



TECHNOLOGY
POLICY
INSTITUTE

Preserving the Institutional Value of the FTC in the Digital Era

Ginger Jin and Liad Wagman

November 2023

Preserving the Institutional Value of the FTC in the Digital Era ¹

Ginger Zhe Jin

University of Maryland & NBER

Liad Wagman

Illinois Institute of Technology

November 2023

Abstract

We examine several ways in which the U.S. Federal Trade Commission's antitrust enforcement has changed under Lina Khan, including policy changes and proposed technology-related rulemakings, and relevant recent court cases and academic research. We comment on the potential consequences of these changes for both the market and for the Commission's reputation as a public institution.

Keywords: Federal Trade Commission; merger; acquisition; antitrust; technology. **JEL**

Classifications: G34, L40, O33, O38

¹ Jin: University of Maryland & NBER, jin@econ.umd.edu. Wagman: Illinois Institute of Technology, lwagman@stuart.iit.edu. Some content of this article was presented as part of the panel "Biden Administration Antitrust Midterm Report Card" at the 2023 Technology Policy Institute Antitrust Conference. Jin and Wagman worked full time at the US Federal Trade Commission in 2015-2017 and 2020-2022, respectively. Wagman is an academic affiliate at the International Center for Law & Economics (ICLE). Jin was on an academic leave to work full time at Amazon from 2019 to 2020. Each of them has provided consulting services to a few companies covered by the studies they authored and cited in this article. These companies may have a financial interest in the output of the Merger Guidelines. Part of these studies are supported by the Washington Center for Equitable Growth. The content and views expressed herein do not relate to any institution or organization with whom the authors are or have been affiliated.

1 Introduction

On July 9, 2021, the Biden Administration issued an Executive Order on Promoting Competition in the American Economy.² The Order aims to “increase opportunities for small businesses by directing all federal agencies to promote greater competition through their procurement and spending decisions,” and “calls on the leading antitrust agencies, the Department of Justice (DOJ) and Federal Trade Commission (FTC), to enforce the antitrust laws vigorously and recognizes that the law allows them to challenge prior bad mergers that past Administrations did not previously challenge.” The Order announces a policy that “enforcement should focus in particular on labor markets, agricultural markets, healthcare markets (which includes prescription drugs, hospital consolidation, and insurance), and the tech sector.”³

The Administration’s Executive Order is the result of calls for antitrust reform by different groups of constituents and stakeholders, arguing that US markets have become more concentrated, that large incumbents’ profit margins have increased, and that some of these changes may be attributed to lax enforcement.⁴ While each of these arguments is part of

² <https://www.whitehouse.gov/briefing-room/presidential-actions/2021/07/09/executive-order-on-promoting-competition-in-the-american-economy/>.

³ <https://www.whitehouse.gov/briefing-room/statements-releases/2021/07/09/fact-sheet-executive-order-on-promoting-competition-in-the-american-economy/>.

⁴ For example, in April 2016, the White House Council of Economic Advisers under the Obama Administration issued a brief describing the decline of competition in various US industries. It pointed to antitrust and other government actions that could promote competition in a variety of industries. The brief is available at https://obamawhitehouse.archives.gov/sites/default/files/page/files/20160414_cea_competition_issue_brief.pdf.

ongoing debates,⁵ numerous legislative proposals, policy changes, and proposed rulemakings for alleged fixes have been released.⁶

No agency has been more active in this space than the Federal Trade Commission. With a series of rapid policy changes, policy statements, proposed rule changes, and court cases, the FTC has formed the vanguard in the Biden Administration's push for antitrust reform. In this paper, we contextualize some of these changes at the FTC that pertain to the technology space. We primarily do so through economic arguments. We then suggest alternative avenues for reform, as well as for adjusting proposed reforms, in ways that align with recent academic findings.

We proceed as follows. Section 2 describes recent FTC actions that relate to the technology space, including new and proposed policies and guidelines, as well as how some of the FTC's recent enforcement cases have fared in the courts. In Section 3, we summarize public reactions to the FTC's actions. In Section 4, we offer a few observations on the potential consequences of these actions for the FTC and the broader market.

⁵ Economic studies have found mixed evidence on the nature of competition changes over time. De Loecker, Eeckhout and Unger (2020) demonstrate the increase of average price markups in the US between 1980s and 2012, along with a rise in average profit rates and a fall in the labor share. Autor et al. (2020) assert that this shift may, in part, be driven by the rise of superstar firms. At the same time, Syverson (2019) argues that market concentration is an outcome rather than a cause of market competition; Benkard, Yurukoglu and Lee Zhang (2021) show that market concentration has in fact declined since 1994 if markets are defined by products rather than industry sector; and D'opper et al. (2022) find that the average increase in markups from 2006 to 2019 in over 100 consumer product categories has been driven by lower marginal costs and lower consumer price sensitivities.

⁶ In a study commissioned by the Computer & Communication Industry Association, Dippon and Hoelle (2022) summarize seven legislative bills introduced in the US Congress between May 2021 and January 2022 regarding antitrust reforms and the regulation of large online platforms.

2 Recent FTC Actions in Tech and Innovation

2.1 New and Proposed Policies and Guidelines

We begin by describing four sweeping changes that the FTC introduced under Chair Khan concerning merger review and case work. They apply to all industries, but can be particularly relevant to the technology space and to technological innovation.

