barrier*, 103 AMER. ECON. REV. 2935, 2935 (2013) (estimating, using data on U.S. imports, that "each day in transit is equivalent to an ad-valorem tariff of 0.6 to 2.1 percent"); MULCAHY ET AL., *supra* note 6 (estimating average price increases following generic drug shortages). Shortages can also significantly reduce output. One recent study modeled increases in international delivery times such as those seen in the United States during the Covid-19 crisis, and found that firms "optimally raise prices" and "output in the traded goods sector [falls] by 8.4% on impact." *See* George Alessandria et al., *The Aggregate Effects of Global and Local Supply Chain Disruptions: 2020–2022*, J. INT. ECON. at E2 (in press 2023).

mergers, increased risk falls squarely within Section 7's concerns and can be analyzed by courts under existing caselaw.[20]

As a legal matter, increased risk should be actionable under Section 7. But practically integrating risk analysis into merger review is no simple task because the relationship between competition and risk is empirically complex.[21] On the one hand, shocks to firms facing limited competition are especially harmful because trading partners have few options to turn to, or rely on the merged firm for many products or services. Competition also often induces firms to guard against disruptions in order to gain market share or increase prices during a crisis. On the other hand, firms facing limited competition are generally less likely to be disrupted by shocks insofar as their higher profits give them greater incentive and ability to invest in resilience.

Because competition has cross-cutting effects on risk, I show how the antitrust agencies can focus on mergers that pose the clearest danger of increasing risk, and which do so in ways enforcers can most readily analyze.[22] The agencies should pay special heed to mergers that threaten production mavericks—firms that produce goods or services using differentiated processes—and those that significantly increase customer exposure to a particular firm across multiple products or services in which the merged entity has market power. Enforcers should also, when analyzing merger efficiencies, consider whether such cost-cutting measures will increase risk. In such cases, the agencies should consider not only a merger's projected effect on prices in the short run, but also the possibility of shortages and higher prices in the future. Finally, when setting enforcement priorities among anticompetitive mergers, the agencies can choose to focus on mergers that are forecast to have large effects on risk over similarly anticompetitive mergers that lack such concerns.

Enforcers should be especially interested in risk analysis now, after the supply-chain snarls—and resulting surge in inflation—caused by the Covid-19

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[20] On related discussions concerning wage suppression as antitrust harm see, e.g., Eric A. Posner et al., *Antitrust Remedies for Labor Market Power*, 132 HARV. L. REV. 536 (2018); Ioana Marinescu & Eric A. Posner, *Why Has Antitrust Law Failed Workers?*, 105 CORNELL L. REV. 1343 (2020).

[21] *See infra* Section I.B. Moreover, as Rebecca Allensworth has argued, balancing antitrust harms when they conflict—for example, if decreased short-term price comes at the cost of increased risk—is far from straightforward. *See* Rebecca Haw Allensworth, *The Commensurability Myth in Antitrust*, 69 VANDERBILT L. REV. 1, 6–7 (2016). *See also* Niels J. Rosenquist et al., *Addictive Technology and Its Implications for Antitrust Enforcement*, 100 N.C. L. REV. 431, 465–72 (2022) (discussing the challenges of measuring consumer welfare in industries with addictive goods); Daniel A. Crane, *Harmful Output in the Antitrust Domain: Lessons from the Tobacco Settlement*, 39 GA. L. REV. 321 (2005).

[22] *See infra* Part III.

pandemic and the Russia-Ukraine war. Nor are these concerns likely to go away amid mounting tension between the United States and China, and projected increases in climate-change induced natural disasters.[23]

These events have already caused the agencies to start thinking more carefully about the relationship between competition and risk.[24] In December 2023, the DOJ and FTC noted in their revised Merger Guidelines that when a merger is projected to reduce output or capacity, this "may affect the market's resilience in the face of future shocks to supply or demand, and the Agencies will consider this loss of resilience in assessing whether the merger" may be unlawful.[25]

This revision to the Merger Guidelines is an important step. But it provides little guidance as to how the agencies will change their approach in light of risk. The agencies have long said that mergers tending to increase the merged parties' incentive to cut output or capacity pose serious competition concerns.[26] How does considering resilience change that analysis? What is more, because the Merger Guidelines are staking out many novel positions, courts may give them less credence than they have traditionally assigned to the Guidelines.[27] If courts are to take risk effects seriously, they will need some convincing. And if the agencies are to rigorously analyze how mergers affect resilience, they will need

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[23] *See* Gloria Oladipo, *US Sets New Record for Billion-Dollar Climate Disasters in Single Year*, GUARDIAN (Sept. 11, 2023), https://www.theguardian.com/environment/2023/sep/11/us-record-billion-dollar-climate-disasters; Eduardo Baptista & Joe Cash, *China Hits Back at West's De-Risking Strategy at Supply Chain* Expo, REUTERS (Nov. 28, 2023), https://www.reuters.com/world/china-says-against-supply-chain-decoupling-wants-closer-ties-with-all-2023-11-28/.

[24] *See, e.g.*, *FTC Launches Inquiry into Supply Chain Disruptions*, FED. TRADE COMM'N (2021), https://www.ftc.gov/news-events/news/press-releases/2021/11/ftc-launches-inquiry-supply-chain-disruptions; *Assistant Attorney General Jonathan Kanter Delivers Remarks at New York City Bar Association's Milton Handler Lecture*, U.S. DEP'T OF JUST. (2022), https://www.justice.gov/opa/speech/assistant-attorney-general-jonathan-kanter-delivers-remarks-new-york-city-bar-association ("Our markets are suffering from a lack of resiliency . . . . Competitive markets create resiliency."); Jim Tankersley & Alan Rappeport, *As Prices Rise, Biden Turns to Antitrust Enforcers*, N.Y. TIMES (Dec. 25, 2021), https://www.nytimes.com/2021/12/25/business/biden-inflation.html.

[25] *See* U.S. DEP'T OF JUST. & FED. TRADE COMM'N, MERGER GUIDELINES (2023), at § 4.2.D, https://www.justice.gov/d9/2023-12/2023%20Merger%20Guidelines.pdf [Hereinafter 2023 MERGER GUIDELINES]. *See also id.* at § 1 ("Competition is a process of rivalry that incentivizes businesses to offer lower prices, improve wages and working conditions, *enhance quality and resiliency*, innovate, and expand choice, among many other benefits." (emphasis added)).

[26] *See, e.g.*, 2010 MERGER GUIDELINES, *supra* note 10, at §§ 6.3, 10.

[27] *See* Daniel Francis, *Revisiting the Merger Guidelines: Protecting an Enforcement Asset*, COMP. POL'Y INT'L (Nov. 2022) (noting that the Guidelines are widely viewed as persuasive by courts because they are perceived to be based on thoughtful and non-partisan engagement with economic evidence).

a framework to detect which mergers threaten to unlawfully increase risk and which do not. In this Article, I set out to present such a framework.

Scholars and government officials have previously recognized a relationship between risk and antitrust enforcement.[28] For example, in 1945 the Attorney General blamed aluminum shortages in the run-up to World War II on supply constraints created by Alcoa's aluminum monopoly.[29] A similar concern was resurrected after the financial crisis of 2008, with scholars arguing that lax antitrust enforcement had made the banking sector more fragile.[30] The recent law and macroeconomics literature, too, has trained attention on the role the law can play in averting and addressing economic crises.[31] As that literature has shown, legal rules and decisions—including those in fields far removed from traditional financial oversight, such as utility rate regulation and contract law—have significant macroeconomic consequences, including on wealth distribution, employment, and the effects of economic shocks.[32]

There is also a long history of recognizing that the antitrust laws in general, and Section 7 of the Clayton Act in particular, are designed not merely to guard against short-run price hikes but to create competitive market structures over the

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[28] For an overview, *see* Barak Orbach, *Antitrust in the Shadow of Covid-19 (and Other Disruptions)*, 34 ANTITRUST 32 (2020). *See also, e.g.*, LAWRENCE A. SULLIVAN ET AL., THE LAW OF ANTITRUST: AN INTEGRATED HANDBOOK ¶ 1.5b.3 (3d ed. 2015); Peter Carstensen & Robert H. Lande, *The Merger Incipiency Doctrine and the Importance of "Redundant" Competitors*, 2018 WIS. L. REV. 783; BARRY C. LYNN, END OF THE LINE: THE RISE AND COMING FALL OF THE GLOBAL Corporation (2005).

[29] *See The Aluminum Industry: Letter from the Attorney General*, 79th Cong. 1st. Sess., S. Doc. 94 (1945); GEORGE DAVID SMITH, FROM MONOPOLY TO COMPETITION: THE TRANSFORMATION OF ALCOA, 1888-1986, at 237-38 (1988). My thanks to Steve Salop for pointing me to this example.

[30] *See* Jeremy C. Kress, *Reviving Bank Antitrust,* 72 DUKE L.J. 519, 570-72 (2022); Darren Bush, *Too Big to Bail: The Role of Antitrust in Distressed Industries*, 77 ANTITRUST L.J. 277 (2010); Jesse W. W. Markham, Jr., *Lessons for Competition Law from The Economic Crisis: The Prospect for Antitrust Responses to the "Too-Big-To-Fail" Phenomenon*, 16 FORDHAM J. CORP. & FINANCIAL L. 261 (2011); Sharon E. Foster, *Too Big to Fail—Too Small to Compete: Systemic Risk Should Be Addressed Through Antitrust Law But Such a Solution Will Only Work if It Is Applied on an International Basis*, 22 FL. J. INT. L. 31 (2010); Maurice E. Stucke, *Lessons from the Financial Crisis*, 77 ANTITRUST L.J. 313 (2010). My thanks to Barak Orbach for his thoughts on this literature.

[31] *See* Anna Gelpern & Adam J. Levitin, *Considering Law and Macroeconomics*, 83 L. & CONTEMP. PROBLEMS i, vi-xi, xv (2020); Yair Listokin, *Law and Macro: What Took So Long?*, 83 L. & CONTEMP. PROBLEMS 141 (2020).

[32] *See, e.g.*, Yair Listokin, *Law and Macroeconomics: The Law and Economics of Recessions*, 34 YALE J. ON REG. 791 (2017); Rory Van Loo, *Broadening Consumer Law: Competition, Protection, and Distribution*, 95 NOTRE DAME L. REV. 1 (2019).

long run.[33] Derek Bok famously argued that Congress cared about more than "prices, innovation, distribution, and efficiency" when passing the Clayton Act.[34] The Supreme Court embraced this wider vision in *United States v. Brown Shoe Co.*, holding that consolidation was an evil in its own right.[35] Although "occasional higher costs and prices might result from the maintenance of fragmented industries and markets," Congress had, according to the Court, "resolved these competing considerations in favor of decentralization."[36] Even more concretely, in *United States v. Philadelphia National Bank* the Court adopted a structural approach to merger control, holding that the "ultimate question under [Section] 7 . . . requires not merely an appraisal of the immediate impact of the merger upon competition, but a prediction of its impact upon competitive conditions in the future," a prediction that "is sound only if it is based upon a firm understanding of the structure of the relevant market."[37]

In what follows, I build on this history by exploring how competition and risk are connected. Applying the modern economic framework, I analyze how the antitrust agencies can assess the effect of mergers on first-order risk to

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[33] *See, e.g.*, TIM WU, THE CURSE OF BIGNESS: ANTITRUST IN THE NEW GILDED AGE (2018); ZEPHYR TEACHOUT, BREAK 'EM UP: RECOVERING OUR FREEDOM FROM BIG AG, BIG TECH, AND BIG MONEY (2020); Lina Khan & Sandeep Vaheesan, *Market Power and Inequality: The Antitrust Counterrevolution and Its Discontents*, 11 HARV. L. & POL'Y REV. 235 (2017); Eric A. Posner, *Market Power, Not Consumer Welfare: A Return to the Foundations of Merger Law* (working paper 2023), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4364084; Richard M. Brunell, *The Social Costs of Mergers: Restoring 'Local Control' as a Factor in Merger Policy*, 85 N.C. L. REV. 149 (2006).

[34] Derek Bok, *Section 7 of the Clayton Act and the Merging of Law and Economics*, 74 HARV. L. REV. 226, 236 (1960).

[35] 370 U.S. 294, 344 (1962).

[36] *Id.*; *see also* Bok, *supra* note 34, at 247-48 ("Underlying the legislative deliberations [behind Section 7] was the conviction that small business and the dispersion of economic power are salutary and should be encouraged by the new section. This premise clearly suggests reliance upon a structural theory of competition which stresses the advantages of large numbers of small-sized firms.").

[37] 374 U.S. 321, 362 (1963). Indeed, a minority of the Court argued in the 1940s that allowing consolidation of key industries can increase risk by subjecting the public to the idiosyncratic fate of a small number of companies. In *United States v. Columbia Steel Co.*, Justice Douglas, writing for four justices, dissented from a decision permitting the largest U.S. producer of rolled steel to buy an important customer. 334 U.S. 495, 534 (1948) (Douglas, J., dissenting). Douglas argued that because "the price of steel determines the price of hundreds of other articles," any firm that can control "prices in the steel industry" has "powerful leverage [over] our economy." *Id*. at 536. He contended that the industry should be required to remain fragmented because "the fortunes of the people [should] not be dependent on the whim or caprice, the political prejudices, the emotional stability of a few self-appointed men." The majority decision was a major impetus behind Congress's decision to pass the Celler-Kefeauver amendment bolstering Section 7 of the Clayton Act. *See* Charles J. Steele, *A Decade of the Celler-Kefauver Anti-Merger Act*, 14 VAND. L. REV. 1049, 1051 (1961).

merging parties' trading partners (direct risk) and second-order risk to the economy (systemic risk). Building risk into merger review is consistent with the broad structural goals of the Clayton Act recognized by the still precedential Warren Court decisions, as well as the law and economics approach that courts and enforcers embraced starting in the 1970s. By looking to factors such as market power, economic centrality, and customer exposure, the antitrust agencies can make informed forecasts of how mergers will add to or reduce risk.

I.   Risk, Competition, and Market Structure

A. Defining Risk

For our purposes, risk is the expected value of harm to third parties resulting from a shock to a particular firm.[38] Shocks can stem from aggregate disruptions, i.e., those affecting an entire industry or economy (for example, pandemics or wars), or from idiosyncratic events, i.e., disturbances that affect a small number of firms (for example, cyberattacks or industrial accidents).

The expected value of harm is the sum of the products of all probabilities of harm multiplied by their respective magnitude. For example, assume that an auto parts manufacturer has market power because automakers cannot easily find a replacement in the short run. If a complete stoppage will cost an automaker $1,000 a day, and there is a 10% probability in a given year of a complete auto parts shutdown for a day, the auto parts supplier is imposing a

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[38] *See* Dirk Helbing, *Globally Networked Risks and How to Respond*, 497 NATURE 51, 51 (risk "is often quantified as the probability of occurrence of an (adverse) event, times its (negative) impact (damage)."). Risk is a notoriously slippery concept. *See, e.g.*, Dimitrios Bisias et al., *A Survey of Systemic Risk Analytics*, 4 ANN. REV. FIN. ECON. 255, 256 (2012) (providing a "partial listing of possible definitions" of systemic financial risk, the breadth of which suggests to the authors that "more than one risk measure will be needed to capture the complex and adaptive nature of the financial system"). I use the definition provided by Helbing here because it is analytically clear and directs us to what I take Section 7 to focus on: the expected effect of a transaction. *See infra* note 181. This definition is not meant to exclude shocks of Knightian uncertainty, i.e., possibilities that we have no reliable means of estimating. *See* Cass R. Sunstein, *Knightian   Uncertainty*   (working   paper   2023), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4662711.   Those   possibilities   are axiomatically incalculable. Yet they are still subject, as a group, to the general relationship between competition and risk. For example, we have no reliable way to forecast the likelihood of a major cyberattack aimed at U.S. steel plants on March 2, 2030. But if dampening competition in low-competition markets tends to increase the expected harm from negative shocks, and we have reason to think a merger will accomplish that, we need not know the likelihood of a cyberattack to predict in what direction a merger will affect its probability.

$100 annual risk on the automaker.[39] In a competitive market, risk will often be appropriately accounted for in price just as other forms of product and service quality are. For antitrust purposes, then, we care about the additional risk beyond the amount that would exist under competitive conditions.[40] In this example, if the automaker can freely turn to a competing supplier of parts, that reduces the $100 risk.

Firms can pose a risk to their trading partners—i.e., consumers, suppliers, and employees—and so create direct risk. And firms can create systemic risk, adding risk to the broader society. In cases of systemic risk, the immediate harm caused by a firm's shock cascades as customers' trading partners are struck in an expanding circle. To continue the example, the auto parts shortage harms not only the automaker, but also the automaker's trading partners: car dealerships, shipping companies, auto workers, and so on. Because harms can amplify as they spill down the chain, systemic risk can equal or exceed direct risk.[41]

Firms do not fully internalize the risks they impose on trading partners or the public. For one thing, companies do not fully capture the benefits they provide society when reliably delivering goods or services.[42] So they do not fully bear the costs of failing to be reliable.[43] And because of limited liability laws, a company's value cannot fall below zero, while the harm it imposes on others is theoretically unbounded.[44] For example, a single firm, Taiwan Semiconductor Manufacturing Company (TSMC), manufactures more than 90% of the world's

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[39] In this simple example there is a binary probability of 10% total shutdown of production and 90% probability of full production. In the real-world, by contrast, risk generally operates on a spectrum. Claire Finkelstein was the first to use the term "risk harm," though I am adopting it without using her framework. *See* Claire Finkelstein, *Is Risk a Harm?*, 151 U. PA. L. REV. 963 (2003).

[40] *Cf.* 2010 MERGER GUIDELINES, *supra* note 10, at § 6.4 (comparing the incentives to innovate after a merger to "the level that would prevail in the absence of the merger").

[41] *See* Vasco M. Carvalho et al., *Supply Chain Disruptions: Evidence from the Great East Japan Earthquake*, 136 Q. J. ECON. 1255, 1258 (2021) (finding that companies two-firms-removed from companies hit by the Great East Japan Earthquake were only slightly less affected than those at a single remove); Bernard Herskovic et al., *Firm Volatility in Granular Networks*, 128 J. POL. ECON. 4097, 4100 (2020) (finding similar results in a study of U.S. public companies).

[42] *See* Matthew Elliott et al., *Supply Network Formation and Fragility*, 112 AMER. ECON. REV. 2701, 2738 (2022); Gene M. Grossman et al., *Supply Chain Resilience: Should Policy Promote Diversification or Reshoring?*, 131 J. POL. ECON. 3462, 3464 (2023); Agostino Capponi et al., *Are Supply Networks Efficiently Resilient?* (working paper, 2024), http://www.nber.org/papers/w32221, at 3.

[43] That might suggest that firms with market power, which can collect more of the surplus they provide society than do firms without market power, would also better internalize future disruptions. I address that issue *infra* at notes 90-104 and accompanying text.

[44] *See* Matthew Elliott & Benjamin Golub, *Networks and Economic Fragility*, 14 ANNUAL REV. ECON. 665, 690-91 (2022).

cutting-edge processing chips.[45]   If TSMC's chipmaking abilities were destroyed, its shares could lose about $490 billion in market capitalization (as of late 2023). But that loss would almost certainly be far outstripped by the economic effects of a shortfall in the advanced chips that power our cellphones, computers, data centers, search engines, and AI models.[46] Indeed, these losses would be so catastrophic that they are likely uninsurable.[47]

B. Competition and Direct Risk

Mergers can increase direct risk to trading partners in two main ways: by increasing a merged firm's market power and by raising trading partners' exposure to a merged firm across multiple products or services. I will explain why this is so theoretically and show how recent economic evidence bolsters these theoretical conclusions.

i.   Market Power

A merger can increase direct risk by increasing the merged firm's market power. Although antitrust agencies already target mergers that increase or entrench market power, they have not recognized the significant role market power plays in generating and amplifying risk, and so to that degree underestimate the cost of market power.[48] In addition, market power's effect on risk is complex—it generally increases the magnitude of harm from negative

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[45] *See* Richard Cronin, *Semiconductors and Taiwan's "Silicon Shield"*, STIMSON (Aug. 16, 2022), https://www.stimson.org/2022/semiconductors-and-taiwans-silicon-shield/.

[46] *See generally* CHRIS MILLER, CHIP WAR (2022). To take a simple example, TSMC manufactures all of Apple's iPhone processors, and Apple had $205 billion in iPhone sales in fiscal year 2022. *See Apple Inc. Condensed Consolidated Statement of Operations (Unaudited)*, APPLE   (2022), https://www.apple.com/newsroom/pdfs/FY22_Q4_Consolidated_Financial_Statements.pdf.

[47] *Cf.* Ian Smith, *Cyber Attacks Set to Become 'Uninsurable', Says Zurich Chief*, FIN. TIMES (Dec. 26, 2022), https://www.ft.com/content/63ea94fa-c6fc-449f-b2b8-ea29cc83637d. Even if risk can be insured against, the necessity of securing such insurance, and its expense, is one measure of the cost of that risk. See my related discussion on the cost of investing in relationships with powerful suppliers *infra* at notes 95-102 and accompanying text.

[48] The 2023 Merger Guidelines mention that output and capacity restrictions may harm resiliency, but they do not otherwise discuss how market power affects risk. And though the agencies are clear that the lodestar of merger review is already preventing the creation or consolidation of market power, if market power is worse than is commonly assumed, that fact should make the agencies more willing on the margin to block a transaction that threatens to increase market power (e.g., at lower concentration thresholds). *See infra* Part II for further discussion.

shocks, but may reduce the likelihood of such shocks. Enforcers should therefore approach risk analysis with care.[49]

When a merger combines two companies that make competing products, that combination can increase the merged firm's market power by reducing customers' ability to switch suppliers (see Figure 1). This in turn increases the risk the firm imposes on those customers, all else equal. For example, consider the case of two leading chipmakers merging, leading to the creation of a firm with greater market power. If the merged firm suffered an idiosyncratic shock— for example, a natural disaster—its customers would suffer more than they would in a world without the merger. Absent the merger, the chip buyers could have turned to the firm's rival, which in most cases would be unlikely to have suffered an idiosyncratic shock at the same time.[50] After the merger, chip buyers have one fewer supplier to make up for the shortfall—making the accident costlier, either in higher prices, lost sales, or both.
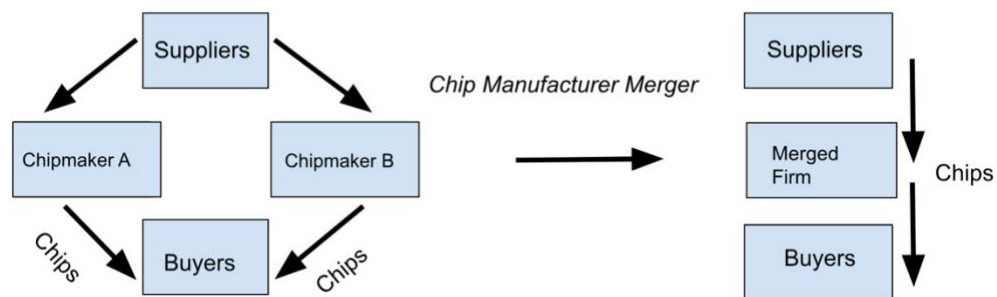

Figure 1: A horizontal merger increasing the merged chipmakers' market power

An infamous industrial accident illustrates how market power can increase risk. In 2000, a Philips chip-manufacturing plant burst into flames after an electric grid failure.[51] The ten-minute blaze destroyed millions of chips. These cellphone-specific chips were made only by Philips and one of its subcontractors, putting cellphone makers Ericsson and Nokia in a bind. Without these exact chips, billions of dollars in cellphone sales were in jeopardy. Nokia was able to jury-rig a solution; Ericsson could not. Unable to find replacement chips, Ericsson simply cut back on production, ultimately losing $450 million in

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[49] *See infra* notes 89-104 and accompanying text.

[50] Even if both firms had suffered similar, simultaneous shocks, retaining both might allow one firm to resolve the shock in a way another could not. The Philips example, *infra*, illustrates this effect. My thanks to P. Quinn White for a helpful comment on this example.

[51] *See* Almar Latour, *A Fire in Albuquerque Sparks Crisis for European Cell-Phone Giants*, WALL ST. J. (Jan. 29, 2001), https://www.wsj.com/articles/SB980720939804883010.

sales.[52] The example shows both how Philips' market power in the market for chips increased risk, and how competition in the market for cell phones reduced it: Nokia found a way to manufacture phones where Ericsson could not.

Or consider the 2017 malware attack known as NotPetya, which nearly hamstrung the global shipper Maersk and several other large firms.[53] Maersk grew to be the world's largest container carrier through a series of mergers in the 1990s and 2000s.[54] In just seven minutes the attack on Maersk wiped out tens of thousands of the company's computers, leaving the shipper in the dark about its cargo's whereabouts—almost 20% of global ocean shipping.[55] A stroke of luck saved the company's data, but not before the mass disruption cost Maersk, its customers, and business partners hundreds of millions of dollars in losses.[56] Economists studying the effects of the attack on firms including Maersk found that "the downstream disruption caused by the cyberattack [was] concentrated among customers that [had] fewer alternatives for the directly hit supplier."[57]

While extreme, these examples are far from alone. Market power generally makes negative shocks costlier to customers, as Jean-Noël Barrot and Julien Sauvagnat found in a study examining thirty years of U.S. natural disasters. When a major natural disaster strikes a supplier, its customers on average

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[52] *See* LYNN, *supra* note 28, at 220.

[53] *See* Andy Greenberg, *The Untold Story of NotPetya, the Most Devastating Cyberattack in History*, WIRED (Aug. 22, 2018), https://www.wired.com/story/notpetya-cyberattack-ukraine-russia-code-crashed-the-world/.

[54] *See* Jason Singer et al., *Maersk Agrees to Buy P&O for $2.95 Billion*, WALL ST. J. (May 11, 2005), https://www.wsj.com/articles/SB111578944165630212; *Our history*, MAERSK (2021), https://www.maersk.com/about/our-history/explore-our-history.

[55] *See* Rae Ritchie, *Maersk: Springing Back from a Catastrophic Cyber-Attack*, I-CIO (Aug. 2019), https://www.i-cio.com/management/insight/item/maersk-springing-back-from-a-catastrophic-cyber-attack; Adam Bannister, *When the Screens Went Black*, DAILY SWIG (May 18, 2021), https://portswigger.net/daily-swig/when-the-screens-went-black-how-notpetya-taught-maersk-to-rely-on-resilience-not-luck-to-mitigate-future-cyber-attacks.

[56] *See* Greenberg, *supra* note 53 (According to one estimate, "NotPetya cost Maersk between $250 million and $300 million . . . [But] those numbers only start to describe the magnitude of the damage. . . . Jeffrey Bader, president of a Port Newark-based trucking group . . . estimates that the unreimbursed cost for trucking companies and truckers alone is in the tens of millions. . . . The wider cost of Maersk's disruption to the global supply chain as a whole—which depends on just-in-time delivery of products and manufacturing components—is far harder to measure.").

[57] Matteo Crosignani et al., *Pirates Without Borders: The Propagation of Cyberattacks Through Firms' Supply Chains*, 147 J. FIN. ECON. 432, 433 (2023).

experience a sales growth rate 25% lower than their unaffected peers.[58] This effect is almost entirely explained by disasters hitting suppliers with market power as measured by research and development spending, product differentiation, and patent ownership.[59]

In a related finding, Enghin Atalay showed that industry-level negative shocks from a variety of causes are more harmful to trading partners when those partners are unable to pivot quickly to other types of goods.[60] And José-Miguel Gaspar and Massimo Massa found that as a firm's market power increases, it can more easily pass the cost of shocks onto its customers.[61] An increase in market power magnifies the effects of negative shocks, because customers do not have as many options to avoid the price increase.[62] At the same time, weakening competition reduces the benefits of positive shocks (such as new and more effective production techniques) because firms locked in to suppliers with market power find it harder to switch to alternative suppliers that have become more productive.[63] Firms appear to recognize the costs of relying on a single trading partner: McKinsey recently found that "dual sourcing was the planned action cited most frequently by supply chain executives" to increase resilience.[64]

Heightened buyer market power (i.e., monopsony) can also increase risk. For example, the top four hospital Group Purchasing Organizations (GPOs) in the United States account for an increasing share of all purchases of injectable

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[58] *See* Jean-Noël Barrot & Julien Sauvagnat, *Input Specificity and the Propagation of Idiosyncratic Shocks in Production Networks*, 131 Q. J. ECON. 1543, 1588 (2016). *See also* David Rezza Baqaee, *Cascading Failures in Production Networks*, 86 ECONOMETRICA 1819, 1834 n.16 (2018); Carvalho et al., *supra* note 41, at 1276.

[59] *See* Barrot & Sauvagnat, *supra* note 58, at 1545, 1588.

[60] *See* Enghin Atalay, *How Important Are Sectoral Shocks?*, 9 AMER. ECON. J. MACROECONOMICS 254, 255 (2017).

[61] *See* José-Miguel Gaspar & Massimo Massa, *Idiosyncratic Volatility and Product Market Competition*, 79 J. BUS. 3125, 3126 (2006) (finding evidence consistent with theory that "[a] firm with monopoly power is able to pass on a bigger proportion of any idiosyncratic cost shocks to its consumers").

[62] *Id.* at 3128.

[63] *See* Baqaee, *supra* note 58, at 1835 ("[A]s the degree of substitutability increases, the market can reallocate more forcefully to take advantage of variation in the productivity of different industries, amplifying the spill-over effects from shocks."). *See also* Gaspar & Massa, *supra* note 61, at 3128 (arguing that firms with market power attenuate positive productivity shocks because they react to such shocks "by not lowering prices and expanding output as much as a firm with more elastic demand would do").

[64] SUSAN LUND ET AL., RISK, RESILIENCE, AND REBALANCING IN GLOBAL VALUE CHAINS (2022), MCKINSEY, https://www.mckinsey.com/~/media/McKinsey/Business%20Functions/Operations/Our%20Ins ights/Risk%20resilience%20and%20rebalancing%20in%20global%20value%20chains/Risk-resilience-and-rebalancing-in-global-value-chains-full-report-vH.pdf, at 77; *see also id.* at 17.

generic pharmaceuticals, allowing GPOs to push some generic prices close to, or even below, marginal cost.[65] Intense buyer market power makes entry into the capital-intensive injectable pharmaceutical market unattractive, and induces manufacturers to spend as little as possible on factory upkeep and reliability.[66] The result is that most injectable drugs are supplied by a small number of manufacturers, and firms in the market are rewarded for offering low prices even at the cost of frequent supply disruptions.[67]

Even if a merger does not allow the merged firm to exercise market power immediately, it can make an increase in market power more likely following a supply or demand shock.[68] Consider hospital mergers. In good times a merger can allow hospitals to cut slack and lower costs, potentially leading to lower prices. Economists have found that mergers often allow hospitals to cut bed capacity and lower their costs.[69] Insofar as a small number of firms can still compete vigorously, this may have little immediate effect on market power.[70] However, those same savings increase patients' risk by making them reliant on a small number of key hospitals with fewer beds. Both consequences mean that hospitals gain significant market power in a crisis—for example, if a local natural disaster, or an infectious disease outbreak, leads to a sharp increase in demand for hospital services.

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[65] *See* DRUG SHORTAGES: ROOT CAUSES AND POTENTIAL SOLUTION, U.S. FOOD & DRUG ADMIN. (2020), https://www.fda.gov/media/131130/download, at 22; Anaïs Galdin*, Resilience of Global Supply Chains and Generic Drug Shortages* (working paper 2023), https://agaldin.github.io/webfiles/GALDINAnais_JMP_OffshoringShortages.pdf, at 65, 70 & n.96.

[66] See Galdin, *supra* note 65, at 14, 70 (finding "that the median number of manufacturers for [a given] sterile injectable drug[], as measured by manufacturing facilities, is 1.9").

[67] *Id.* at 70 ("Market concentration is the underlying reason why [injectable] markets are so slow in responding to shortages. When production is halted for quality control problems . . . there is no alternative facility available."). The problem is particularly acute because of the endemic principal-agent problems in health markets: GPOs are rewarded by hospitals for paying the lowest possible price for medicine, even though patients (who typically do not pay directly for drugs) would likely prefer to pay higher prices for greater reliability. *See id.* at 50-53 (finding that policies favoring reliability would likely increase both drug prices and patient welfare).

[68] *See* Capponi et al., *supra* note 42, at 5 ("Supply network fragility can lead to an increase in market power . . . especially when demand is at its greatest.").

[69] *See* Matt Schmitt, *Do Hospital Mergers Reduce Costs?,* 52 J. HEALTH ECON. 74, 74 (2017) (finding that U.S. acquired hospitals "realize cost savings between 4 and 7 percent in the years following the acquisition"); *id.* at 82 (finding that acquired hospitals reduce their number of beds following the merger compared with matched controls); Theodore E. Keeler & John S. Ying, *Hospital Costs and Excess Bed Capacity: A Statistical Analysis*, 78 REV. ECON. STAT. 470 (1996) (finding annual cost of excess bed capacity in U.S. hospitals to be $24 billion in 1991). My thanks to Steve Salop for a helpful discussion on this question.

[70] *But see* Zack Cooper et al., *The Price Ain't Right? Hospital Prices and Health Spending on the Privately Insured*, 134 Q. J. ECON. 51 (2018).

Meatpacking plants provide another example of this phenomenon. In April 2020, meatpacking plants turned into some of the largest pandemic hotspots in the United States.[71] As the disease tore through the beef industry, many of the largest plants shut down, decimating production. In one week in early May 2020 two plants that together slaughter more than 10% of U.S. cattle were temporarily shuttered.[72] Between March and April, beef output fell by 25%.[73] As key plants closed, ranchers had few places to sell their cattle. Half a million cattle slated to be slaughtered were left at the feedlot, the last stop on the way to the meatpacking plant.[74]

With a glut of steers and heifers at the slaughterhouse gates, cattle prices fell even as beef prices rose. Between January and May the difference between the price meatpackers paid for cattle and the price they charged for beef grew 645%.[75] In May 2020 the price of grocery store beef rose at the fastest rate on record.[76] And even as cattle prices were falling, retailers saw their spread (reflected in the difference between retail and wholesale prices) fall 57% between January and May.[77]

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[71] Michael Grabell et al., *Emails Reveal Chaos as Meatpacking Companies Fought Health Agencies over COVID-19 Outbreaks in Their Plants*, PROPUBLICA (June 12, 2020), https://www.propublica.org/article/emails-reveal-chaos-as-meatpacking-companies-fought-health-agencies-over-covid-19-outbreaks-in-their-plants.

[72] Joe Fassler & H. Claire Brown, *Why Covid-19 Plant Shutdowns Could Make the Big Four Meatpackers Even More Profitable*, COUNTER (May 14, 2020), https://thecounter.org/covid-19-meat-plant-closures-food-prices-cattle/.

[73] USDA, *Red Meat and Poultry Production* (Excel Spreadsheet May 27, 2020), https://www.ers.usda.gov/webdocs/DataFiles/51875/RedMeatPoultry_ProdFull.xlsx.

[74] *See* Jacob Bunge, *Coronavirus to Slow U.S. Meat Production for Months, CEO Says*, WALL ST. J. (May 15, 2020), https://www.wsj.com/articles/coronavirus-to-slow-u-s-meat-production-for-months-ceo-says-11589540400.