On September 15, 2021, the FTC, in a 3-2 vote, “voted to withdraw its approval of the Vertical Merger Guidelines, issued jointly with the Department of Justice (DOJ), and the FTC’s Vertical Merger Commentary.” The Commission asserted that the “guidance documents, which were published in 2020, include unsound economic theories that are unsupported by the law or market realities,” and withdrew “its approval in order to prevent industry or judicial reliance on a flawed approach.” More specifically, “the majority statement explains that the guidelines adopted a particularly flawed economic theory regarding purported pro-competitive benefits of mergers, despite having no basis of support in the law or market reality.” The FTC claimed that it would “look at ways to provide guidance on ineffective remedies, based on an evaluation of past remedy practices and any evidence that past remedies may not have fully restored competition.”⁷ Such a rapid about-turn may increase policy uncertainty for all sectors that benefit from technological innovation, because such innovations often disrupt traditional markets, blur market boundaries, and introduce new, non-horizontal relationships among firms.

On June 27, 2023, with concurrence from the DOJ’s Antitrust Division, the FTC proposed significant changes to the premerger notification form and associated instructions, as well as the premerger notification rules implementing the Hart-Scott-Rodino (HSR) Act.⁸The HSR

⁷ <https://www.ftc.gov/news-events/news/press-releases/2021/09/federal-trade-commission-withdraws-vertical-merger-guidelines-commentary>.

⁸ <https://www.ftc.gov/news-events/news/press-releases/2023/06/ftc-doj-propose-changeshr-form-more-effective-efficient-merger-review>.

Act and its implementing rules require parties that propose certain mergers and acquisitions to submit premerger notification to the FTC and DOJ (the Agencies), including completing HSR Forms, and to wait a specified period of time before consummating their transactions. If the HSR-related proposed changes are implemented, parties making filings will need to provide significantly more information, including data on their employees, internal strategic plans, reports, and deal-related documents; write detailed narratives about the transaction, including its rationale and synergies, the parties to the deal, and the markets in which they operate; dedicate significant additional resources to preparing the required HSR filing; and lengthen their expected time frame to obtain merger clearance. All of these changes serve to increase the complexity, risk, length, and uncertainty of the merger review process, though they do not necessarily alter substantive antitrust doctrine (that is, for the government to block a transaction, it would generally still need to prove in court that the transaction is likely to result in a substantial lessening of competition). For fast-evolving dynamic industries where exits through acquisitions provide essential capital liquidity, particularly tech and tech-reliant industries, the proposed filing changes can introduce significant new market frictions.

On July 19, 2023, the DOJ and the FTC released the Draft Merger Guidelines (DMG)⁹, proposing many significant changes from earlier Merger Guidelines.⁹ Of the 13 guidelines highlighted in the DMG, two are particularly novel as well as relevant to tech acquisitions. One is Guideline #4, which states that “mergers should not eliminate a *potential* entrant in a concentrated market” and the other is Guideline #9, stating that “when a merger is part of a *series* of multiple acquisitions, the agencies may examine the whole series” (emphases added). While the DMG provide scant details on #9, they offer a list of potential evidence that the agencies may consider in support of #4. For example, a firm’s “sufficient size and resources to enter,” current participation “in adjacent or related markets,” or even being

⁹ https://www.justice.gov/d9/2023-07/2023-draft-merger-guidelines_0.pdf. ⁹See a summary by Froeb, Sokol and Wagman (2023) and Werden (2023).

considered by industry participants as “a potential entrant” can constitute evidence for the firm’s reasonable probability of entry. More importantly, a reasonable probability of entry is *presumed* to result in deconcentration or other significant benefits for competition, unless there is substantial direct evidence that the competitive effect would be *de minimis*. Simply put, a merger that is deemed to reduce a reasonable probability of entry is presumed to harm market competition. These changes, if implemented, could be especially relevant to technology startups, their investors, and their potential acquirers, because the market for tech-enabled products and services is often fluid and fast-changing over time.

On November 21, 2023, the FTC approved a resolution authorizing the use of compulsory processes in investigations involving products and services that use or claim to be produced using artificial intelligence (AI) or claim to detect its use. The resolution aims to streamline the FTC’s ability to issue civil investigative demands (CIDs), a form of compulsory process similar to a subpoena, in investigations relating to AI, while retaining the Commission’s authority to determine when CIDs are issued. The FTC issues CIDs to obtain documents, information and testimony that advance FTC consumer protection and competition investigations. The resolution will be in effect for 10 years.¹⁰ The Commission voted 3-0 to approve the resolution, with all 3 being Democrat Commissioners. The FTC’s stated concerns are that although AI, including generative AI, offers beneficial uses, it can also be used to engage in fraud, deception, infringements on privacy, and other practices that may be deemed unfair, potentially violating the FTC Act and other laws. In addition, AI can raise competition issues in a variety of ways, including if one or just a few companies control the essential inputs or technologies that underpin AI. While AI is expected to become a general purpose technology that may transform every corner of the global economy, its creation and impact begin with the tech space. It appears this new policy would enable the FTC to gather more

¹⁰ <https://www.ftc.gov/news-events/news/press-releases/2023/11/ftc-authorizescompulsory-process-ai-related-products-services>.

information about the use and consequence of AI in both antitrust enforcement and consumer protection areas.

2.2 Recent Court Cases

Over the past three years, the FTC has brought multiple antitrust cases that are broadly related to technology and innovation.