[75] Author calculations from USDA, *Summary of Retail Prices and Price Spreads* (Excel Spreadsheet, June 10, 2020), https://www.ers.usda.gov/webdocs/DataFiles/52160/sumtab.xls [Hereinafter *June Retail Summary*]. The USDA figures reflect the difference between the average price of a quantity of beef leaving the plant needed to produce a pound of average retail beef (about 1.14 pounds), plus meatpackers' sale of non-meat residual product, and the average price of 2.4 pounds of cattle entering the plant. *See Documentation*, USDA (2021), https://www.ers.usda.gov/data-products/meat-price-spreads/documentation/. My thanks to USDA economist William Hahn for his help understanding these figures. Ultimately, the wholesale-farmer spread is highly correlated with packers' gross margins, though the two figures are not identical. *See* WILLIAM HAHN, BEEF AND PORK VALUES AND PRICE SPREADS EXPLAINED, USDA (May 2004), https://wayback.archive-it.org/5923/20110903181317/http://ers.usda.gov/publications/ldp/APR04/ldpm11801/ldpm11801r.pdf, at 6; Telephone interview with William Hahn, Economist, USDA (June 15, 2020).

[76] Press Release, U.S. Bur. Lab. Stat., Consumer Price Index Summary (June 11, 2020),https://www.bls.gov/news.release/cpi.nr0.htm.

[77] USDA, *June Retail Summary*, *supra* note 75.

How did meatpackers raise meat prices even as the cost of cattle fell? The answer lies in meatpackers' market power. In a crisis, meatpackers have extraordinary buying and selling market power because they are the industry's bottleneck: there are many ranchers and retailers, but only a small number of significant meatpackers. That fact is the direct result of industry consolidation.[78] In 1980, the top four beef-packing firms slaughtered 36% of U.S. fed cattle.[79] As the Reagan Administration slackened antitrust merger review, the leading meatpacking firms consolidated production through a series of mergers.[80] By the 1990s, 80% of cattle were slaughtered by the four leading firms, a share that has remained steady through today.[81] As firms consolidated, the total number of meatpacking plants declined.[82] Between 1980 and 2019, the number of plants fell by more than half. By 2019 just 49 facilities slaughtered 95% of all cattle in the United States.[83]

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[78] As a simple point of comparison, poultry meatpacking has remained relatively unconsolidated, with the top four firms slaughtering and packing just over half of chickens by weight in 2017. *See* USDA, PACKERS AND STOCKYARDS DIVISION ANNUAL REPORT 2018, at 9, https://www.ams.usda.gov/sites/default/files/media/PSDAnnualReport2018.pdf [hereinafter 2018 ANNUAL REPORT]. The price of chicken rose by less than half as much as beef. *See U.S. City Average, by Detailed Expenditure Category*, U.S. BUR. LAB. STAT. (June 10, 2020), https://www.bls.gov/news.release/cpi.t02.htm.

[79] USDA, CONCENTRATION IN THE RED MEAT PACKING INDUSTRY (1996) [Hereinafter CONCENTRATION IN PACKING], https://www.gipsa.usda.gov/psp/publication/con_tech%20report/conc-rpt.pdf, at 4.

[80] *Mergers and Concentration: The Food Industries: Hearing Before the Subcomm. on Monopolies and Commercial Law of the H. Comm. on the Judiciary*, 100th Cong. 13-15 (1988) (statement of B.H. Jones, Administrator, Packers and Stockyards Admin., USDA); Bruce W. Marion & Donghwan Kim, *Concentration Change in Selected Food Manufacturing Industries: The Influence of Mergers vs. Internal Growth*, 7 AGRIBUSINESS 415, 424-25 (1991) (finding that "the 19-point increase in [the top 4 firms' share of all cattle slaughtering], from 1982 to 1988 was almost totally driven by mergers and acquisitions" rather than internal growth). *See also* Azzeddine M. Azzam, *Competition in the US Meatpacking Industry: Is It History?*, 18 AGRICULTURAL ECON. 107, 119-121 (1998). On the Reagan Administration's weakening of merger review, see William E. Kovacic, *The Modern Evolution of U.S. Competition Policy Enforcement Norms*, 71 ANTITRUST L.J. 377, 437 (2003). In 2009, the DOJ successfully prevented a merger between two of the leading four firms, JBS and National Beef. *See Department of Justice Statement on the Abandonment of the JBS/National Beef Transaction*, DEPT. OF JUST. (2009), https://justice.gov/opa/pr/department-justice-statement-abandonment-jbsnational-beef-transaction.

[81] USDA, CONCENTRATION IN PACKING, *supra* note 79, at 4; USDA, 2018 ANNUAL REPORT, *supra* note 78, at 8.

[82] This is not a connection that will always pertain, but did in this case.

[83] Author calculations from USDA, LIVESTOCK SLAUGHTER ANNUAL SUMMARY 1980 (1981), https://downloads.usda.library.cornell.edu/usda-esmis/files/r207tp32d/xw42nc91d/fq978010d/LiveSlauSu-03-00-1981.pdf, at 45, tbl. 25, and USDA, LIVESTOCK SLAUGHTER ANNUAL SUMMARY 2019 (2020)

Mergers that eliminate a production maverick are especially likely to allow for increased market power following an industry-wide shock. Firms that rely on different production techniques than their rivals increase market resilience because they are less affected by disruptions to inputs used by others in the industry.[84] For example, consider the Japanese carmaker Toyota. After experiencing a series of disasters in the 2010s, Toyota shifted away from industry-standard just-in-time manufacturing and began keeping more product inventory on hand, or requiring its suppliers to do so.[85] That approach helped the carmaker maintain production output in 2021, even as rivals suffered from severe chip shortages.[86] The historic uniformity of leading U.S. automakers present a sharp contrast to Toyota's maverick approach. In 2008, the CEO of Ford asked Congress to bail out General Motors and Chrysler because the collapse of either firm would threaten the suppliers and dealers upon which Ford too relied, potentially disrupting its ability to produce cars within a matter of hours.[87]

In brief, mergers can increase risk either by immediately raising the merging firms' market power or by making such market power more likely following a shock. The latter danger is all too often overlooked in merger review, which generally focuses on short-term effects.[88] We thus have both theoretical and empirical reasons to believe that mergers that increase a firm's market power generally increase the magnitude of harm suffered by its customers in the event of a negative shock.

> ii.   The Effects of Market Power on the Magnitude and Likelihood of Negative Shocks

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https://downloads.usda.library.cornell.edu/usda-esmis/files/r207tp32d/34850245n/5712mr72x/lsan0420.pdf, at 60.

[84] For evidence from the financial industry, addressing the dangers of correlated portfolios, see Matthew O. Jackson & Agathe Pernoud, *Systemic Risk in Financial Networks: A Survey*, 13 ANN. REV. ECON. 171, 183 (2021) ("[P]ositive correlation in investments across banks erases some of the benefits of diversification in counterparties and facilitates contagion. More generally, increasing the correlation in portfolios of investments leads to increasing probabilities of codefaults."); *id.* at 185.

[85] *See* Elliott & Golub, *supra* note 44, at Appendix A.

[86] *Id. See also* Richard Baldwin & Rebecca Freeman, *Risks and Global Supply Chains: What We Know and What We Need to Know*, 15 ANN. REV. ECON. 153 (2022); LUND ET AL., *supra* note 64, at 82-83; Raphael Lafrogne-Joussier et al., *Supply Shocks in Supply Chains: Evidence from the Early Lockdown in China*, 71 IMF ECON. REV. 170, 170 (2022).

[87] *See* Daron Acemoglu et al., *The Network Origins of Aggregate Fluctuations*, 80 ECONOMETRICA 1977, 1978 (2012).

[88] *See* Salop & Scott Morton, *supra* note 13, at 96-97.

Although there is powerful evidence that increases in market power raise the magnitude of direct harm from a negative shock, economic theory does not make a clear prediction about the relationship between market power and the likelihood of negative shocks affecting a firm's trading partners.

On the one hand, firms with market power make higher profits than firms in competitive conditions, and those profits provide the incentive and ability to invest in resiliency.[89] Such firms may therefore invest more to avoid supply disruptions than firms facing more competition, such as by retaining spare capacity or higher-quality facilities. And their trading partners, recognizing that they have few alternatives, may also invest in supply chain resilience.[90] On this point, economists have found that when firms cannot price their goods above marginal cost—as in some generic pharmaceutical markets—increased supplier competition can actually degrade reliability.[91]

On the other hand, robust competition may lead to greater overall investment in reliability than would be the case in a market with a monopolist.[92] In a market with a single firm, the incumbent will invest in resilience to protect its monopoly profits. But in a competitive market, multiple firms will invest in resilience to compete for monopoly profits in the event of a shock affecting rivals.[93] In line

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[89] *See id.* at 97 ("[C]onsolidation sometimes can reduce the likelihood of cascading failures, by internalizing some risks, so that offset also must be factored into the analysis."). Firms with larger market share may also have more incentive to invest in resiliency because they can appropriate more of the gains from stability than firms with smaller market share. *Cf.* Richard M. Brunell, *Appropriability in Antitrust: How Much is Enough?*, 69 ANTITRUST L.J. 1 (2001).

[90] *See* Elliott et al., *supra* note 43, at 2735.

[91] *See* Galdin, *supra* note 65, at 7, 10-11. As discussed above, this result is also distorted by principal-agent problems in the healthcare industry and by buyer market power. *See supra* note 67.

[92] *See* Grossman et al., *supra* note 42, at 3493. This arises because of the business-stealing externality, which comes about because firms do not internalize the effects of their actions on their rivals. But in settings with reduced competition, firms internalize in part the reduced profits they inflict on rivals.

[93] Each firm will individually invest less than the monopolist would, because all recognize the possibility that full monopoly profits may not be available if multiple firms are able to supply during a crisis. But the aggregate investment in resilience will often be higher. For example, consider a case in which Firm A and Firm B are competitors in the market for smartphones. Assume that, if both firms are viable in a given week, each will earn a profit of $4. If only a single firm is viable, it will earn $10 in profits. Firm A and Firm B will invest in resilience to chase $10 in profits each, or $20 total (with some reduction for the possibility that both firms will remain viable). In the same market with a monopolist, however, only a single firm would invest to retain $10 in profits during a disruption. Theoretically, these incentives could lead firms to invest *too much* in resilience, just as competition may lead firms to overinvest in research and development or market entry. *See, e.g.*, Brunell, *supra* note 89, at 34-35; N. Gregory Mankiw & Michael D. Whinston, *Free Entry and Social Inefficiency*, 17 RAND J. ECON. 48 (1986).

with this reasoning, economists have found that competition often increases reliability, for example in the airline and supermarket industries.[94]

An important piece evidence on this question comes from a paper by Gaurav Khanna and colleagues of the behavior of Indian firms during the early stages of the Covid-19 pandemic. The authors found that buyers purchasing from firms with market power were less likely to break off purchases in the event of a shock (here, Covid-19-related lockdowns) than buyers with more supplier options.[95] Khanna and colleagues hypothesize that buyers invest more in relationships with firms with market power because they have few alternatives.[96] And they found that, after the Covid-19 lockdowns, buyers chose to buy more from large and well-connected suppliers, perhaps suggesting that they perceive such suppliers as more capable of withstanding further shocks.[97]

This is an important challenge to the claim that market power increases risk. Still, on balance, the evidence that shocks to large firms have macroeconomic effects, covered in more detail below, suggests that the greater magnitude of harm from shocks to large companies, or those with market power, may well

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[94] *See* David A. Matsa, *Competition and Product Quality in the Supermarket Industry*, 126 Q. J. ECON. 1539, 1539 (2011) (finding "that stores facing more intense competition have fewer shortfalls. Competition from Walmart—the most significant shock to industry market structure in half a century—decreased shortfalls among large chains by about a third."); Matias Busso & Sebastian Galiani, *The Causal Effect of Competition on Price and Quality: Evidence From a Field Experiment*, 11 AMER. ECON. J. APPLIED ECON. 33 (2019); Michael J. Mazzeo, *Competition and Service Quality in the U.S. Airline Industry*, 22 REV. INDUSTRIAL ORG. 275, 275 (2003) ("[B]oth the prevalence and duration of flight delays are significantly greater on routes where only one airline provides direct service. Additional competition is correlated with better on-time performance."); Daniel Greenfield, *Competition and Service Quality: New Evidence From the Airline Industry*, 2 ECON. TRANSPORTATION 80 (2014) (finding that the Delta-Northwest Airlines merger degraded on-time arrival performance on routes that suffered reduced competition).

[95] *See* Gaurav Khanna et al., *Supply Chain Resilience: Evidence from Indian Firms* (NBER Working Paper No. 30689, 2022), https://www.nber.org/papers/w30689 (finding that "the most resilient supply chains are [those in which] suppliers are larger, inputs more differentiated, and the number of alternative suppliers is low."). Their main finding is that firms buying from suppliers with market power, and those buying from more complex supply chains, have fewer "net-separations"—i.e., terminated supplier relationships plus restored supplier relationships— than firms buying from suppliers with less market power or in simpler supply chains. *See id.* at 5-6, 13-14.

[96] *See id.* at 14 (buyers with many suppliers cut ties with high-risk suppliers at a higher rate than buyers with fewer suppliers, "presumably [because they] have several suppliers for the products, and breaking links with high-risk zone suppliers is less disruptive for them.").

[97] *See id.* at 16.

offset any decreases in the likelihood of shocks conferred by market power.[98] That is, firms with market power may be less likely to incur supply disruptions on average—but when they do, those disruptions are likely so large that they more than make up for the smaller number of shocks.[99]   In Barrot and Sauvagnat's study of U.S. natural disasters, for example, shocks hitting suppliers significantly harm buyers only when the suppliers have market power.[100] Similarly, Matteo Crosignani and colleagues found that the NotPetya cyberattack only significantly harmed downstream customers of affected suppliers when those customers had few alternatives.[101] Moreover, the study by Khanna and colleagues does not address the costs buyers must pay to invest in relationships with the firms on which they depend—costs they might otherwise not need to bear.[102] In effect, those costs are a reflection of the increased risk that market power imposes on customers, which customers offset through the insurance of investing in close relationships.

Although this is a question that demands further research, the current evidence makes two practical upshots clear.[103] First, mergers that significantly concentrate markets that already exhibit weak competition are likely to increase risk on net. In these markets, shocks to firms with market power are especially harmful because customers have limited options.   Moreover, because competition is limited, firms in these markets already capture a significant share of consumer surplus, and a merger will generally not appreciably increase the merged firm's incentive to invest in resilience.[104] Second, mergers that threaten

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[98] *See infra* notes 115, 175-173, and accompanying text. *Cf.* Cooper et al., *supra* note 70, at 103 (finding that hospitals that have greater market power force insurers to bear greater patient risk than do hospitals with less market power).

[99] For a discussion of a related phenomenon in banking, *see* Jackson & Pernoud, *supra* note 84, at 185 ("Large core banks can be resistant to small shocks but can fail catastrophically when hit with large shocks, especially when those shocks are correlated."); Haelim Anderson et al., *Bank Networks and Systemic Risk: Evidence from the National Banking Acts*, 109 AMER. ECON. REV. 3125 (2019) (finding that the National Banking Acts of 1863 and 1864 concentrated banking networks, which both increased network resilience in the face small shocks and reduced resilience in the face of large shocks); Daron Acemoglu et al., *Systemic Risk and Stability in Financial Networks*, 105 AMER. ECON. REV. 564 (2015).

[100] *See* Barrot & Sauvagnat, *supra* note 58, at 1545 ("Firms' sales growth and stock prices significantly drop only when a major disaster hits one of their specific suppliers," i.e., a supplier with market power).

[101] *See* Crosignani et al., *supra* note 57, at 441-42.

[102] *See* Khanna et al., *supra* note 95, at 14; Elliott et al., *supra* note 43, at 2735.

[103] *See infra* Sections III.A-B.

[104] Although the research on this question is less clear, market-power increasing mergers in these settings will likely also be especially harmful because they reduce the business-stealing incentive to invest in resilience more than would mergers in highly competitive markets. In highly competitive markets, the business-stealing effect is more limited because firms recognize that

to eliminate a production maverick tend to increase both the likelihood and severity of industry-wide shocks by removing a source of idiosyncratic resilience from the market.[105]

iii.   Trading Partner Exposure

A merger can also increase direct risk by making customers more reliant on a firm as a supplier for a greater fraction of all the products they buy, even if the products are not in the same relevant market.[106] Such mergers will generally increase risk if several conditions hold. First, the merging parties must each have market power in the products they sell to a common customer. Second, the common customer must be made worse off by the withdrawal of both products simultaneously than by their withdrawal at different times. Third, the merger must introduce correlated risks across both products. And fourth, the merger's increase in the magnitude of harm stemming from a negative shock must not be offset by a decrease in the probability of such a shock.

Mergers meeting these conditions make customers worse off by increasing the negative effects of shocks to the merged entity.[107] And such mergers lessen competition by allowing the merged firm to threaten to withhold multiple products simultaneously, increasing the merged firm's leverage over its customers.[108]

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they have almost no ability to reap large profits during a crisis. *See* Mankiw &. Whinston, *supra* note 93, at 49-50 (discussing the more general question of when the business-stealing effect will arise, and concluding it has little salience in highly competitive markets in which firms are "price-takers").

[105] *See, e.g.*, *supra* note 84 and accompanying text.

[106] These will often be what are termed conglomerate mergers, i.e., mergers combining firms that sell products or services that do not directly compete. You can think of such mergers, in the language of economics, as increasing a firm's scope (the breadth of products it produces) whereas mergers of direct rivals increase the merged entity's scale (the depth of its production of a particular good). *See* John C. Panzar & Robert D. Willig, *Economies of Scope*, 71 AMER. ECON. REV. 268 (1981). My thanks to Alvin Klevorick for a helpful conversation on this issue. Below, I generally use examples of exposure from the perspective of a purchaser whose suppliers are merging. But the concept also applies to mergers among a firm's buyers.