On December 9, 2020, the FTC sued Facebook, alleging that the company is illegally maintaining its personal social networking monopoly through a years-long course of anticompetitive conduct. Following a lengthy investigation in cooperation with a coalition of attorneys general of 46 states, the District of Columbia, and Guam, the complaint alleges that Facebook has engaged in a systematic strategy—including its 2012 acquisition of upand-coming rival Instagram, its 2014 acquisition of the mobile messaging app WhatsApp, and the imposition of anticompetitive conditions on software developers—to eliminate threats to its monopoly. The FTC is seeking “a permanent injunction in federal court that could, among other things: require divestitures of assets, including Instagram and WhatsApp; prohibit Facebook from imposing anticompetitive conditions on software developers; and require Facebook to seek prior notice and approval for future mergers and acquisitions.”¹¹ A novel aspect of this case is the focus on Facebook’s (Meta’s) alleged monopolization, despite the fact that the core set of services the company offers to end users are priced at zero.

This case was first brought by the FTC under Chair Joseph J. Simons, but the US District Court dismissed its initial complaint in June 2021, arguing that the FTC’s allegation of Facebook’s monopoly power in the market of Personal Social Networking Services was unsupported.¹² After Chair Khan was sworn into office on June 15, 2021, the FTC filed an

¹¹ <https://www.ftc.gov/news-events/news/press-releases/2020/12/ftc-sues-facebook-illegal-monopolization>.

¹² The ruling is available at <https://storage.courtlistener.com/recap/gov.uscourts.dcd.224921/gov.uscourts.dcd.224921.73.0.pdf>.

amended complaint in August 2021, which was subsequently accepted by the Court. As of today, the case is still in the discovery phase.

In a case originating in March 2021, the FTC filed an administrative complaint and authorized a federal court lawsuit to block Illumina's proposed acquisition of Grail, a maker of a non-invasive, early detection liquid biopsy test that can screen for multiple types of cancer in asymptomatic patients at very early stages using DNA sequencing. Illumina spun off Grail in 2016 to develop a blood test to detect early stages of cancer. Illumina moved to buy back the company and closed the deal in August 2021. The agency's administrative judge sided with the company in September 2021, but was overruled by the FTC's commissioners. That prompted Illumina's appeal to the Fifth Circuit.

At the time, Illumina was the only provider of DNA sequencing that is a viable option for such multi-cancer early detection, or MCED, tests in the US. The FTC's complaint alleges that "the acquisition would diminish innovation in the U.S. market for MCED tests, which could be used to detect up to 50 types of cancer. Most of these types of cancer are not screened for at all today, and the MCED test could save millions of lives around the world." Illumina's appeal contests the constitutionality of the agency's leadership structure and how the agency tackles merger investigations with the DOJ. Illumina further asserts that the FTC lacks clear direction from Congress on how to decide whether to bring cases to federal court or in-house, and that its ability to exercise investigative, prosecutorial and adjudicative powers violated due process. The case is at the US Court of Appeals for the 5th Circuit, which previously ruled in favor of plaintiffs targeting executive branch agencies.¹³

In December 2021, the FTC sued to block Nvidia's \$40 billion acquisition of Arm.¹⁴ Nvidia is a US-based chip supplier and Arm is a UK-based chip designer. The FTC was concerned that the proposed vertical deal would enable Nvidia to control one essential input on which rival

¹³ <https://news.bloomberglaw.com/antitrust/illumina-attacks-ftc-structure-leaders-in-constitutional-appeal>.

¹⁴ <https://www.ftc.gov/legal-library/browse/cases-proceedings/2110015-nvidiaarm-matter>

firms may rely to develop their own competing chips. The FTC alleges that the deal may provide Nvidia with access to competitively-sensitive information regarding Arm's licensees—some of which are Nvidia's rivals—and the combined firm would have the means and incentive to stifle innovative next-generation technologies, including those used to run data centers and car driver-assistance systems. Nvidia announced it would abandon the deal in February 2022, and Arm ultimately became a publicly-traded company on the NASDAQ stock exchange in September 2023.

In August 2022, the FTC challenged Meta's acquisition of Within Unlimited (a startup that offers a fitness virtual reality app). The FTC argued that Meta was a potential entrant because it had sufficient size and resources to enter the dedicated fitness virtual reality market, but the court rejected this argument because it found that Meta had considered its own entry through organic growth but concluded that it did not have all the relevant expertise.¹⁵ The FTC subsequently withdrew its case.¹⁶

In December 2022, the FTC challenged Microsoft's acquisition of Activision. The complaint alleged that as a result of the merger, the acquirer could gain control of top video game franchises, thus harming competition in high-performance gaming consoles and subscription services by denying or degrading rivals' access to its content.¹⁷ In contrast, the Court allowed Microsoft to proceed with the acquisition, arguing that the merger might in fact enhance consumer access to Activision's content. The Court also questioned the FTC's argument regarding a trend toward further concentration in the industry, asserting that the FTC failed to explain how this trend is anticompetitive.¹⁸

¹⁵ See the Court's order denying the FTC's motion preliminary injunction opinion at <https://s3.documentcloud.org/documents/23598337/ftc-vs-meta-within-ruling.pdf>.

¹⁶ <https://www.ftc.gov/legal-library/browse/cases-proceedings/221-0040metazuckerbergwithin-matter>.

¹⁷ <https://www.ftc.gov/legal-library/browse/cases-proceedings/2210077-microsoftactivision-blizzard-matter>.

¹⁸ See the Court's preliminary injunction opinion at <https://www.cand.uscourts.gov/wp-content/uploads/2023/07/FTC-v-Microsoft.pdf>.