[107] *See* Leemore Dafny et al., *The Price Effects of Cross-Market Mergers: Theory and Evidence from the Hospital Industry*, 50 RAND J. ECON. 286, 290 (2019) ("A positive price effect can arise if the [customer] suffers a larger profit reduction if both suppliers [cut off supply] than the combined sum of profit reductions that would arise from [losing] each supplier separately."). *See also* Jaime S. King et al., *Antitrust's Healthcare Conundrum: Cross-Market Mergers and the Rise of System Power*, 74 HASTINGS L.J. 1057, 1084-89 (2023).

[108] *See* Dafny et al., *supra* note 107; *c.f.* David Crow, *Saline Investigation Highlights the Cost of American Healthcare*, FIN. TIMES (Mar. 4, 2018), https://www.ft.com/content/4593b93e-1887-

For example, take the case of Firm A, which makes sparkplugs, merging with Firm B, which makes wire harnesses (see Figure 2). Assume that Firm A and Firm B had market power in the markets for spark plugs and wire harnesses, respectively, and that carmakers need both parts. If the merged company, Firm AB, has idiosyncratic risk that can affect the production of both sparkplugs and wire harnesses, the merger will generally increase carmakers' risk.[109] To see why, consider what would happen if Firm AB faced a sudden firmwide negative shock harming production of both sparkplugs and wire harnesses—for example, a vulnerability in a software package it inherited from Firm A.[110] Whereas without the merger a negative shock would have lowered only Firm A's production, now production in both sparkplugs and wire harnesses declines. Without the merger, carmakers would have faced a single part shortfall. With the merger, they face two shortfalls simultaneously. Holding all else equal, the merger is projected to increase risk.[111]
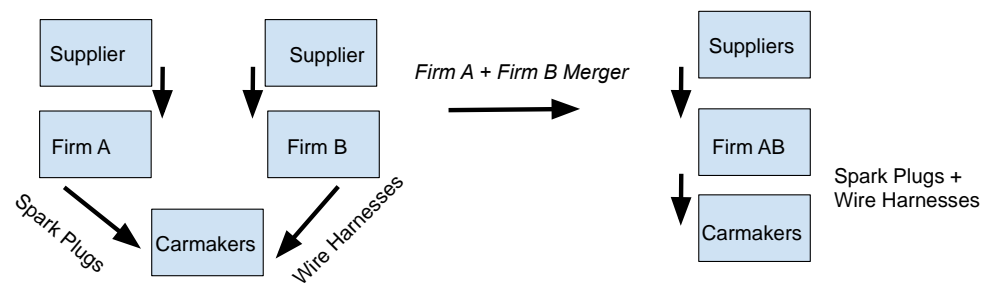

Figure 2: A merger raising carmakers' exposure to Firm AB

It is worth exploring the four conditions under which mergers combining two products bought by a common customer will increase trading partner exposure.

11e8-9376-4a6390addb44 (relating that, amid a shortage of saline, a "sales rep suggested Baxter would be unable to guarantee [a] hospital's existing supply of saline unless it signed a new five-year contract that required it to also buy other 'consumables' used to deliver the solutions, like intravenous tubes and taps").

[109] The one exception, discussed below at *infra* note 112 and accompanying text, is when the loss of either product on its own would put the consumer out of business. When that is the case a merger does not increase risk by virtue of combining idiosyncratic risks.

[110] *C.f.* Greenberg, *supra* note 53.

[111] *See* Francis Kramarz et al., *Volatility in the Small and in the Large: The Lack of Diversification in International Trade*, 122 J. INT. ECON. 1, 6 (2020) ("A less concentrated trade network mechanically reduces [a] firm's exposure to . . . shocks.").

First, the merged firm must independently have market power in at least two relevant product markets. Without market power a negative shock hitting a firm imposes no or little harm on its trading partners. To draw on the car-part example, if a large number of other firms could easily and quickly increase their production of sparkplugs should Firm AB increase price or reduce output, Firm AB has little market power in sparkplugs. Because purchasers of Firm AB's sparkplugs could easily turn to another producer, a negative shock to Firm AB would not harm them. (And the same holds for wire harnesses.) But if Firm AB has market power in two products, a shock to its production would harm those that depend on both products, as customers would not have ready alternatives for either.

Second, the merger must make it more likely that the products are subject to shared risk as compared to the time before the merger. A merger will not increase direct risk by merely changing ownership, but rather by subjecting two previously independent products to the shared risk that comes from being produced by a single firm. Risks can take many forms: the risk of a software crash, the risk of firm bankruptcy, the risk of poor executive management, and so on. The important point is that if the merger does not make the previously separate products vulnerable to newly correlated disruptions, there will be no increase in risk. Because there are almost always idiosyncratic firm risks, mergers combining products will generally subject those products to newly shared risks.

Third, a simultaneous negative shock to the previously independent products must harm the merged firm's customers more than such a shock to each of the products at different times. This will often be true, because simultaneous shocks can have super-additive properties. For example, if two products fail at the same time, this may force a buyer to default on its debt or to be unable to produce a good that it could have made with only a single failed input. Or a bundle—e.g., a grocery basket—may be much less valuable with the loss of two products than of only one, if the goods are complementary.[112] But this will not always be the case. To take one example, if a carmaker will go out of business if it does not receive sparkplugs on schedule, it will not matter if it *also* does not receive wire harnesses on time.[113] In that case, a merger combining a manufacturer of sparkplugs and wire harnesses adds no additional risk. Counterintuitively, then, if either of the merging parties had monopoly power in a market critical to its

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[112] *See* Dafny et al., *supra* note 107, at 286-87 (arguing that this effect is especially likely for "intermediaries that bundle products or services for sale to customers, who in turn may aggregate the preferences of multiple individuals").

[113] See the helpful discussion in *id*. at 292 & n. 13.

customers the deal may do less to increase risk because the magnitude of the potential shock is already at its maximum.

Fourth, a merger's increase in the magnitude of harm stemming from a negative shock must not be offset by a decrease in the probability of such a shock. As explained above, increasing a firm's market power in markets that are not highly competitive generally increases risk.[114] And though larger firms with greater market power are less likely to experience or pass on negative shocks, this increased stability is not sufficient to overcome the increased magnitude of harm they transmit when they are hit with a shock.[115]

Recent empirical research confirms that concentration among a firm's trading partners increases risk. Bernard Herskovic and colleagues find that, holding other factors constant, the more concentrated a firm's customer network is, the more volatile are its sales.[116] They argue that increasing U.S. market concentration between the 1960s and 1990s helps explain the increase in average firm volatility over that span.[117] Francis Kramarz and colleagues find similar effects in international trade: the more diversified a firm's customers are, the less volatile are its sales, leading to large differences in volatility.[118] Looking at demand shocks, they find that nations whose firms sell to a concentrated pool of customers face more volatility than those whose firms sell to a more diversified set of companies.[119] These findings suggest that mergers that increase customer exposure in turn increase direct risk.

C. Competition and Systemic Risk

In addition to increasing direct risk to a firm's customers, mergers can also increase systemic risk, that is, second-order risk to the economy as a whole. Mergers increase systemic risk in three main ways: by increasing the merged firm's market power, economic centrality, and size.[120]

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[114] *See supra* notes 98-104 and accompanying text.

[115] *See* Julian di Giovanni & Andrei A. Levchenko, *Country Size, International Trade, and Aggregate Fluctuations in Granular Economies*, 120 J. POL. ECON. 1083, 1116 (2012).

[116] *See* Herskovic et al., *supra* note 41, at 4100.

[117] *Id.* at 4099.

[118] *See* Kramarz et al., *supra* note 111, at 2. *See also* Francesco Caselli et al., *Diversification Through Trade*, 135 Q.J. ECON. 449 (2020) (finding that in recent decades international trade has diversified national economic risk and lowered economic volatility in most countries).

[119] *See* Kramarz et al., *supra* note 111, at 2.

[120] These correspond to several of the criteria laid out by the U.S. Financial Stability Oversight Council in defining systemically important nonbank financial institutions, in particular concentration/substitutability (market power), interconnectedness (centrality), and size. *See* 12 C.F.R. § 1310.11(a)(7) (2023); *id.* Part 1310, Appx. A § 3.b.

i.   Market Power

Mergers that increase market power tend to increase systemic risk. Market power results from inflexible demand for a particular product or service. Because customers have few or no other places to turn, a negative supply shock to a firm with market power can prove damaging not only to its immediate customers but to an entire supply network, leading to cascading harm.[121]

In our specialized economy, firms often make items that are essential for their trading partners.[122] For example, a semiconductor manufacturer might make a chip that is essential for, and can only be used with, a single cell phone model. The chip and the remainder of the cell phone are complements: they each make the other more valuable.[123] Negative shocks to firms making highly complementary goods are thus especially *systemically* harmful, because they can result in a total shutdown of a firm's trading partners' production.[124] Charles Jones has argued that the lack of substitutes for complementary goods in the supply chain in poorer countries helps explain large income differences between rich and poor countries.[125]

Consider a merger that reduces the number of competitors in the spark plug industry, resulting in the merged firm having significant market power. If the merged firm were to experience a sudden production stoppage, this would result not in some incremental harm to carmakers but a catastrophic harm as lines shut down and firms scramble to try to find replacements. As lines close, the harm cascades: carmakers decrease orders for other parts; dealerships run out of new models; the merged firm cuts back on purchases from its own suppliers and lays off workers.[126] If the market for spark plugs was competitive, a single firm shutting down would matter little to customers or the system as a whole: carmakers would seamlessly switch to a new supplier and lines would run

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[121] *See* Baqaee, *supra* note 58, at 62 (finding that systemically important firms share several qualities, including "[l]ow elasticity of substitution within [their] industry"). *See also* David Rezza Baqaee & Emmanuel Farhi, *The Macroeconomic Impact of Microeconomic Shocks: Beyond Hulten's Theorem*, 87 ECONOMETRICA 1155, 1194 (2019) ("[T]he macroeconomic impact of a microeconomic shock depends greatly on how quickly factors can be reallocated across production units.").

[122] *See* Atalay, *supra* note 60, at 276; Baqaee & Farhi, *supra* note 121, at 1157 & n.2.

[123] *See* Laurence S. Seidman, *Complements and Substitutes: The Importance of Minding p's and q's*, 56 S. ECON. J. 183, 183 (1989).

[124] *See* Baqaee & Farhi, *supra* note 121, at 1164 ("When goods are . . . complements, [systemic risk] amplif[ies] the effect of negative shocks and attenuate[s] the effect of positive shocks relative to the [direct risk].").

[125] *See* Charles I. Jones, *Intermediate Goods and Weak Links in the Theory of Economic Development*, 3 AMER. ECON. J. MACROECONOMICS 1, 6 (2011).

[126] *C.f.* Acemoglu et al., *supra* note 87, at 1978.

without a hitch. Because the merged firm has significant market power, its failure imposes systemic harm. And because the merged firm does not fully bear the cost of its systemic risks, it does not internalize those costs and is not incentivized to sufficiently invest in preventing such risks.[127]

As this example illustrates, mergers that increase the market power of intermediate goods producers are a particular systemic risk concern. It is no coincidence that many of the best examples of systemic risk are for intermediate goods: there are typically more substitutes, even if imperfect, for final goods than for intermediate goods.[128] A person looking for lunch can eat tacos or sushi or salad, but a Tesla *needs* one type of gasket.[129] Jones provides a helpful image: a shock to a final good happens once, but a shock to an intermediate good shocks again and again as it works down the supply chain.[130] If the steel shipment is delayed, a gasket might not be made; without the gasket, a car can't be finished; without new car shipments, car salespeople might lose their jobs, and so on.

Empirical studies confirm that shocks to firms are more harmful to the national economy when they occur in industries in which individual firms have more market power, such as the automobile, oil, and transportation industries.[131] Supply networks featuring firms with market power have a harder time adjusting in the face of shocks, and such frictions lower GDP and increase volatility.[132]

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[127] *See* sources cited in notes 42-44, 89, *supra*, especially Elliott et al., *supra* note 42, at 2738 ("[T]he reliability of a firm's intermediate good production increases the reliability, and hence profitability, of those firms sourcing from it, the firms sourcing from these firms, and so on. Firms do not internalize their contributions to helping other [firms] function. This pushes a planner to want to choose higher reliabilities, relative to firms." (emphasis omitted)); *id.* (finding that because of the reliability externality, "in any equilibrium, there is always underinvestment" in resilience). *See also* Jackson & Pernoud, *supra* note 84, at 187-89 (discussing this externality in the context of the banking industry).

[128] *See* Jones, *supra* note 125, at 6; Barrot & Sauvagnat, *supra* note 58, at 1544; Boehm et al., *supra* note 59, at 16. *See also* Alessio Moro, *The Structural Transformation Between Manufacturing and Services and the Decline in the US GDP Volatility*, 15 REV. ECON. DYNAMICS 402 (2012) (arguing that manufacturing's dependence on intermediate goods makes it naturally more volatile than services).

[129] *See* Yosse Sheffi & Barry C. Lynn, *Systemic Supply Chain Risk*, BRIDGE (Fall 2014), at 25.

[130] Jones, *supra* note 125, at 24.

[131] *See* Julian di Giovanni et al., *Firms, Destinations, and Aggregate Fluctuations*, 82 ECONOMETRICA 1303, 1305-06 (2014) ("[F]irm-specific shocks in more concentrated industries, such as transport, petroleum, and motor vehicles, contribute more to aggregate volatility than firm-specific shocks in less concentrated sectors such as metal products or publishing.").

[132] *See* Mathieu Taschereau-Dumouchel, *Cascades and Fluctuations in an Economy with an Endogenous Production Network* (working paper 2022), https://www.mathtd.info/files/papers/Network/paper.pdf, at 41-43.

Shocks to specific firms or industries have significant downstream effects. Julian di Giovanni and colleagues found that idiosyncratic shocks' systemic effects are generally three times as large as their direct effects.[133] Vasco Carvalho and colleagues found that the Great East Japan Earthquake of 2011 harmed firms several trading partners removed from the earthquake almost as much as stricken firms' immediate trading partners.[134] The earthquake's economic disruption also struck the United States, reducing U.S. manufacturing by 1% and durable goods production by almost 2%.[135]

Banking is a notable industry in which market power can lead to systemic risk.[136] In the highly concentrated market for business lending, switching costs are high and the results of bank failure can be catastrophic, especially for smaller borrowers. The collapse of Lehman Brothers in 2008 led to a sudden reduction in credit for thousands of firms, many of which could not quickly secure

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[133] Di Giovanni et al., *supra* note 131, at 1303 ("Firm linkages are approximately three times as important as the direct effect of firm shocks in driving aggregate fluctuations.").

[134] *See* Carvalho et al., *supra* note 41, at 1258 ("[W]e find that disaster-stricken firms' customers' customers experienced a 2.8 percentage point reduction in sales growth, while their suppliers' suppliers experienced a 2.1 percentage point decline.").

[135] *See* Christoph E. Boehm et al., *Input Linkages and the Transmission of Shocks: Firm-Level Evidence from the 2011 Tōhoku Earthquake*, 101 REV. ECON. STAT. 60, 62 (2019).

[136] The relationship between competition and risk in banking is complex, and many empirical questions in this arena are unsettled. Financial firms make bets that may be correlated with one another even if there are many competitors. Indeed, competition can spur banks to cluster in correlated portfolios that provide the highest short-term returns. *See* Matthew O. Jackson & Agathe Pernoud, *Systemic Risk in Financial Networks: A Survey*, 13 ANN. REV. ECON. 171 (2021), Supplemental Materials, https://www.annualreviews.org/doi/suppl/10.1146/annurev-economics-083120-111540/suppl_file/EC13_Jackson_SupMat.pdf, at 3-4. Thus, the industry may be vulnerable to systemic failure despite a large number of significant rivals. Moreover, banks engage in extensive horizontal trading among themselves, and the density of connections between banks can both reduce risk (through diversification) and increase it (by exposing banks to more sources of shocks). *See id.* at 7; Jackson & Pernoud, *supra* note 84, at 181-85 (discussing crosscutting effects of network density). For these reasons, production mavericks are especially important in banking, as they reduce contagion dangers. For recent evidence on these questions see also, *e.g.*, Mark Carlson et al., *The Effects of Banking Competition on Growth and Financial Stability: Evidence from the National Banking Era*, 130 J. POL. ECON. 462 (2022) (finding that increased banking competition in the 19th century United States promoted economic growth and increased financial risk); Kress, *supra* note 30, at 570-72 (discussing "numerous empirical studies [that] demonstrate[] that large bank mergers increase financial instability."); Prasanna Gai et al., *Complexity, Concentration, and Contagion*, 58 J. MONETARY ECON. 453, 467 (2011) (finding, using simulations, that "for a given level of complexity, a more concentrated network is more vulnerable to shocks to key banks"); Tommaso Gasparini, *Imperfect Banking Competition and the Propagation of Uncertainty Shocks* (working paper 2023), https://www.crctr224.de/research/discussion-papers/archive/dp416, at 1 (finding, "[u]sing a panel dataset of 44 countries . . . that lower banking competition amplifies the negative impact of uncertainty on output growth."). My thanks to Brett McDonnell and David Wishnick for helpful thoughts on this point.

alternative sources of funding. That credit crunch explains between one third and one half of small and medium size borrowers' subsequent layoffs.[137] Those layoffs, in turn, had large spillover effects of their own.[138] European firms tied to high-risk banks laid off workers and pulled back in other ways as well, including through sharp reductions in investment and in credit extended to customers.[139]

Some mergers preceding the financial crisis of 2008 appear to have exacerbated the crash. For example, in 2000 the Swiss bank Credit Suisse (now part of UBS) bought New York's junk bond king, Donaldson, Lufkin & Jenrette (DLJ), for $11.5 billion.[140] The merger swelled Credit Suisse's position in junk bonds and commercial loans and was sold as a move "to better compete against Wall Street's giants."[141] As a result, more firms relied on Credit Suisse as a source of credit, including some that had previously borrowed from both firms. The merger was approved in under three months with no conditions attached.[142]

In the following seven years Credit Suisse became a leading packager of mortgage-backed securities.[143] After real estate prices crashed in 2007, Credit Suisse had to reduce lending as it struggled to survive. In the single year between 2007 and 2008 the bank cut its commercial lending by 82%, more than

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[137] *See* Gabriel Chodorow-Reich, *The Employment Effects of Credit Market Disruptions: Firm-Level Evidence from the 2008-09 Financial Crisis*, 129 Q. J. ECON. 1, 1 (2014).