On September 26, 2023, the FTC and 17 state attorneys general sued Amazon, alleging the company's actions enabled it to stop rivals and sellers from lowering prices, degrade quality for shoppers, overcharge sellers, stifle innovation, and prevent rivals from fairly competing against it, all of which amounted to using anticompetitive strategies to illegally maintain monopoly power.¹⁹ This allegation contrasts with Chair Khan's own criticism of Amazon in 2017. At that time, while a law student, Khan published a paper entitled "Amazon's Antitrust Paradox," arguing that because Amazon offered *low* prices, it would gain market share, making it more difficult for smaller businesses to compete, resulting in fewer choices for consumers and higher prices in the long term.²⁰ That article further asserted that the framework for analyzing antitrust violations, centered around the consumer welfare standard (where consumer prices are the guiding factor), needed to change.

2.3 FTC Study on Non-HSR Reportable Transactions

Recent debates about competition in the technology space often point to the merger and acquisition (M&A) activities of top technology firms. Some suggest that acquisitions by the largest tech companies, Google/Alphabet, Amazon, Apple, Facebook/Meta, and Microsoft (collectively also known as GAFAM), are unusual in their number, pace and concentration.

To address this issue, the FTC, under Chair Simons, initiated a study under Section 6(b) of the FTC Act, examining GAFAM's M&A activities. Subsequently, under Chair Khan, the FTC released a public report on the study in September 2021. The report, entitled "NonHSR Reported Acquisitions by Select Technology Platforms, 2010-2019," describes features of GAFAM's M&A activities such as the pace of their transactions and the distributions of their transaction sizes in dollar terms, as well as the ages of the acquired firms.²¹ The report

¹⁹ <https://www.ftc.gov/news-events/news/press-releases/2023/09/ftc-sues-amazon-illegally-maintaining-monopoly-power>.

²⁰ https://www.yalelawjournal.org/pdf/e.710.Khan.805_zuvfyyeh.pdf.

²¹ "Non-HSR Reported Acquisitions by Select Technology Platforms, 2010-2019: An FTC Study." Available at: <https://www.ftc.gov/reports/non-hsr-reported-acquisitions-select-technologyplatforms-2010-2019-ftc-study>.

highlights that GAFAM acquired 400 US companies from 2010 to 2019 for over \$1 million, of which 86 were over \$50m and 314 were between \$1m and \$50m. It further notes that, while some of the transactions covered in the study exceeded the HSR Size of Transaction threshold, parties to a merger may not need to file a pre-merger notification to the antitrust authorities if certain other criteria are met or statutory or regulatory exemptions apply.

3 Public Reactions to the FTC Actions

The rapid-fire changes brought by the FTC under Chair Khan have generated mixed reactions from practitioners, FTC staff, and the public in general.

3.1 Practitioner Reactions

Sokol et al. (2023) use practitioner surveys to understand whether and how the change in the Biden Administration's antitrust agenda has affected merger review, investments, decision making, and counsel. Their findings indicate that practitioners have a more critical perception of the FTC and DOJ compared to prior administrations.

In particular, they find that while both agencies are perceived as less transparent and less fair in their interactions with merging parties, practitioners are particularly critical in their views of the FTC. The agency's leadership is perceived as less effective in terms of communicating concerns, maintaining staff morale, and grounding decisions in economic expertise. The majority of respondents indicated that they view FTC enforcement as efficiency degrading, and see the enforcement process as more demanding in terms of the scope of data collected and the time it takes to complete. Survey respondents also indicated that the agencies appear to have departed from precedents as they increasingly scrutinize labor issues and transactions that are vertical in nature.

Sokol et al. (2023) find that the impact of these (at least, perceived) changes in enforcement and associated increases in uncertainty and costs appears to differ by practice

area. For example, some practitioners have adapted to the changing environment by anticipating greater antitrust scrutiny at the time of deal initiation and advising clients to expect higher costs and longer timelines.

3.2 Commissioner and Senior Personnel Departures

The FTC's Director of its Bureau of Economics, Dr. Marta Wosinska, abruptly resigned on February 16, 2022, less than a year after she was appointed by then-Acting Chair Rebecca Kelly Slaughter in April 2021. Neither the FTC nor Dr. Wosinska specified the reason for her unexpected departure. Almost 10 months later, FTC Chair Khan named Aviv Nevo as the Agency's Director of Bureau of Economics.²²

Minority Commissioner Phillips, having announced his resignation in August of that year,²³ stated that antitrust enforcement under the Biden Administration “has been anything but vigorous—indeed, it has been sclerotic. By that I mean not just fewer cases being brought, but a longer process with fewer decisions being made.”²⁴

Minority Commissioner Wilson subsequently resigned effective March 31, 2023. In her resignation letter directed to the Biden Administration, Commissioner Wilson stated that “now, I barely recognize the FTC. It pains me to observe the tarnishing of its reputation, the diminution of its efficacy, and the exodus of its experienced personnel, many of whom agree with the policy goals of Ms. Khan and your administration,” and cited the agency's annual performance and employee survey as a reflection of agency underperformance and staff dissatisfaction with the agency's new approach and leadership.²⁵

Commissioner Wilson's departure left the FTC with only Majority Commissioners, raising the prospect that any decisions subsequently made may be reversed by a White House

²² <https://www.ftc.gov/news-events/news/press-releases/2022/12/ftc-chair-khan-names-aviv-nevo-agencys-director-bureau-economics>.

²³ https://www.ftc.gov/system/files/ftc_gov/pdf/phillips-resignation-statement.pdf.