[138] For an example of the large spillover effects of layoffs, *see, e.g.*, Joanne W. Hsu et al., *Unemployment Insurance as a Housing Market Stabilizer*, 108 AMER. ECON. REV. 49, 49 (2018).

[139] *See* Samuel Bentolila et al., *When Credit Dries Up: Job Losses in the Great Recession*, 16 J. EURO. ECON. ASSOC. 650, 650 (2018); Federico Cingano et al., *Does Credit Crunch Investment Down? New Evidence on the Real Effects of the Bank-Lending Channel*, 29 REV. FIN. STUDIES 2737, 2739 (2016). *See also* Viral V. Acharya et al., *Real Effects of the Sovereign Debt Crisis in Europe: Evidence from Syndicated Loans*, 31 REV. FIN. STUDIES 2855, 2855 (2018).

[140] *See* Randall Smith & Charles Gasparino, *Credit Suisse Unit Confirms Agreement to Acquire DLJ in a $11.5 Billion Deal*, WALL ST. J. (Aug. 30, 2000), https://www.wsj.com/articles/SB967567494108117264.

[141] *Id.*

[142] *See* Press Release, Credit Suisse, Credit Suisse Group Completes Acquisition of Donaldson, Lufkin & Jenrette (Nov. 3, 2000), https://www.sec.gov/Archives/edgar/data/29646/000094787100000697/0000947871-00-000697-0004.txt.

[143] *See* Press Release, Dep't Just., Credit Suisse Agrees to Pay $5.28 Billion in Connection with Its Sale of Residential Mortgage-Backed Securities, (Jan. 17, 2017), https://www.justice.gov/opa/pr/credit-suisse-agrees-pay-528-billion-connection-its-sale-residential-mortgage-backed. The settlement was the eighth-largest settlement paid by any bank connected to the financial crisis. Kara Scannell, *US Haul from Credit Crisis Bank Fines Hits $150bn*, FIN. TIMES (Aug. 6, 2017), https://www.ft.com/content/71cee844-7863-11e7-a3e8-60495fe6ca71.

$100 billion.[144] Though the credit crunch was global, Credit Suisse's borrowers were among the worst-hit.[145] The bank reduced its lending by more than all but seven other firms, plunging from the ninth largest global lender in 2007 to the twenty-second in 2008.[146] In 2008, the bank managed 59% fewer high-yield bonds than the year before, a $10 billion decline.[147] Credit Suisse's pullback led to a catastrophic cascade. Firms that had a borrowing relationship with Credit Suisse were much less likely to get a loan than firms that regularly borrowed from healthier banks.[148] This hurt not only those firms, but also their employees, customers, and suppliers.[149]

Economists Mary Amiti and David Weinstein point to another striking example of financial market power leading to systemic harm. In 2005, a trader at one of Japan's largest banks, Mizuho Financial Group, sold 610,000 shares of a small recruiting company for 1 yen apiece instead of 1 share for 610,000 yen.[150] That costly error did not just harm Mizuho—it led to an aggregate decline in lending to the entire Japanese economy.[151] Amiti and Weinstein find that similar idiosyncratic banking shocks explain 30 to 40 percent of the variation in total lending and investment in Japan between 1990 and 2010.[152]

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[144] Bloomberg Mandated Lead Arranger Ranking: Table - Global Loans (2007) (Bloomberg LP terminal data generated Mar. 22, 2019) [hereinafter Bloomberg Global Loan Data 2007]; Bloomberg Mandated Lead Arranger Ranking: Table - Global Loans (2008) (Bloomberg LP terminal data generated Mar. 22, 2019) [hereinafter Bloomberg Global Loan Data 2008].

[145] *See* Chodorow-Reich, *supra* note 137, at 2-3.

[146] Gabriel Chodorow-Reich, Employment Effects of Credit Market Disruptions Variables (2007) (excel sheet), https://scholar.harvard.edu/chodorow-reich/publications; Bloomberg Global Loan Data 2007, *supra* note 144; Bloomberg Global Loan Data 2008, *supra* note 144.

[147] Bloomberg Bookrunner Ranking: Table – US Loans (2007) (Bloomberg LP terminal data generated Mar. 14, 2019); Bloomberg Bookrunner Ranking: Table – US Loans (2008) (Bloomberg LP terminal data generated Mar. 14, 2019).

[148] *See* Chodorow-Riech, *supra* note 137, at 3 ("Precrisis clients of banks in worse financial condition had a 50% lower likelihood of receiving a new loan or a positive modification in the nine months following Lehman's failure.").

[149] *See supra* notes 138-139; *see also, e.g.*, Bettina Wassener, *Credit Suisse to Cut Another 5,300 Jobs*, N.Y. TIMES (Dec. 4, 2008), https://www.nytimes.com/2008/12/04/world/asia/04iht-04bank.html.

[150] *See Please May I Take It Back?,* ECONOMIST (Dec. 14, 2005), https://www.economist.com/finance-and-economics/2005/12/14/please-may-i-take-it-back.

[151] *See* Mary Amiti & David E. Weinstein, *Online Appendix for How Much Do Idiosyncratic Bank Shocks Affect Investment? Evidence from Matched Bank-Firm Loan Data*, 126 J. POL. ECON., at 7 (2018), https://www.journals.uchicago.edu/doi/suppl/10.1086/696272/suppl_file/2016003Appendix.pdf.

[152] *See* Mary Amiti & David E. Weinstein, *How Much Do Idiosyncratic Bank Shocks Affect Investment? Evidence from Matched Bank-Firm Loan Data*, 126 J. POL. ECON. 525, 525 (2018).

Nation states, too, are affected by banks' market power. Economists have found that developing countries that had borrowed from banks that were subsequently hit by an unrelated shock end up with higher borrowing costs and are more likely to experience a debt crisis than countries that had borrowed from more stable banks.[153] If banks did not have market power, these idiosyncratic risks would not so easily transmit to their customers and the economy as a whole.[154]

The financial industry also points to the important role production mavericks can play in reducing systemic risk. Banks often herd into correlated portfolios, and such correlations significantly exacerbate—and even cause—financial crises.[155] The decline of a single asset class can affect a broad swath of the banking sector, leading to contagion between institutions and self-fulfilling prophesies of collapse.[156] In these settings, banks that have unusual portfolios provide ballast to the economy by withstanding, and at times even benefitting from, shocks that harm their peers.[157]

ii.   Firm Centrality

Mergers that concentrate central industries are especially likely to increase systemic risk. Central industries are those in which firms trade with many firms that in turn trade with many firms.[158] These are hub sectors such as trucking, oil and gas, electricity generation, and finance: industries that are connected to many others.[159] Centrality is conceptually distinct from market power. A monopolist in hunting and trapping equipment would be less central than a powerful bank because hunting and trapping is one of the most peripheral sectors in the U.S. economy.[160]

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[153] *See* Juan M. Morelli et al., *Global Banks and Systemic Debt Crises*, 90 ECONOMETRICA 749 (2022).

[154] *See* Kress, *supra* note 30, at 527, 570-72.

[155] *See* Jackson & Pernoud, *supra* note 84, at 188-89.

[156] *See id.*

[157] *See* Matthew Elliott et al., *Financial Networks and Contagion*, 104 AMER. ECON. REV. 3115, 3143-44 (2014); *see also id.* Online Appendix: Financial Networks and Contagion, https://assets.aeaweb.org/asset-server/articles-attachments/aer/app/10410/20130115_app.pdf, at 8-11 (performing simulations using different degrees of asset correlations).

[158] This definition comes from Vasco M. Carvalho, *From Micro to Macro via Production Networks*, 28 J. ECON. PERSP. 23, 36 (2014).

[159] *See id.* at 36-38 (trucking and oil and gas are central); Baqaee & Farhi, *supra* note 121, at 1156 (electricity generation is central); Everett Grant & Julieta Yung, *The Double-Edged Sword of Global Integration: Robustness, Fragility, and Contagion in the International Firm Network*, 36 J. APPLIED ECONOMETRICS 760 (2021) (finance is central).

[160] *See* Carvalho, *supra* note 158, at 37-38.

Firms that trade with many others play an outsized role in orchestrating economic activity, and when such firms suffer a negative shock they cause outsized harm.[161] In some cases, central sectors are key to virtually the entire economy. For example, though both contribute about 4% of U.S. GDP, turning off all electricity generation in the U.S. would cause more economic devastation than shutting down Walmart.[162] Recent work on Covid-19 similarly highlights the importance of central firms in propagating shocks.[163] And the financial crisis of 2008 is a notable example of central firms causing systemic harm, as the collapse of U.S. real estate prices brought down large banks, sparking a credit crunch that harmed the whole economy.[164]

Central firms impose their direct risk not only on trading partners, but, because they are so interconnected, they also carry risk from one sector of the economy to another.[165] Central firms are exposed to risks from many different parts of the economy, but while this helps stabilize the firms themselves (by diversifying their risks) it does not appear to balance out their increased risk of conducting negative shocks.[166] Recent empirical work has found that shocks to

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[161] *See* Baqaee, *supra* note 58, at 1819; Acemoglu et al., *supra* note 87, at 1982; David Rezza Baqaee, Cascading Failures in Production Networks, Presentation, at 62 (2017), https://sites.google.com/site/davidbaqaee/, at 62; Ian Dew-Becker, *Tail Risk in Production Networks*, 92 ECONOMETRICA (forthcoming 2024), https://t.co/jad76tfhCB, at 3 ("The importance of a sector depends on how much of GDP is downstream of it . . . . [T]he size of a sector in good times does not determine its importance in extreme situations. A sector can be simultaneously small and also systemically important—utilities being the canonical example.").

[162] *See* Baqaee & Farhi, *supra* note 121, at 1156; *see also* Dew-Becker, *supra* note 161, at 5 (comparing restaurants and electricity generation).

[163] *See* Brian Cevallos et al., *Production Networks and Firm-Level Elasticities of Substitution* (STEP Working Paper WP027, 2022), https://steg.cepr.org/sites/default/files/2022-09/WP027%20CevallosFujiyGhoseKhanna%20ProductionNetworksAndFirmLevelElasticities OfSubstitution_0.pdf.

[164] *See generally* ADAM TOOZE, CRASHED (2018).

[165] Carvalho, *supra* note 158, at 31. *See also* Elliott et al., *supra* note 43, at 2740 ("[P]olicymakers should be especially interested in identifying upstream, or central, complex industries in a critical equilibrium."); Acemoglu et al., *supra* note 87, at 2004 ("[S]izable aggregate fluctuations may originate from microeconomic shocks only if there are significant asymmetries in the roles that sectors play as direct or indirect suppliers to others."); Dew-Becker, *supra* note 161, at 28 (noting that shocks to "the energy sector, financial services, and legal and accounting institutions" can lead to systemic harm because those events "all represent shocks to universal inputs").

[166] *See* Grant & Yung, *supra* note 159, at 1; *see also* Taschereau-Dumouchel, *supra* note 132, at 2 ("[H]ighly connected firms are more resilient to shocks but, upon shutting down, they create larger cascades that lead to the exit of several of their neighbors."). Taschereau-Dumouchel does not compute the expected welfare effects of shocks to highly central firms as compared to less central firms.

highly central "bottleneck" firms "reduce the productive capacity of the economy."[167]

Mergers are therefore likely to increase systemic risk when they consolidate central industries, increasing economic exposure to individual firms. For example, the merger between U.S. Airways and American Airlines further consolidated the highly central airline industry, increasing the post-merger firm's centrality.[168]

iii.   Firm Size

Mergers that significantly increase a merged firm's size as a fraction of national economic activity are, all else equal, likely to increase systemic risk. This is an empirical claim, not a legal one. I am not suggesting that a merger can be unlawful simply because it increases the size of a merged firm.[169]

The intuition here is straightforward: diversity reduces risk. Think of the economy as a stock portfolio. Just as a stock portfolio's volatility falls as it becomes more diverse, so national economies calm as they become less dependent on a handful of firms. If a fund owned shares in ten firms and two of the largest firms in their portfolio merged, that would reduce its diversification—the previously independent firms would now be subject to newly shared fluctuations—and the fund's volatility would increase.[170]

Xavier Gabaix showed theoretically why the more concentrated a country's total sales are by firm, the more volatile its GDP growth (all else equal).[171] That contention has been validated empirically in studies looking at a cross-section of international economies.[172] And studies taking advantage of fine-grained

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[167] *See* Elliott & Golub, *supra* note 44, at 686.

[168] On airline centrality, see Filipe Campante & David Yanagizawa-Drott, *Long-Range Growth: Economic Development in the Global Network of Air Links*, 133 Q.J. ECON. 1395, 1400 (2018).

[169] As I will explore in Part II, an increase in firm size is not by itself an actionable lessening of competition under the Clayton Act.

[170] *See* Ian Ayres & Edward Fox, *Alpha Duties: The Search for Excess Returns and Appropriate Fiduciary Duties*, 97 TEX. L. REV. 445, 449-50 (2019).

[171] *See* Xavier Gabaix, *The Granular Origins of Aggregate Fluctuations*, 79 ECONOMETRICA 733, 737, 741 (2011); di Giovanni et al., *supra* note 131, at 1305.

[172] *See* di Giovanni & Levchenko, *supra* note 115, at 1084-85. *See also* Caselli et al., *supra* note 118, at 451.

European corporate data have found that shocks to large firms account for a significant proportion of economic volatility in Belgium, Sweden, and France.[173]

In our context, an increase in firm size via merger will thus increase systemic risk when two conditions are met. First, the merger must leave the combined firm with idiosyncratic risk that its predecessor firms did not share before the merger. Second, the merger must not reduce the probability of negative shocks sufficiently to offset the increase in the magnitude of systemic harm in the event of a negative shock.

Single firms—even those with unrelated units—almost always possess firm-wide idiosyncratic risks.[174] Units within a firm share financial obligations, executives, and owners, and also typically share functions like accounting, human resources, and IT. In non-conglomerate mergers the shared risks can be more direct, as different units may depend on similar suppliers or other inputs. Thus, mergers will generally subject the merged firm to some idiosyncratic risks that were not shared by the merging parties before the combination. To be clear, this does not mean that mergers will generally *increase* idiosyncratic risk, only that the fate of the constituent parts of the merged firm will be more correlated than they were pre-merger.

The second criterion will often be met as well. As a rule, large firms experience less volatile sales than do small firms, though it is unsettled to what degree.[175] By depending on a more diverse pool of customers and suppliers, large firms lower their volatility.[176] But large firms play such an important role

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[173] *See* Glenn Magerman et al., *Heterogeneous Firms and the Micro Origins of Aggregate Fluctuations* (National Bank of Belgium Working Paper No. 312, 2017), at 4, https://static1.squarespace.com/static/55e85d72e4b0146280523def/t/5bd834f09140b759d930e 412/1540895994454/aggfluc_live.pdf; Richard Friberg & Mark Sanctuary, *The Contribution of Firm-Level Shocks to Aggregate Fluctuations: The Case of Sweden*, 147 ECON. LETTERS 8, 10 (2016); di Giovanni et al., *supra* note 131, at 1303.

[174] *See, e.g.*, Amiti & Weinstein, *supra* note 152, at 527 n.1; Amiti & Weinstein, *supra* note 151, at 7; di Giovanni & Levchenko, *supra* note 115, at 1116.

[175] *Compare* Yeh, *Revisiting the Origins of Business Cycles with the Size-Variance Relationship*, REV. ECON. STAT. (forthcoming 2024) https://www.dropbox.com/s/kcl2ix2l2dm369r/granularity_August2021.pdf?dl=0, at 1 ("documenting a robust, negative relation between a firm's volatility and its size") *with* di Giovanni & Levchenko, *supra* note 115, at 1116 ("In practice . . . the negative relationship between firm size and its sales volatility is not very strong.").

[176] *See* di Giovanni et al., *supra* note 131, at 1315; Herskovic et al., *supra* note 41, at 4; Kramarz et al., *supra* note 111, at 2 & n.4.

in the economy that they impose significant systemic risk despite their relative stability.[177]

Large firms need not contribute to systemic risk disproportionately to their share of GDP to increase risk. Because large individual firms make up such a large share of economic activity, when they have idiosyncratic fluctuations those shocks are not canceled out by the fluctuations of other companies.[178] For example, if Apple's sales were to fall 10% this year because a new iPhone release was a flop, many smaller firms would need to have idiosyncratically positive years to make up for the $40 billion decline in Apple's revenue. By contrast, economists have found that shocks hitting smaller firms cancel out and so contribute little to economy-wide risk.[179] We should therefore expect that mergers that significantly increase the combined firm's share of economic activity will generally increase systemic risk.

II.   Risk as a Competition Harm Under Section 7

Mergers can increase direct and systemic risk. But are such mergers an antitrust problem? In this Part, I argue that they can be under conventional interpretations of the Clayton Act. I will address how considering risk should concretely change merger review in Part III.

A merger only violates Section 7 of the Clayton Act if "the effect of such acquisition may be substantially to lessen competition, or to tend to create a monopoly."[180] As the Third Circuit recently summarized the law, to win a Section 7 case, a plaintiff must (1) "propose [a] proper relevant market" and (2)

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[177] *See* di Giovanni & Levchenko, *supra* note 115, at 1116 ("If the volatility of sales decreases sufficiently fast in firm size, larger firms will be so much less volatile that they will not affect aggregate volatility. In fact, [in] an economy in which larger firms are just agglomerations of smaller units each subject to [their own idiosyncratic] shocks . . . shocks to firms cannot generate aggregate fluctuations."); Vasco M. Carvalho & Basile Grassi, *Large Firm Dynamics and the Business Cycle*, 109 AMER. ECON. REV. 1375, 1410 (2019). For various estimates of the role large firms play in U.S. economic volatility, see *id.* at 1377; Gabaix, *supra* note 171, at 733; Yeh, *supra* note 175, at 1. These findings do not entirely agree with one another numerically. But they all show that, though large firms are less volatile than small firms, they are not sufficiently stable to avoid imposing significant systemic risk on the national economy.

[178] *See* Basile Grassi, *IO in I-O: Size, Industrial Organization and the Input-Output Network Make a Firm Structurally Important* (working paper 2017), https://docs.google.com/viewer?a=v&pid=sites&srcid=ZGVmYXVsdGRvbWFpbnxncmFzc2l iYXNpbGV8Z3g6NDBjMDIzYWJjODI0M2RhNA, at 32.

[179] *See* Carvalho & Grassi, *supra* note 177, at 1410. *See also* di Giovanni et al., *supra* note 131, at 1328 ("The more fat-tailed is the distribution of firm size, the larger will be the Herfindahl index [i.e., a measure of concentration] and the greater will be the aggregate volatility generated by firm-specific shocks.").

[180] 15 U.S.C. § 18.

"show that the effect of the merger in that market is likely to be anticompetitive."[181]

Courts have held that plaintiffs can use several means to show that there is a reasonable probability that a merger will have anticompetitive effects. All of them test whether the merger will significantly reduce competition, whether between the merging parties or in the market as a whole. And by competition, courts mean rivalry: firms' striving to capture business by serving the needs of trading partners.[182]

Plaintiffs can use structural evidence to forecast whether a merger will lessen competition. The Supreme Court has held that sufficiently clear evidence that a merger will concentrate an already concentrated market creates a presumption that the transaction is anticompetitive.[183] Such consolidation makes it less

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[181] United States v. United States Sugar Corp., 73 F.4th 197, 203 (3d Cir. 2023) (modification omitted); *see also, e.g.*, United States v. Marine Bancorporation, Inc., 418 U.S. 602, 618 (1974) ("Determination of the relevant product and geographic markets is a necessary predicate to deciding whether a merger contravenes the Clayton Act." (internal quotation marks and citation omitted)); Saint Alphonsus Med. Center v. St. Luke's Health Sys., Ltd., 778 F.3d 775, 783 (9th Cir. 2015); United States v. Baker Hughes Inc., 908 F.2d 981, 982 (D.C. Cir. 1990). In a working paper, I argue that the likelihood standard applied by many courts (including, most recently, the Third Circuit in *United States Sugar Corp.*) is neither faithful to the Clayton Act nor founded on sound economics. *See* Doni Bloomfield, *Getting to "May Be": Regulating Harm to Future Competition* (working paper 2023); *see also* Steven C. Salop, *A "Probability of a Probability": Understanding the Section 7 Reasonable Probability Standard*, U. BALTIMORE L. REV. (forthcoming 2024).

[182] For courts exploring the meaning of the terms "competition" or "anticompetitive effects," see, e.g., Int'l Shoe Co. v. FTC, 280 U.S. 291, 298 (1930) ("Section 7 of the Clayton Act . . . was intended for the protection of the public against the evils which were supposed to flow from the undue lessening of competition."); United States v. El Paso Nat. Gas Co., 376 U.S. 651, 659 (1964) (explaining that a market is not competitive because "merchants are [not] in a continuous daily struggle to hold old customers and to win new ones over from their rivals"); Nat'l Soc. of Pro. Engineers v. United States, 435 U.S. 679, 695 (1978) (Congress's "assumption that competition is the best method of allocating resources in a free market recognizes that all elements of a bargain—quality, service, safety, and durability—and not just the immediate cost, are favorably affected by the free opportunity to select among alternative offers."); NCAA v. Bd. of Regents of Univ. of Oklahoma, 468 U.S. 85, 106-08 (1984) ("The anticompetitive consequences of [the] arrangement [at issue] are apparent. Individual competitors lose their freedom to compete. Price is higher and output lower than they would otherwise be, and both are unresponsive to consumer preference."). *See also* Posner, *supra* note 33, at 5 ("Competition means rivalry . . . [S]ection 7 forbids mergers that reduce the struggle for the business of third parties—customers, workers, suppliers, investors."); 2023 MERGER GUIDELINES, *supra* note 25, at § 2.2 ("Competition often involves firms trying to win business by offering lower prices, new or better products and services, more attractive features, higher wages, improved benefits, or better terms relating to various additional dimensions of competition.").

[183] *See* Philadelphia Nat'l Bank, 374 U.S. at 362.

likely, all else equal, that firms in the post-merger market will compete as vigorously.[184]

Plaintiffs can also present direct evidence that a merger will lessen competition.[185] Such evidence can consist of specific projections that the merger will harm customers because of reduced rivalry.[186] The paradigmatic examples of anticompetitive effects are increased price or reduced output,[187] but courts have concluded that virtually any harm to customers as a result of significantly slackened competition can be a relevant anticompetitive effect.[188] The critical

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[184] *See, e.g.*, H.J. Heinz Co., 246 F.3d at 715-16 ("Increases in concentration above certain levels are thought to raise a likelihood of interdependent anticompetitive conduct." (internal quotation marks, citation, and modifications omitted)).

[185] *See, e.g.*, St. Alphonsus Medical Center, 778 F.3d at 786; FTC v. Hackensack Meridian Health, Inc., 30 F.4th 160, 173 (3d Cir. 2022) (collecting cases).

[186] *See* Ohio v. Am. Express Co., 138 S. Ct. 2274, 2284 (2018) ("Direct evidence of anticompetitive effects [consist of] proof of actual detrimental effects on competition, such as reduced output, increased prices, or decreased quality in the relevant market." (internal quotation marks, citations, and modifications omitted)); United States Sugar Corp., 73 F.3d at 207 ("[W]hen defining a market, courts may draw distinctions as necessary to understand a merger's effects on consumers."). *See also, e.g.*, Hackensack Meridian, 30 F.4th, at 172–75; FTC v. Univ. Health, Inc., 938 F.2d 1206, 1219–20 & n. 27 (11th Cir.1991); Chicago Bridge & Iron Co. N.V. v. FTC, 534 F.3d 410, 431–32 (5th Cir. 2008); FTC v. H.J. Heinz Co., 246 F.3d 708, 719 (D.C. Cir. 2001); 2010 MERGER GUIDELINES, *supra* note 10, at § 2; 2023 MERGER GUIDELINES, *supra* note 25, at § 2.2, 4.2.

[187] *See* NCAA v. Alston, 141 S. Ct. 2141, 2155 (2021).

[188] *See, e.g.*, Hackensack Meridian Health, Inc., 30 F.4th at 172 ("Anticompetitive effects can include price increases and reduced product quality, product variety, service, or innovation.") (citing 2010 MERGER GUIDELINES, *supra* note 10, at § 1); United States v. AT&T, Inc., 916 F.3d 1029, 1045 (D.C. Cir. 2019) ("[T]he court does not hold that quantitative evidence of price increase is required in order to prevail on a Section 7 challenge . . . . Vertical mergers can create harms beyond higher prices for consumers, including decreased product quality and reduced innovation."); Lifewatch Servs. Inc. v. Highmark Inc., 902 F.3d 323, 340 (3d Cir. 2018) (finding a complaint alleging that a restraint, *inter alia*, "hinders research, development, and innovation" to properly plead antitrust harm); Duty Free Americas, Inc. v. Estee Lauder Cos., 797 F.3d 1248, 1263 (1lth Cir. 2015) ("Actual anticompetitive effects include, but are not limited to, reduction of output, increase in price, or deterioration in quality."); Crown Zellerbach Corp. v. FTC, 296 F.2d 800, 817 (9th Cir. 1961) ("A promptness in supplying orders is a well known factor in advantageous competition."); Philadelphia Nat'l Bank, 374 U.S. at 368 ("Competition among banks exists at every level—price, variety of credit arrangements, convenience of location, attractiveness of physical surroundings, credit information, investment advice, service charges, personal accommodations, advertising, miscellaneous special and extra services . . . ."). For a survey of how courts summarize the goals of antitrust law, see Herbert Hovenkamp, *Antitrust's Goals in the Federal Courts* (working paper 2023), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4519993. For enforcers' perspective, see 2010 MERGER GUIDELINES, *supra* note 10, at § 1 (concluding that the Clayton Act bars mergers that are "likely to encourage one or more firms to raise price, reduce output, diminish innovation, or *otherwise harm customers* as a result of diminished competitive constraints or incentives"

point for our purposes is that for a merger's harm to customers to be cognizable under Section 7, it must not merely be an incidental byproduct of a merger but the result of lessened competition.

A plaintiff carries the burden to show a Section 7 violation throughout litigation, and defendants can rebut a prima facie case that the merger is anticompetitive by showing either that the plaintiff has failed to properly define a relevant antitrust market[189] or failed to show a reasonable probability of anticompetitive effects in a market.[190] Whether a defendant can rebut a plaintiff's prima facie case by demonstrating that anticompetitive effects are offset by merger-specific efficiencies is still unsettled.[191] But the antitrust agencies have long maintained that they consider efficiencies in enforcement decisions.[192]

With that doctrinal background, we can now explain why antitrust authorities and courts should care about risk in merger review—namely, because increased risk can be an anticompetitive effect in a relevant market. Mergers can increase risk by reducing rivalry in an antitrust market. Plaintiffs can therefore use the fact that a merger is forecast to increase risk as direct evidence of a merger's probable anticompetitive effects, just as they can with projections of increased price or reduced quality. But because mergers can increase risk both by reducing rivalry and through other means, to make out a Section 7 case plaintiffs will need to show how a merger's risk effects are a manifestation of lessened competition.[193]

(emphasis added)); 2023 MERGER GUIDELINES, *supra* note 25, at § 1 ("Competition is a process of rivalry that incentivizes businesses to offer lower prices, improve wages and working conditions, enhance quality and resiliency, innovate, and expand choice, among many other benefits.").

[189] *See* United States Sugar Corp., 74 F.4th at 201-02; FTC v. Lundbeck, Inc., 650 F.3d 1236, 1239 (8th Cir. 2011).

[190] *See, e.g.*, Baker Hughes, 908 F.2d at 992; H.J. Heinz Co., 246 F.3d at 718; Penn State Hershey Med. Center, 838 F.3d at 347; Sanford Health, 926 F.3d at 964.

[191] *See* United States v. Anthem, Inc., 855 F.3d 345, 353 (D.C. Cir. 2017) ("Despite . . . widespread acceptance of the potential benefit of efficiencies as an economic matter . . . it is not at all clear that they offer a viable legal defense to illegality under Section 7."); *see also, e.g.*, H.J. Heinz Co., 246 F.3d at 720; Saint Alphonsus Med. Center, 778 F.3d at 788-91; Penn State Hershey Med. Center, 838 F.3d at 347-48; FTC v. Tenet Health Care Corp., 186 F.3d 1045, 1053-55 (8th Cir. 1999); FTC v. Univ. Health, Inc., 938 F.2d 1206, 1222 (11th Cir. 1991).

[192] *See* 2010 MERGER GUIDELINES, *supra* note 10, at § 10; 2023 MERGER GUIDELINES, *supra* note 25, at § 3.3.

[193] For example, mergers that significantly increase a firm's centrality or size do not thereby necessarily reduce rivalry. A conglomerate merger combining two large companies in distinct markets may well increase systemic risk, as explained in Section I.C.iii, *supra*. But unless the

Increased risk can be a symptom of lessened competition in several common scenarios. In these situations, it will be straightforward for the agencies to show that a forecast of increased risk is a projected anticompetitive effect.

First, mergers can increase risk by eliminating alternative suppliers, thus reducing competition to serve customers reliably.

This effect might manifest shortly after a merger with reduced explicit rivalry to supply goods or services without interruption. For example, leading cloud providers Amazon, Microsoft, and Google compete fiercely to demonstrate their reliability.[194] A merger between two leading cloud providers might give the merged entity the incentive and ability to slacken resilience investments in at least one of its cloud products because a sizable share of customers sensitive to the change would be diverted to its other product.[195] Mergers that threaten to eliminate a production maverick may be especially concerning on this front because such firms naturally boost competition to offer customers resilient options.[196]

In other cases, the competitive harm from eliminating an additional supplier may manifest only in the event of a shock. The meatpacking mergers discussed in Part I are illustrative. The DOJ could have argued that, by removing alternative suppliers and consolidating manufacturing, those mergers would increase risk in the national market for beef (on the supplier side) and local

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merger eliminates potential competition between the two companies, or dampens rivalry in either market, the transaction would likely not have a reasonable probability of significantly lessening competition, and so would pose no problem under Section 7. For further discussion, see *infra* Section III.C.

[194] *See* David Jeans, *Amazon's Devoted Cloud Customers Face A Decision After Outages: Leave, Stay Or Diversify?*, FORBES (Jan. 27, 2022), https://www.forbes.com/sites/davidjeans/2022/01/27/amazon-aws-outages-multi-cloud/?sh=48df7f2d4cec. *See also* Leslie Hook & Tim Bradshaw, *Apple Signs Up to Google Cloud Services*, FIN. TIMES (March 17, 2016), https://www.ft.com/content/d5d3d5fc-ebc9-11e5-bb79-2303682345c8. For an example in banking, see Amiti & Weinstein, *supra* note 152, at 547-48 (discussing Japanese firms' tendency to spread out their borrowing among many banks).

[195] *See* 2010 MERGER GUIDELINES, *supra* note 10, at § 6.1. As another example, consider the FTC's case against Graco Inc. In that case, the FTC charged Graco with acquiring its two closest rivals, leading to a virtual monopoly in equipment for applying fast-set chemicals used in protective coatings. According to the FTC, prior to the mergers equipment suppliers often carried competing fast-set equipment products. After the mergers, Graco closed its former competitors' manufacturing facilities and stopped making competing products. The agency settled with Graco by requiring it to take several steps to facilitate competitive entry. *See Analysis of Agreement Containing Consent Order To Aid Public Comment*, FED. TRADE COMM'N (2013), https://www.ftc.gov/sites/default/files/documents/cases/2013/04/130418gracoanal.pdf.

[196] For a further discussion, see *infra* notes 219-224 and accompanying text.

markets for cattle (on the buyer side).[197] Although the agencies already seek to block many transactions that lead to a firm controlling a large portion of a concentrated market, they weigh those effects against merger-specific efficiencies that can boost competition.[198] Here, the mergers plausibly offered efficiencies that would allow the post-merger firms to compete more vigorously on prices in good times.[199] By using bigger and more efficient plants, the merged firms drove down costs and reduced slack capacity.[200]

But the DOJ could have concluded that these efficiencies were outweighed by the fact that, in the event of a shock, the mergers threatened to significantly reduce rivalry in the markets for beef and for cattle.[201] In challenging these mergers the DOJ could have first presented structural evidence that the transactions would substantially concentrate already concentrated markets. If the merging parties responded with evidence that efficiencies would obviate any anticompetitive effects, the DOJ could present countervailing evidence that, once accounting for reduced competition in a crisis, the mergers would lead to

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[197] *See supra* notes 71-83 and accompanying text.

[198] *See* 2023 MERGER GUIDELINES, *supra* note 25, at § 3.3; 2010 MERGER GUIDELINES, *supra* note 10, at § 10.

[199] At least, in the market for beef. Whether efficiencies increased competition in the markets for cattle has received less attention. *See* Michael K. Wohlgenant, *Competition in the US Meatpacking Industry*, 5 ANN. REV. RESOURCE ECON. 1, 10 (2013); U.S. GOV'T ACCOUNTABILITY OFF., RETAIL FOOD PRICES GREW FASTER THAN THE PRICES FARMERS RECEIVED FOR AGRICULTURAL COMMODITIES, BUT ECONOMIC RESEARCH HAS NOT ESTABLISHED THAT CONCENTRATION HAS AFFECTED THESE TRENDS 28 (2009), https://www.gao.gov/new.items/d09746r.pdf. Between 1980 and 2019, the real price of beef fell by 22%, more than other animal food products and more than food and beverages overall. *See* USDA, *Historical Monthly Price Spread Data for Beef, Pork, Broilers* (Excel Spreadsheet, Feb. 28, 2020), https://www.ers.usda.gov/webdocs/DataFiles/52160/history.xls?v=8914.7; *CPI Inflation Calculator*, U.S. BUR. LAB. STATS. (2020), https://www.bls.gov/data/inflation_calculator.htm (applying CPI Inflation Calculator, set to normalize to January 2019, to Historical Price Spread Data entry for January 1980); *Consumer Price Index for All Urban Consumers: Meats, Poultry, Fish, and Eggs in U.S. City Average*, FED. RESERVE BANK OF ST. LOUIS (2021), https://fred.stlouisfed.org/series/CUSR0000SAF112; *Consumer Price Index for All Urban Consumers: Food and Beverages in U.S. City Average*, FED. RESERVE BANK OF ST. LOUIS (2021), https://fred.stlouisfed.org/series/CPIFABSL.

[200] *See* Catherine J. Morrison Paul, *Cost Economies and Market Power: The Case of the U.S. Meat Packing Industry*, 83 REV. ECON. STAT. 531 (2001); Catherine J. Morrison Paul, *Market and Cost Structure in the U.S. Beef Packing Industry: A Plant-Level Analysis*, 83 AMER. J. AGR. ECON. 64 (2001).