²⁴ <https://www.reuters.com/world/us/us-ftc-commissioner-phillips-resign-this-fall-202208-08/>.

²⁵ https://www.ftc.gov/system/files/ftc_gov/pdf/p180200wilsonresignationletter.pdf.

Administration from a different political party. Such a prospect was already heightened given the partisan nature of most decisions under Chair Khan’s leadership.

3.3 FTC Staff Feedback

Hundreds of FTC employees respond annually to the Federal Employee Viewpoint Survey. In 2020, the last year under the prior White House Administration, 87% of surveyed FTC employees agreed that senior agency officials maintain high standards of honesty and integrity. As of the 2021 survey, that share was 53%, and only 49% of respondents had a “high level of respect” for senior leaders, down from 83% in 2020. Overall satisfaction with the agency dropped by a third, to 60% from 89%.²⁶ Per the Commission’s 2021 survey, the results are “lower than the average for medium-size agencies and show a marked decrease from the FTC’s 2020 results. The FTC’s Employee Engagement score of 74% is below the medium-size agency average of 77% and is a 13-point decrease from the FTC’s 2020 score of 87%. The Global Satisfaction Index for all of the FTC was 60%, which is also lower than the 71% score for other medium-size agencies and shows a 22-point decrease from the agency’s 2020 score of 82%.”²⁷ The agency’s 2022 survey results were similar to 2021,²⁸ and the 2023 results continued to reflect poorly on agency leadership.²⁹

3.4 Public Comments on FTC-Initiated Policy Changes

The FTC, at times together with the DOJ, sought public comments on the changes it proposed regarding HSR filings and merger guidelines. Table 1 summarizes the volume of the public

²⁶ https://www.ftc.gov/system/files/ftc_gov/pdf/21apr_22-23app.pdf.

²⁷ https://www.ftc.gov/system/files/ftc_gov/pdf/2021_FEVS_Results_At_Glance.pdf.

²⁸ https://www.ftc.gov/system/files/ftc_gov/pdf/2022_FEVS_Results_At_Glance.pdf.

²⁹ https://www.ftc.gov/system/files/ftc_gov/pdf/2023_FEVS_Results_At_Glance.pdf.

comments submitted in connection with those proposals through the related FTC and DOJ websites.³⁰

Table 1: Summary of Public Comments on Proposed Policy Changes

| Topic | Time open for comments | # of comments filed | # of comments filed with attachments |
|---|----------------------------|------------------------|--|
| Draft Vertical Merger Guidelines | 2020/01/10 – 2020/02/26 | 72 | 72 |
| Merger Enforcement (preceding Draft Merger Guidelines) | 2022/01/18 – 2022/05/06 | 1906 | 215 |
| Hart-Scott-Rodino Coverage, Exemption, and Transmittal Rules | 2023/06/30 – 2023/09/28 | 720 | 86 |
| Draft Merger Guidelines | 2023/07/19 – 2023/09/29 | 1600 | 212 |

Compared with the comments filed on the Draft Vertical Merger Guidelines (more than one year before Chair Khan took her FTC office), the public has filed many more comments in connection with the FTC-proposed policy changes concerning HSR premerger filing rules and draft merger guidelines. Admittedly, the format of comment submission has changed from email to website entry, which explains why all the 72 comments filed in 2020 in response to the Draft Vertical Merger Guidelines had some attachment while only a minority of comments filed in and after 2022 have attachments. Even if we only count the comments with any attachments, the volume of comments submitted is significantly higher than before,

³⁰ Public comments on the Hart-Scott-Rodino Coverage, Exemption, and Transmittal Rules can be found at <https://www.regulations.gov/docket/FTC-2023-0040/comments>. There were two rounds of public comments on merger enforcement, ultimately in connection with the Draft Merger Guidelines (DMG): one before and one after the FTC and DOJ released the DMG in July 2023. They are available at <https://www.regulations.gov/docket/FTC-2022-0003/> and <https://www.regulations.gov/docket/FTC-20230043>. Public comments on the 2020 Draft Vertical Merger Guidelines are available at <https://www.justice.gov/atr/public-comments-draft-vertical-merger-guidelines>. We accessed all on November 25, 2023.

suggesting that the public has paid more attention to the three policy changes proposed by the FTC under Chair Khan.

It is difficult to gauge the sentiment of these comments, as some attachments contain scanned documents. That being said, when we apply a Lexicon analysis or a standard natural language processing (NLP) package³¹ to the text of the comments or the first three pages of their corresponding attachments with machine-readable text, we observe a diverse distribution of sentiment. The sentiment from the Lexicon analysis ranges from -0.9978 to 0.999, with the average being moderately positive (around +0.4242), whereas the average sentiment from the NLP analysis is moderately negative (around -0.2322 in a range from -0.9996 to 0.9997).³² These crude statistics suggest that the high attention to the FTC proposed policy changes under Chair Khan is most likely accompanied by mixed reactions from the public.

4 Our Thoughts and Recommendations

The rapid succession of FTC actions, rulemakings, statements, attempted court cases, and proposed new rules and guidelines have had and will continue to have consequences for the market and the agency itself. Throughout most of 2023, the FTC has been operating solely with Majority Commissioners. The last Minority Commissioner resigned as of March 31, 2023,³³ leaving with strong departing remarks about the state of the agency.³⁴ This state of the Commission is in contrast to its long history of bipartisanship. When the FTC was created

³¹ we employ a pre-trained NLP model from Hugging Face to determine the sentiment score of each comment. This model is a fine-tuned checkpoint of DistilBERT-base-uncased, accessible at <https://huggingface.co/distilbert-base-uncased-finetuned-sst-2-english>.

³² By definition, both approaches define extremely negative sentiment as -1 and extremely positive sentiment as +1.

³³ https://www.ftc.gov/system/files/ftc_gov/pdf/p180200wilsonresignationletter.pdf.

³⁴ <https://www.wsj.com/articles/why-im-resigning-from-the-ftc-commissioner-ftc-linakhan-regulation-rule-violation-antitrust-339f115d>.

in 1914, it was designed to be a bipartisan agency, with an explicit structure to include commissioners from both major political parties. The composition — of up to five commissioners serving staggered seven-year terms, with no more than three commissioners from the same political party — is intended to ensure a balanced and bipartisan approach to the agency’s decision-making processes.

On the positive side, the intensive debates surrounding the FTC’s actions and policy proposals have drawn more public attention, motivated more academic research, and drawn more academic researchers to the area, especially with respect to evaluating the nature of the digital economy and whether new antitrust criteria and regulatory frameworks are needed. The debates have also broadened the coverage of antitrust concerns. For example, more attention has been recently devoted to non-horizontal mergers, conduct cases, non-price effects, and dynamic concerns, as well as to potential ties between antitrust and consumer protection (Jin and Wagman, 2021), via data regulation, privacy protection, and the use of AI and emerging technologies. The agency has also been able to publish reports, including its report on acquisitions by GAFAM, that at least demonstrate some effort to better understand the competitive landscape. Additionally, the agency’s actions have triggered formal reviews by the court system and new case law.

However, this can be a costly way to achieve clarity on untested legal theories of harm and may diminish the agency’s ability to enforce through deterrence when court decisions are not in its favor. Below we offer a few observations on the potential negative consequences of the recent FTC actions.

4.1 Reversion to Decades-old Arguments, No Clear Path Forward

It is concerning that the FTC’s recent actions revert to antitrust practices from the 1960s and 1970s, while ignoring significant progress in economic, legal, and case law understanding and treatment of antitrust since then.

For example, when the FTC withdrew its own 2020 vertical merger guidelines in September 2021, the majority statement claimed that the guidelines' most significant flaw was its recognition of efficiencies (such as the elimination of double marginalization) as an argument in favor of a vertical merger, which is contrary to the text of the Clayton Act (enacted in 1914 and amended in 1976).³⁵ This is despite the fact that the 1982 and 1984 vertical guidelines had recognized such efficiencies and there is a large academic literature supporting the importance of those efficiencies to adequately evaluating vertical mergers.³⁶ In fact, the Review of Industrial Organization published a special issue on the 2020 Vertical Merger Guidelines (VMG).³⁷ Though not all authors in this special issue agree with every detail of the VMG, the analysis pointed out that the literature offers mixed evidence regarding the competitive harms and efficiencies of vertical mergers, and as a result, does not provide sufficient guidance to develop presumptions on the competitive nature of vertical mergers one way or the other (Lafontaine and Slade, 2021; Beck and Scott Morton, 2021).

Taking the FTC/DOJ Draft Merger Guidelines as another example, an opinion piece published by the Wall Street Journal noted that "weighted by the number of citations, the average year of the 50 cases the FTC and Justice Department cite in support of their approach is 1975."³⁸

Not only is the agency's omission of decades-long developments in the antitrust literature and practice at odds with its own extensive research history, it is also risky because the technologies and business models that have enabled the fast-growing digital economy are

³⁵ https://www.ftc.gov/system/files/documents/public_statements/1596396/statement_of_chair_lina_m_khan_commissioner_rohit_chopra_and_commissioner_rebecca_kelly_slaughter_on.pdf.

³⁶ See, for example, https://www.pymnts.com/cpi_posts/two-bridges-too-far-first-take-on-the-draft-merger-guidelines/ and <https://www.promarket.org/2023/07/28/steven-salop-and-jennifer-sturiale-vertical-merger-enforcement-in-the-draft-merger-guidelines/>.

³⁷ Review of Industrial Organization, Volume 59, issue 2, September 2021 Special Issue: The U.S. Vertical Merger Guidelines, edited by Roger D. Blair, table of contents available at <https://link.springer.com/journal/11151/volumes-and-issues/59-2>.

³⁸ <https://www.wsj.com/articles/antitrust-regulation-by-intimidation-khan-kanter-caselaw-courts-merger-27f610d9>.

vastly different from their parallels in the 1960s and 1970s. According to the US Bureau of Economic Analysis (Highfill and Surfield, 2022), the digital economy accounted for 10.3% of the US GDP in 2021, and its 9.8% annual growth from 2020 was significantly higher than the 5.9% growth of the US GDP during the same period (both in the real terms). Even during the earlier years of internet commerce, Goolsbee (2000) demonstrated that the internet had knocked down the geographic boundaries of local markets, enabling buyers and sellers to transact across states. As the fraction of the US population using the internet has grown from 43.08% in 2000 to 91.8% in 2023,³⁹ it is not surprising that many products and services are now offered through large digital platforms with a global reach. None of this could have been anticipated by lawmakers, judges, scholars, and practitioners back in the 1970s.