[201] For simplicity, I am referring to the series of mergers as being litigated in a single case. In reality, the government could have concluded that risk effects would outweigh efficiencies in only some, or even none, of these mergers, depending on the particular facts of the case. The point is conceptual: there were tradeoffs across these mergers between efficiencies and risk, and the risk effects resulted from a lessening of competition.

worse prices for trading partners on average over time.[202]   (Such a showing would depend on the existence of reliable relevant data, an issue I discuss more below.)[203]

Similarly, mergers can increase risk by eliminating a potential competitor. Combining two firms in related markets that would otherwise have had the incentive and ability to compete in the future can substantially lessen competition and increase customer risk. For example, the Teva-Allergan merger combined two of the world's most significant manufacturers of generic drugs and removed the threat that either firm would seek to enter and compete with the other in hundreds of individual therapy markets.[204] Before the merger, customers' risks in markets in which Teva (or Allergan) had market power were reduced by the possibility that Allergan (or Teva) could enter, diversifying supply and making it less likely that customers would experience simultaneous shortages.[205]   After the transaction, that potential risk-reducing competition diminished, with the exception of the specific development projects the FTC required the companies to divest as a condition of merger approval.[206]

Second, mergers can increase risk by making it easier or more attractive for firms to collude or tacitly coordinate. Firms invest in resilience in part to raise prices or increase their market share when their rivals cannot meet customer demand.[207] But when rivals agree, either implicitly or explicitly, not to compete for one another's customers, this incentive will diminish. This helps explain why increased competition generally boosts service reliability.[208] To be sure, weakened competition may have the countervailing effect of increasing firms' incentives to invest in resilience because firms with significant market power have more to lose from disruptions than those facing robust competition. But as argued above, the typical effect of increased market power is increased risk, at least in highly concentrated markets.[209]

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[202] That is, higher prices for retailers and lower prices for ranchers.

[203] *See* text accompanying notes 212-213, *infra*.

[204] *See supra* notes 1-12 and accompanying text.

[205] Amanda Starc and Thomas Wollmann have shown that supracompetitive prices in generic markets induce entry, though with some lag driven by regulatory barriers. *See* Starc & Wollmann, *supra* note 4, at 1.

[206] *See Analysis of Agreement Containing Consent Orders to Aid Public Comment*, FED. TRADE COMM'N   (2016), https://www.ftc.gov/system/files/documents/cases/160727tevaallergananalysis.pdf, at 6-8.

[207] *See* Grossman et al., *supra* note 42, at 3464. *See also supra* notes 92-93 and accompanying text.

[208] *See supra* note 94 and accompanying text.

[209] *See supra* notes 98-104 and accompanying text.

Third, mergers can increase risk by raising a merged firm's incentive and ability to anticompetitively bundle products.[210] In such cases, a merger can allow the post-merger firm to exercise its market power in one market to exclude rivals from another, inducing customers to buy multiple products from the same firm in a manner they would not otherwise freely choose to do. Such bundling can raise customers' exposure to a single firm and thereby increase risk.[211]

For example, suppose two drugmakers merged, each of which had market power in an essential therapy targeting unrelated diseases (e.g., Firm A sold amoxicillin targeting bacterial infections and Firm B sold warfarin targeting blood clots). After the merger, hospitals must still purchase both drugs. The merger may incentivize the combined firm to engage in exclusionary practices, such as bundling or loyalty discounts, to penalize hospitals that buy one of the therapies from a rival. This bundling would increase hospitals' exposure to Firm AB's idiosyncratic risks, and the risk of simultaneous failure of both products.

Gathering evidence of increased risk for litigation purposes may not be easy, because the distribution of future shocks is uncertain. Such evidence could consist, for example, of historical data showing supply chain issues resulting in simultaneous shortages across a manufacturer's portfolio, or data showing how idiosyncratic events have affected firms in the relevant industry. Recent advances in modeling supply chains may also allow the agencies to analyze how the merger will affect market incentives to invest in resilience.[212] More promisingly, the agencies can cite economic regularities that are associated with increased trading partner risk, such as significantly increased customer exposure or the elimination of a production maverick. Such regularities underlie other heuristics courts use in merger cases, most notably the structural presumption against mergers further concentrating a concentrated market.[213]

Enforcers already seek to prevent mergers that threaten to lessen competition in some of the respects mentioned above. But risk effects should make enforcers and courts more willing on the margin to condemn such mergers. Considering risk can demonstrate that the expected harm to competition from a given merger

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[210] On the anticompetitive consequences of bundling, see generally Einer Elhauge, *Tying, Bundled Discounts, and the Death of the Single Monopoly Profit Theory*, 123 HARV. L. REV. 397 (2009); 2023 MERGER GUIDELINES, *supra* note 25, at § 2.6.B. *See also* Dafny et al., *supra* note 107.

[211] *See supra* Section I.B.ii. I am not suggesting that increased customer exposure is only a Section 7 problem if a merger creates a reasonable probability of otherwise unlawful bundling. If a merger eliminates a substantial rival and would thereby increase customer exposure, that outcome can be an anticompetitive effect of the transaction. *C.f.* Posner, *supra* note 33, at 7.

[212] *See generally, e.g.*, Galdin, *supra* note 65, Grossman et al., *supra* note 42, and Elliott et al., *supra* note 42.

[213] *See* H.J. Heinz Co., 246 F.3d at 716; Philadelphia Nat'l Bank, 374 U.S. at 363.

is worse than it would otherwise appear to be.[214] Risk effects can therefore make a difference, even when they point in the same direction as other indicators of competition. Moreover, as I discuss in the next Part, considering risk should also focus the attention of enforcers and courts on largely overlooked market factors.

III.   Incorporating Risk Analysis into Merger Review

In the 2023 Merger Guidelines, the antitrust agencies observe obliquely that they will consider how transactions affect resilience when evaluating mergers.[215] But the Guidelines do not explain how to do so. In this Part, I propose three main ways for the agencies to incorporate risk analysis into merger review. First, recognizing the practical difficulties of forecasting risk in many cases, I start by outlining scenarios in which the agencies can most confidently predict that a merger will anticompetitively increase risk. Second, I argue that the agencies should change their approach to evaluating merger efficiencies in light of risk effects. I conclude by explaining how risk analysis should inform enforcement priorities when the agencies are debating which of several anticompetitive mergers to challenge.

A. Recognizing Neglected Risk-Increasing Mergers

The Guidelines already explain that the agencies' chief concern in merger review is guarding against increased market power.[216] For that reason, the fact that large mergers in low-competition markets generally increase risk should not substantially change merger review; enforcers are already wary of such mergers.[217] But enforcers neglect two types of mergers that threaten to increase risk: mergers involving production mavericks and those that significantly increase customer exposure to the merged entity. As I argued above, increased risk is an anticompetitive effect in both instances, and transactions can be challenged on that ground alone.[218]

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[214] *Cf.* JASON FURMAN ET AL., H.M. TREASURY (U.K.), UNLOCKING DIGITAL COMPETITION: REPORT OF THE DIGITAL COMPETITION EXPERT PANEL (2019), at 98-99 (arguing that antitrust agencies should apply an expected-harm framework to enforcement decisions).

[215] *See* 2023 MERGER GUIDELINES, *supra* note 25, at §§ 1, 4.2.D.

[216] *See id*. at § 1; *see also* 2010 MERGER GUIDELINES, *supra* note 10, at § 1.

[217] In addition, the agencies have recently lowered the change-in-concentration thresholds they view as presumptively unlawful. *See* 2023 MERGER GUIDELINES, *supra* note 25, at § 2.1.

[218] *See supra* notes 194-196 and *infra* notes 219-224, and accompanying text (discussing anticompetitive effect of eliminating a production maverick); *supra* notes 204-**Error! B ookmark not defined.**, 210-211, and *infra* notes 226-228, and accompanying text (discussing anticompetitive effect of increasing customer exposure). As argued above, purely conglomerate

Mergers that will eliminate a production maverick—a company that makes its goods or services using a process with risks uncorrelated to those of its rivals—raise particular risk concerns. Such mergers threaten to undercut competition more than would a merger in the same market between two firms with similar production processes. The agencies have long recognized that mergers involving a price maverick, i.e., a firm with an idiosyncratic tendency to drive prices down, are of special concern.[219] Price mavericks spur competition because they face unusual incentives to offer better prices to customers.[220] Similarly, production mavericks boost competition because their idiosyncratic approach offers customers resilient alternatives to other firms in the market.[221] The agencies should therefore be especially concerned with the anticompetitive threat posed by acquisitions by or of production mavericks. By the same token, if a merger offers to create a production maverick in a manner that could not be accomplished absent the merger, that may weigh in favor of permitting the acquisition.[222]

For example, consider the differences between Intel, one of the last semiconductor designers with its own manufacturing facilities, and AMD, which spun out its manufacturing unit in 2008 as GlobalFoundries.[223] Were Intel to sell its manufacturing unit to GlobalFoundries, leaving Intel like other "fabless" semiconductor designers, enforcers could reasonably study whether the deal would substantially increase customers' correlated risks by removing idiosyncratic resiliency inherent in retaining Intel's unusual business model.[224] The merger would not only threaten to increase GlobalFoundries's market power (by combining rivals in a concentrated market), but also to reduce rivalry in the market based on differentiated approaches to production. This latter

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mergers that do not pose a reasonable probability of lessening competition do not violate Section 7, even if they increase customer exposure.

[219] *See* 2010 MERGER GUIDELINES, *supra* note 10, at §§ 2.1.5, 5.3, 7.1, 10; 2023 MERGER GUIDELINES, *supra* note 25, at § 2.3.A.

[220] *See* Jonathan B. Baker, *Mavericks, Mergers, and Exclusion: Proving Coordinated Competitive Effects Under the Antitrust Law*s, 77 N.Y.U. L. REV. 135 (2002).

[221] *See* Elliott & Golub, *supra* note 44, at 670. Production mavericks can also bolster the competition that would exist after an industry-wide shock. *See supra* notes 197-201 and accompanying text.

[222] *See* 2010 MERGER GUIDELINES, *supra* note 10, at § 10 (discussing merger-specific efficiencies); 2023 MERGER GUIDELINES, *supra* note 25, at § 3.3 (same).

[223] *See* Cara Lombardo & Dana Cimilluca, *Intel is In Talks to Buy GlobalFoundries for About $30 Billion*, WALL ST. J. (July 15, 2021), https://www.wsj.com/articles/intel-is-in-talks-to-buy-globalfoundries-for-about-30-billion-11626387704.

[224] *Cf.* LUND ET AL., *supra* note 64, at 78 (arguing that companies can reduce supply chain risk by "bring[ing] production of key components in-house").

anticompetitive effect would constitute an independent basis on which to challenge the merger under Section 7.

In evaluating whether one of the merging parties serves as a production maverick, enforcers can rely on evidence traditionally used in merger review, such as internal corporate documents and interviews with customers.[225] Such evidence can show whether the companies compete to supply their customers reliably, and whether one of the merging parties is perceived to act like a production maverick.

The agencies should also pay more attention to mergers that significantly concentrate customer exposure to a single firm. For example, the Teva-Allergan merger increased customers' exposure to newly shared risks. As the FTC found during its investigation, purchasers in the generic drug industry recognized the risk of relying too much on any one firm and sought to diversify their supply base.[226] Before the merger, Teva and Allergan competed in offering diverse portfolios of generic drugs with different factories, supply chains, and organizational structures. Their competition diversified buyers' risks, including the risk of concurrent shortages of different drugs. Teva, for example, had strong manufacturing capabilities for pre-drug ingredients, while Allergan mostly relied on third parties for those inputs.[227] The merger predictably removed that diversity. Thus, if post-merger Teva were struck with an idiosyncratic firm-wide shock, all of its drugs—including those that it had acquired from Allergan—may well have been affected. If the merger had been blocked, Allergan would have remained an independent manufacturer, lessening the blow to consumers of any shock to Teva. Because Teva and Allergan were key suppliers for many of their shared customers, it was predictable that after the merger, firm-wide shocks to Teva could lead to simultaneous shortages that

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[225] *See* 2023 MERGER GUIDELINES, *supra* note 25, at § 2.5.A.2; Baker, *supra* note 220, at 175 (discussing use of documentary evidence to detect price mavericks); Marina Lao, *Reimagining Merger Analysis to Include Intent*, 71 EMORY L. J. 1035, 1054-56 (2022) (discussing cases in which courts have used internal corporate documents to assist in market definition).

[226] *See FTC Teva-Allergan Statement*, *supra* note 1, at 3.

[227] *See* DG Competition, *Case M.7746 - TEVA / ALLERGAN GENERICS*, EURO. COMM'N (Oct. 3, 2016), http://ec.europa.eu/competition/mergers/cases/decisions/m7746_4632_3.pdf, at 206; *FTC Teva-Allergan Statement*, *supra* note 1, at 2 n.2.

would not have happened absent the deal.[228] As discussed above, this increased risk is a cognizable anticompetitive effect.[229]

Enforcers could examine customer exposure in part by developing new tools to forecast risk effects, just as they use heuristics to predict other changes to market power. The most prominent tool for forecasting future market power is the Herfindahl-Hirschman Index (HHI), a gauge of market concentration used by antitrust agencies and courts.[230] The agencies should consider adapting HHI to measure a merger's effect on customer exposure. Call this measure Counterparty HHI, or CHHI. HHI measures market concentration and "is calculated by summing the squares of . . . individual firms' market shares."[231] Similarly, CHHI measures how diversified one firm is in its suppliers or buyers. To my knowledge, this measure was first proposed (without this title) in a working paper version of an economics article written by Emmanuel Dhyne, Ayumu Ken Kikkawa, and Glenn Magerman.[232] Depending on data availability

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[228] *See* Complaint, *Connecticut v. Sandoz, Inc.*, No. 3:20-cv-00802 (D. Conn. June 10, 2020), at ¶¶ 23-28 (discussing generic drug manufacturer customer base). European data also support the view that Allergan and Teva were dominant providers of drugs purchased by shared customers. *See, e.g.*, DG COMPETITION, *supra* note 227, at 23, 65 (alleging, pre-merger, that Allergan Generics had 80-90% of the market for risedronic acid in Belgium and that Teva had 90-100% of the market for Tramadol D in Hungary). *See also* Letter from William S. Comanor & Diana L. Moss, American Antitrust Institute, to Edith Ramirez, Chairwoman, Fed. Trade Comm'n (Jan. 28, 2016), https://www.antitrustinstitute.org/wp-content/uploads/2018/08/AAI_Teva-Allergan-Ltr-to-FTC.pdf (detailing concentration concerns with the Teva-Allergan merger).

[229] In particular, mergers that increase customer exposure generally do so by removing potential competitors or in a manner that gives the merged firm greater negotiating leverage with its customers. Increased risk is a manifestation of those anticompetitive results. *See supra* notes 204-**Error! Bookmark not defined.**, 210-211, and accompanying text.

[230] Though HHI is not a perfect measure of competition, change in HHI is widely recognized as a useful heuristic for predicting competition. For a recent empirical validation, see David Arnold, *Mergers and Acquisitions, Local Labor Market Concentration, and Worker Outcomes* (working paper 2021), https://darnold199.github.io/madraft.pdf.

[231] 2010 MERGER GUIDELINES, *supra* note 10, at § 5.3.

[232] The published version of the article used the somewhat simpler "input share" in its analysis instead. *Compare* Emmanuel Dhyne et al., *Imperfect Competition in Firm-to-Firm Trade*, 20 J. EURO. ECON. ASS'N 1933, 1933 (2022), *with* Ayumu K. Kikkawa et al., *Imperfect Competition in Firm-to-Firm Trade* (working paper 2019), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3389836, at 48 (noting that "there is no perfect reference for the HHI for suppliers' input shares for each buyer firm"). Herskovic and colleagues use the same metric in a 2020 paper, referring to it as an "out-Herfindahl" or "in-Herfindahl." *See* Herskovic et al., *supra* note 41, at 4119, 4123.

the agencies could measure the effect a merger would have on average (or median) CHHI across the merged entities' customers or suppliers.[233]

For any firm, there are at least two relevant CHHIs: one that represents the concentration of those it buys from (its suppliers) and one that represents the concentration of those it sells to (its customers). To calculate supplier CHHI, regulators would first examine the total amount that Firm A spends a year and how much it pays each of its suppliers (see Figure 3). The amount Firm A pays Supplier 1 divided by all of Firm A's payments would equal Supplier 1's pair-level market share. For example, if Firm A spends $1 million a year in total and $250,000 on Supplier 1 products, Supplier 1's pair-level market share is 25%. The sum of the squares of Firm A's suppliers' pair-level market shares would be Firm A's supplier CHHI. If Firm A divided its spending equally among four suppliers, its supplier CHHI would be 2500.[234] An equivalent exercise can be performed for buyer CHHI, examining the firms to which Firm A sells.

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[233] The 2023 Guidelines also recognize that, under certain conditions, it may be appropriate to define a market as narrowly as a set of targeted customers. *See* 2023 MERGER GUIDELINES, *supra* note 25, at § 4.3.D.1.
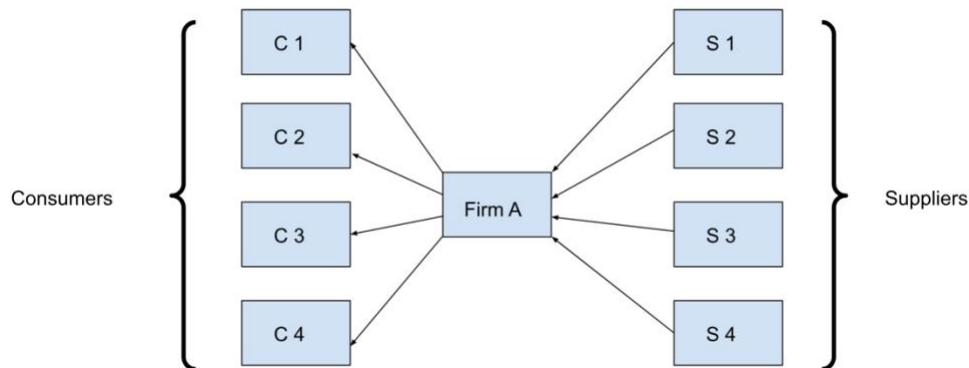
[234] (25^2) x 4 = 2500.

Figure 3: A schematic view of CHHI. Here, Firm A spends $1 million on supplies, equally divided among four suppliers (S1 through S4). Its supplier CHHI is thus 2500.

When a merger will significantly increase the CHHI of a merged firms' trading partners, this often indicates the merger will lessen competition. Such lessening of competition can be manifest in price effects: Dhyne and colleagues, for example, found that Belgian suppliers with higher average input shares among their buyers charge higher markups than those with lower average input shares, even controlling for the suppliers' overall market share.[235] The harm to competition will also often manifest as increased exposure to the merged firm's idiosyncratic risks. [236]

CHHI measures a potential competitive effect on only one side of the market at a time. Supply-side CHHI, in the above example, measures how concentrated Firm A's purchases are.[237] But even when Firm A's supply-side CHHI

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[235] As mentioned above, the published Dhyne et al. study used input shares rather than CHHI as its measure of supply network concentration. They depart also from the working paper version of their project by defining input shares not as a fraction of total purchases but as a proportion of purchases from a particular sector. *See* Dhyne et al., *supra* note 232, at 1934 (finding that "firms charge higher average markups when they have larger input shares amongst their buyers," a relationship that "holds conditional on firms' sectoral market shares," i.e., is not dependent on the firm's market share in the industry); *see also id.* ("[T]he degree of market power a firm can exercise is potentially heterogeneous across buyers.").

[236] What constitutes a significant increase in CHHI is an open and important empirical question. In the working paper version of their article, Dhyne and colleagues suggested that the 2010 Merger Guidelines' HHI thresholds are a reasonable first approximation. *See* Kikkawa et al., *supra* note 232, at 48. More study, however, is needed.

[237] For example, think of Firm A as a coffee shop that purchases coffee beans, utensils, machinery, and electricity, in equal amounts and from four different suppliers. If the coffee bean and utensil sellers merged, that might increase Firm A's reliance on the merged entity. Notably, if the market for coffee beans or utensils was itself unconcentrated, or if there was other evidence

increases, the sell-side CHHI of its suppliers may decrease. For example, consider a case in which all of Firm A's suppliers, S1 through S4, sell only to Firm A. If, as the result of a merger, S1 was incentivized to stop selling to Firm A and begin selling to Firms B through Z, then Firm A's supply-side CHHI would increase even as S1's sell-side CHHI declined.[238] In assessing CHHI changes, then, the agencies must account for effects on both sides of the market.

B. Modifying Merger Efficiency Analysis

Considering risk should also change how agencies and courts analyze merger efficiencies. Companies often assert that a merger will create production efficiencies by closing redundant or ineffective factories.[239] Such efficiencies may be cognizable under current doctrine if they are merger-specific and would help the merged firm compete more fiercely with remaining rivals, thereby boosting market output.[240] But if a merger increases output by slashing excess production capacity, that efficiency may come at the expense of increased customer risk. To determine how the efficiencies and risks compare, the agencies may have to evaluate price and output effects not only in the near-term, but over a longer horizon.[241] And they will have to consider not only how the merger affects competition under stable conditions, but also in the face of shocks that may be unlikely in any given year.

For example, suppose that two chip manufacturers in the same market, Firm A and Firm B, attempt to merge. If Firm A has 10% of the market, Firm B has 40% of the market, and the rest of the market is equally divided among five other firms, the merger would be presumptively anticompetitive under the 2010 or 2023 Guidelines. However, the firms could argue that the merger will result in large merger-specific efficiencies, including combining suppliers, factories, and distribution systems. Those efficiencies are likely cognizable under typical

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that Firm A had easily switched between providers of these goods in the past, that would cut against a finding that this increase in CHHI is competitively important.

[238] I thank an anonymous peer reviewer for this example.

[239] *See, e.g.*, H.J. Heinz Co., 246 F.3d at 720-21; Press Release, Teva to Acquire Allergan, *supra* note 12 ("Teva expects to . . . eliminat[e] duplication and inefficiencies on a global scale . . . Teva expects [$1.4 billion in annual] savings to come from efficiencies in operations, G&A, manufacturing, and sales and marketing."). *See also* Jonathan Rockoff, *Impax Laboratories and Amneal Pharmaceuticals Agree to Merge*, WALL ST. J. (Oct. 17, 2017), https://www.wsj.com/articles/impax-laboratories-and-amneal-pharmaceuticals-agree-to-merge-1508239860 (relating that merging drugmakers attributed forecasted annual savings to manufacturing consolidation).

[240] *See* 2010 MERGER GUIDELINES, *supra* note 10, at § 10; 2023 MERGER GUIDELINES, *supra* note 25, at § 3.3.

[241] *See* 2010 MERGER GUIDELINES, *supra* note 10, at §§ 6.1, 6.3 (evaluating price effects in immediate post-merger environment).

agency analysis because they may give the merged firm the incentive and ability to lower prices.[242]

But once we consider risk effects, these efficiencies may be seen as merger costs, as well as benefits.[243] Merging the supply chain can reduce marginal cost, but it also increases the extent to which the computer chip market is subject to idiosyncratic risk. This would especially be the case if one of the merging parties is a production maverick—for example, by relying on a different lithography supplier than its rivals—and if firms in the industry openly competed on resiliency. As discussed in Part II, whether the agencies can reliably compare the costs and benefits of purported efficiencies may depend on the availability of relevant data, for example, the location and capacity of factories in the industry, and the history of prior shocks in the market. This is of a piece with efficiencies analysis generally, which is highly fact dependent.[244]

C. Considering Risk Effects in Setting Enforcement Priorities

Risk analysis can also help guide the agencies' enforcement discretion. Due to staffing constraints and a commitment to retaining a high win rate in court, the agencies have historically thoroughly investigated and litigated only a subset of potentially anticompetitive mergers.[245] The agencies should focus on mergers

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[242] *See id.* at § 10. Both the 2010 Guidelines and 2023 Guidelines recognize that procompetitive efficiencies are not cognizable to the degree that they rely on anticompetitive worsening of terms to customers. *See id.* ("Cognizable efficiencies . . . do not arise from anticompetitive reductions in output or service. Cognizable efficiencies are assessed net of costs produced by the merger or incurred in achieving those efficiencies."); 2023 MERGER GUIDELINES, *supra* note 25, at § 3.3 ("Any benefits claimed by the merging parties are cognizable only if they do not result from the anticompetitive worsening of terms for the merged firm's trading partners."). Neither document discusses risk as an anticompetitive effect to be measured against efficiency benefits.

[243] Several real examples discussed earlier in this Article, including those involving hospitals, meatpacking mergers, and generic drugs, also show this feature.

[244] *See* 2010 MERGER GUIDELINES, *supra* note 10, at § 10; 2023 MERGER GUIDELINES, *supra* note 25, at § 3.3. *See also, e.g.*, Penn State Hershey Med. Center, 838 F.3d at 349-51 (conducting fact-intensive efficiencies analysis).

[245] *See generally* JOHN KWOKA, MERGERS, MERGER CONTROL, AND REMEDIES: A RETROSPECTIVE ANALYSIS OF U.S. POLICY (2014); JONATHAN B. BAKER, THE ANTITRUST PARADIGM (2019). *See also* Salop & Scott Morton, *supra* note 88, at 83-84 (discussing the agencies' budgetary constraints and high win rate). That said, the Biden Administration agencies, particularly the FTC, are less risk averse than their recent predecessors. *See, e.g.*, *CNBC Transcript: Federal Trade Commission Chair Lina Khan Speaks Exclusively with Andrew Ross Sorkin and Kara Swisher Live from Washington, D.C. Today*, CNBC (Jan. 19, 2022), https://www.cnbc.com/2022/01/19/cnbc-transcript-federal-trade-commission-chair-lina-khan-speaks-exclusively-with-andrew-ross-sorkin-and-kara-swisher-live-from-washington-dc-today.html (Chair Lina Khan remarking that "[e]ven if it's not a slam dunk case, even if there is a risk you might lose, there can be . . . enormous benefits from taking that risk. . . . [Y]ou lose

that increase risk over mergers that threaten to harm competition to a similar degree, but to increase risk less. In this way, a finding that a merger increases risk can make a difference even when the merger is projected to do so by means other than reducing competition. In particular, the agencies should devote more investigative resources to mergers that significantly increase a merged firm's size or economic centrality, and be more willing to litigate such mergers, if found to be anticompetitive, over similarly anticompetitive mergers that do not present the same risk concerns.[246]

The agencies can analyze systemic risk effects by using new modeling tools, like those that assess a merger's effect on economic centrality. A number of scholars, including David Rezza Baqaee and Vasco Carvalho, have presented models of economic centrality on which the agencies can build.[247] These models often weigh a small number of factors such as the number of links and extent of trade between the merging parties and others within a broader trading network. Depending on data availability, this information can be weighted using up-to-date analyses of sector centrality. Jeremy C. Kress has also recently argued that the DOJ can evaluate a bank merger's projected macroeconomic impact by considering "[n]umerous empirical metrics for assessing systemic risk [that] already exist," including "the Basel Committee on Bank Supervision's global systemically important bank score."[248] Kress and Jeffrey Y. Zhang relatedly argue in a forthcoming paper that financial regulators should apply "general equilibrium stress tests," considering financial institutions not as isolated entities but as nodes in webs of relationships.[249]

In weighing whether to thoroughly investigate and challenge a merger, the agencies already consider benefits and harms that are not strictly relevant to competition.[250] For example, under the 2010 Horizontal Merger Guidelines the agencies under certain conditions considered merger efficiencies even if the efficiencies were not in the market in which competition was projected to

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all the shots you don't take. But I think what we can see is that inaction after inaction after inaction can have severe costs. And that's what we're really trying to reverse.").

[246] *C.f.* Brunell, *supra* note 33, at 206 (arguing that antitrust agencies should consider loss of local control in allocating investigative and litigation resources).

[247] *See* Baqaee, *supra* note 58; Carvalho, *supra* note 158, at 36-38. Many of these models appear to be doing similar things and reaching similar results, so the choice of which model to use may not be critical. *See* Francis Bloch et al., *Centrality Measures in Networks* (working paper 2023), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2749124.

[248] Kress, *supra* note 30, at 596 (internal quotation marks omitted).

[249] *See* Jeremy C. Kress & Jeffrey Y. Zhang, *The Macroprudential Myth*, 112 GEO. L. J. (forthcoming 2024), at 9, 27-29; *see also* Elliott & Golub, *supra* note 44, at 691 (advocating a similar policy).

[250] *See also* Brunell, *supra* note 33, at 206 (noting that state attorneys general have at times considered loss of local control in enforcement decisions).

decline.[251]   If the agencies can discretionarily refrain from blocking anticompetitive but socially beneficial transactions, they can also more thoroughly investigate mergers they have reason to think will be more socially harmful. Harms that do not result from a lessening of competition cannot form the basis of a Section 7 case.   But they can push the agencies toward investigating, and ultimately challenging, one anticompetitive merger that threatens to increase risk over a similarly anticompetitive merger that poses fewer risk concerns. For example, if the agency is deciding between challenging one merger in a peripheral sector and one in a central sector, and the mergers are equivalently anticompetitive, the agencies could appropriately choose to focus on the merger in the more central sector on these grounds.

Finally, even when risk analysis does not by itself provide grounds for blocking a merger outright, it may shape how the agencies seek to remedy otherwise anticompetitive mergers.[252] Concerning risk effects can be eliminated or reduced through both conduct agreements and divestitures. For example, in determining what assets merging parties should divest, the agencies can use CHHI to identify risk-increasing product overlaps.

CONCLUSION

Recent decades have taught us that the dynamic results of competition—creativity, invention, quality—can matter no less than the effect of competition

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[251] *Compare* 2010 MERGER GUIDELINES, *supra* note 10, § 10 n. 14 ("[T]he Agencies in their prosecutorial discretion [may] consider efficiencies not strictly in the relevant market, but so inextricably linked with it that a partial divestiture or other remedy could not feasibly eliminate the anticompetitive effect in the relevant market without sacrificing the efficiencies in the other market(s)."), *with* 2023 MERGER GUIDELINES, *supra* note 25, at § 3.3 ("[T]he Agencies will not credit . . . benefits outside the relevant market that would not prevent a lessening of competition in the relevant market."). More recently, the FTC asserted that it is prioritizing merger enforcement against transactions that will "harm historically underserved communities." *See Strategic Plan For Fiscal Years 2022-2026*, FED. TRADE COMM'N (Aug. 26, 2022), https://www.ftc.gov/system/files/ftc_gov/pdf/fy-2022-2026-ftc-strategic-plan.pdf, at 12; *id.* at 19. *See also ABA Spring Meeting Sessions Key Highlights From US Antitrust Enforcers' Statements (March 29–31, 2023)*, WILMERHALE (Apr. 12, 2023), https://www.wilmerhale.com/insights/client-alerts/20230412-aba-spring-meeting-sessions-key-highlights-from-us-antitrust-enforcers-statements ("Director [of the FTC Bureau of Competition Holly] Vedova said the FTC is focusing especially on mergers that would have disproportionate effects on underserved communities."); Dissenting Statement of Commissioner Christine S. Wilson Regarding the Federal Trade Commission Strategic Plan for Fiscal Years 2022-2026, https://www.ftc.gov/system/files/ftc_gov/pdf/Wilson%20dissenting%20statement%20-%20strategic%20plan%20for%20FY22-26%20-%20final.pdf ("The majority's vision for the agency expands its mission to include goals outside our statutory remit. The agency lacks the expertise (and, in some cases, the jurisdiction) to pursue the additional societal goals embodied in the Strategic Plan.").

[252] My thanks to Ariel Ezrachi for a helpful conversation on this point.

on prices. It is past time that the enforcement agencies add risk to that list. Competition can force firms to diverge, explore, and invent, and in doing so it diversifies risks for those firms' trading partners and the economy at large. By considering customer exposure, market power, and economic centrality, the antitrust agencies can make informed predictions about merger risk effects. When mergers pose a reasonable probability of significantly increasing risk by harming competition, the agencies can and should block those mergers or require remedies to eliminate their competitive harm.

I have offered a set of recommendations for putting these findings into action, including paying attention to production mavericks and capacity-cutting efficiencies, deploying a new set of risk forecasting tools, and adjusting remedies to address risk effects. Important questions remain. How do risk effects differ by industry—for example, in cloud computing or banking? Can those differences be accounted for in merger review? How do we empirically validate new risk forecasting tools? Can we tease out the specific causal risk effects from past mergers? How do we trade off efficiencies and risk? I leave those questions for future work.

The following is a proposed addition to future merger guidelines.

In assessing a merger's projected effect on resilience, the Agencies may consider whether a merger is likely, by reducing diversity of market choices, to increase the expected harm of a negative shock to trading partners and the public above the level that would prevail without the merger. That increased risk could result from a reduction in the number of products or services with uncorrelated risks offered to the same customers, for example because one of the merging parties acts as a maverick in its mode of production. Such an increase in risk can constitute an anticompetitive harm as with any price, quality, or innovation effects of a merger.

A merger is more likely to increase risk if the merging parties share trading partners to whom they sell, or from whom they buy, in significant quantities, and already possess market power in those respective areas. It is also more likely if the merger will combine risks of those respective goods or services. For example, a merger could increase supply risk by combining business units, by reducing manufacturing capacity, or by reducing divergent approaches to producing products. When both of the merging firms have market power in relevant markets, the Agencies will consider whether a merger will significantly increase customers' exposure to the merged entity. The Agencies also consider whether the merger is likely to reduce risk by, for example, combining complementary risk-reducing capabilities in a verifiable and merger-specific manner. If the merger is likely to lower risk, that effect may reduce the anticompetitive results of an increase in customer exposure.

In evaluating merger-specific efficiencies, the Agencies may consider whether such efficiencies come at the cost of increased risk. If the efficiencies are small and the risk increases large, the net effect of such efficiencies is generally to make the merger more likely to harm consumers, rather than less. Efficiencies derived from a decrease in unused output capacity, or by the elimination of a divergent and competitive mode of production, are especially likely to result in increased risk.

Example 1: Firm A and Firm B produce products *a* and *b* that are both important inputs to firms in Industry X. Firm A and Firm B have market power, respectively, in the product markets for *a* and *b*. The other suppliers are operating near capacity. Firms in Industry X would be worse off losing access to both *a* and *b* simultaneously than losing access to either *a* or *b* at different times. Firm A proposes to acquire Firm B and to consolidate the

factories that produce *a* and *b* in a single factory. This consolidation will increase Industry X's reliance on that factory. The Agencies may analyze the history of supply disruptions in the relevant or related industries and conclude that the merger will reduce competition, increase risk, and materially harm consumers.

Example 2: Firm A and Firm B produce competing products *a* and *b* that command prices significantly above marginal cost. The market is concentrated and expensive to enter. Firm A manufactures product *a* through a process that relies on different, and more expensive, inputs than other firms in the industry. Firm B proposes to acquire Firm A and argues that manufacturing product *a* through industry-standard processes will result in merger-specific efficiencies that offset the anticompetitive effects of concern. The Agencies may consider whether eliminating Firm A's unique manufacturing process will harm customers' ability to diversify risk, and how the size of those risk effects compare to the size of relevant projected efficiencies.