More importantly, the FTC has yet to develop a coherent overarching framework that explains why the consumer-welfare standard is wrong, what the new framework is, and why the new one is better. For example, prior merger guidelines included both price and nonprice effects, both static and dynamic effects, both upstream and downstream effects. It is unclear what is actually new in the agency's envisioned antitrust doctrine that departs from the consumer welfare standard. For example, is it a greater emphasis on small businesses and the labor force? Under what circumstances are small businesses more important than large businesses, or workers more important than consumers? By what criteria does one judge the relative importance of a large/small firm, and how does one weigh the interests of stakeholders such as businesses/consumers/workers and desired outcomes such as entry, competition, low prices, and innovation? Is it part of the new antitrust doctrine that "big" is automatically bad, and low consumer prices offered by a big firm are automatically predatory and anticompetitive?

Whatever the envisioned criteria are, practitioners, researchers, policymakers, judges, and regulators all need to have clear definitions for them in order to evaluate costs and

³⁹ Source: <https://www.statista.com/statistics/209117/us-internet-penetration/>, accessed on November 25, 2023.

benefits. This means that the criteria must still be rooted in some objective function (higher consumer welfare, total welfare, or something else altogether). Assuming innovation is a desirable outcome, any such framework should incorporate lessons from the extensive academic literature on how free markets may generate over-entry or under-entry, how market concentration may foster or discourage innovations, how investor relationships, networks and corporate governance may affect the volume and quality of innovations, and how innovations may be welfare-enhancing or welfare-reducing as they generate downstream effects on the prices, quality and the variety of products and services available in the marketplace.

4.2 The FTC's GAFAM Study Lacks Depth

As highlighted in Section 2.3, the FTC's study on non-HSR reportable GAFAM acquisitions has been helpful in better understanding the accuracy of data available through proprietary datasets such as those provided by Refinitiv, Crunchbase, S&P, CB Insights, FactSet, and Pitchbook. But one shortcoming is its exclusive focus on GAFAM, without comparing the overall attributes (such as the size, type, pace, and volume) of GAFAM's acquisitions with other leading acquirers of technology companies. Our recent research fills this gap, using M&A data from Crunchbase, Refinitiv, and S&P, and the business data of publicly-traded companies collected by Compustat, the Center for Research in Security Prices (CRSP), and the Hoberg-Phillips Data Library (HPDL). The statistical patterns discovered in these data cast some doubt on the legal theories of harm that GAFAM may have engaged in so-called 'killer acquisitions' or created so-called 'kill zones' (Jin, Lecesse and Wagman, 2023a,b). Unfortunately, those same theories of harm underlie some of the proposals from the FTC and DOJ for new and updated merger guidelines, HSR filing requirements, and competition

laws.⁴⁰

4.3 Proposed Merger Guidelines Overreach on Potential Entrants

As mentioned in Section 2.1, the Draft Merger Guidelines (DMG) released by the DOJ and the FTC on July 19, 2023 feature 13 guidelines, two of which are particularly novel and substantive as far as tech acquisitions. Guideline #4 states that “mergers should not eliminate a *potential* entrant in a concentrated market” and Guideline #9 states that “when a merger is part of a *series* of multiple acquisitions, the agencies may examine the whole series” (emphases added). While the DMG provide scant details on #9, Guideline #4 states that a firm’s “sufficient size and resources to enter,” expansion “into other markets in the past,” current participation “in adjacent or related markets,” being considered by industry participants as “a potential entrant,” as well as “subjective evidence that the company considered entering absent the merger” can all constitute evidence for the firm’s reasonable probability of entry, and a reasonable probability of entry is *presumed* to harm market competition.

While it is true that acquisitions can lead to anticompetitive effects if they result in killer acquisitions, kill zones that effectively deter future entries, or complete foreclosures of competitors’ access to key inputs, these possibilities should be carefully examined in light of empirical facts in each particular case and in comparison with alternative theories of harm as well as potential pro-competitive benefits and efficiencies. Merger guidelines should not simply delineate a short list of potential evidence with the presumption that any evidence covered in that list would automatically lead to substantial harms to competition.

⁴⁰ See, for instance, the remarks of FTC Chair Lina M. Khan Regarding Non-HSR Reported Acquisitions by Select Technology Platforms, <https://www.ftc.gov/public-statements/2021/09/remarkschair-lina-m-khan-regarding-non-hsr-reported-acquisitions-select>.

In a related co-authored piece (Jin, Leccese and Wagman, 2023a), we provide five empirical facts from the academic literature that can be summarized as follows:

- Firm R&D has been shifting from large mature corporations to VC-funded ventures,⁴¹ and VC-backed companies play an important role in R&D,⁴² job creation,⁴³ and the economy in general.⁴⁴
- M&A is one of the most important forms of capital liquidity, driving the funding, creation and growth of VC-funded tech ventures.⁴⁵
- Tech M&As are *not* concentrated among a handful of firms or in a single sector.⁴⁶
- Technology acquirers increasingly overlap with each other through M&A.⁴⁷

⁴¹ See Arora et al. (2020); Ozcan and Greenstein (2016); Greenstein (2015).

⁴² According to the National Science Foundation (2023), 76% of R&D performed in the US in 2020 came from the business sector. Wu and Atkinson (2017) show that the tech sector accounted for 79.1% of business R&D investment and 58.7% of R&D jobs between 2007 and 2017, where “tech” is defined as a set of industries with sufficiently large R&D-to-sales ratio and a share of STEM workers that is twice the national average, which results in the NAICS codes of 3254, 333295, 334, 3344, 3364, 3391, 5112, 518, 5415, 54171.

⁴³ Tech or non-tech business startups contribute about 20% of US gross job creation (Decker et al., 2014), and high growth startups account for as many as 50% of gross jobs created annually (Kauffman Foundation, 2016).

⁴⁴ According to the National Venture Capital Association (2023), the software category is the largest recipient of VC investment in 2022, accounting for about 40% of all US VC-backed deals. As of 2022, VC-backed companies account for the seven largest US publicly-traded companies by market capitalization, five of which are ranked by Fortune in the top 20 of America’s Most Innovative Companies in 2023 (<https://fortune.com/ranking/americas-most-innovative-companies/2023/search/>). Gornall and Strebulaev (2021) find that VC-backed publicly-traded companies account for 41% of total US market capitalization and 62% of R&D spending by publicly-traded companies.

⁴⁵ Initial public offering (IPO) and M&A are the two most common means of successful exits. A survey conducted by Silicon Valley Bank in 2020 (https://www.svb.com/globalassets/library/uploadedfiles/content/trends_and_insights/reports/startup_outlook_report/suo_global_report_2020final.pdf) finds that 58% of US startups view being acquired as the long-term goal, 17% aspire for IPO, and 14% plan to remain private. According to the NVCA (National Venture Capital Association, 2023), from 2012 to 2022, the number of US VC-backed M&A is 12 times that of VC-backed IPOs (11,895 in total). These suggest that M&A is a primary vehicle for capital liquidity for entrepreneurs and their investors.

⁴⁶ See details in Jin, Leccese and Wagman (2023c).

⁴⁷ See details in Jin, Leccese and Wagman (2023b).

- Most acquired firms in tech M&As fall outside the acquirer's core area of business.⁴⁸

Together, these facts imply that Guideline #4 in the DMG, as it is currently proposed, could profoundly distort the incentives of firms and investors, and these new incentives could deter potential entry and considerably diminish competition in the market under consideration. Such unintended anticompetitive effects can manifest not just because the agency appears to overestimate potential entrants' likelihood of entry through organic growth. Guideline #4 specifically provides a tool for a dominant incumbent to request the FTC's assistance in deterring and handicapping current and potential rivals, which runs counter to the goal of antitrust laws to promote competition.

The DMG do not elaborate on Guideline #9, but it is worth noting that based on S&P's tech merger data from 2010 to 2020, the vast majority of tech acquisitions (81.56%) are consummated by firms that have completed prior tech M&As, and that the average time period between any two same-acquirer tech acquisitions is 525 days (Jin, Leccese and Wagman, 2023c). This implies that a systematic evaluation of serial acquisitions requires considerable resources.

It is worth noting that the DMG were released after some antitrust theories of harm underlying its Guideline #4 (on potential entrants) and Guideline #9 (on the trend of market concentration) have been rejected by the courts in recent cases as described in Section 2.2. Put another way, the DMG reflect a lack of learning from, adjusting to and incorporating court decisions. Consequently, it is unclear what message the guidelines will convey to the public and various market stakeholders. Does the FTC's approach risk the prospect of a powerful government agency pushing forward its own doctrine despite court disagreements, whereby industry stakeholders need to follow that doctrine unless they are ready to spend substantial time and resources to fight against the agency in the court? This could undermine the

⁴⁸ See details in Jin, Leccese and Wagman (2023b,c).

credibility of the agency, discourage communication and cooperation from industry stakeholders, and create substantial uncertainty in the marketplace.

4.4 A Missed Opportunity for Technological Overhaul

Unfortunately, the FTC under Chair Khan, rather than pursuing its own digital transformation, has devoted significant time and resources to a series of rapid-fire changes that often range from circumventing a bad outcome in court, expending more resources to support the agencies' existing or broader processes, to wholesale actual and proposed legal changes that either explicitly or implicitly target specific industries or apply across industries, and may or may not comport with prior case law. Such a focus on fast, radical changes in desired outcomes—without a significant upgrade in its policy and economic toolkit—may bring significant political swings across administrations, which may result in socially undesirable outcomes such as enforcement disruptions, policy uncertainty, increased risks for firms and entrepreneurs, and less innovation.

As we assert in an earlier co-authored publication (Jin, Sokol and Wagman, 2022), the focus instead should be on upgrading the toolkit. Digital transformation is not limited to companies. Government agencies also need to change their approach and infrastructure to account for the increased digitization of the economy. A digital transformation entails not merely new resources and systems, but a new approach to the organization of the agencies, including incorporating trained staff with core competencies in software development, analytics, and new technologies, with expertise rooted in data science, data access, and data generation and collection. Such areas of expertise can lend themselves to better data gathering and analytics.

We provide several suggestions from our own experience and prior work. In antitrust, the agencies currently obtain most of their data from parties under investigation. However, this does not allow for effective long-range understanding, pattern identification, and strategic planning as to industry trends. There are numerous third-party data providers that offer

licensed access to commercial information, which would help transform agency thinking about how markets work. To be clear, the agencies should incorporate such external resources into their own specifically-tailored systems for data analysis and broader pattern and trend recognition, combining those external resources with improved internal data generation capabilities.

The FTC should enhance its complaint reporting system to better crowd source its information collection, and develop and improve internal data generation and analysis capabilities. The agencies collect and store large amounts of data as a result of complaints, merger filings, and investigations. There are opportunities to both utilize emerging technologies in the analysis of data, as well as to generate new datasets that are relevant to antitrust research. The ability to more quickly target AI-related firms with CIDs can be a meaningful addition to the FTC's toolkit insofar as the FTC can target it effectively.

To that end, the agencies should reduce their reliance on outsourcing for the development of their own core filing and complaint systems. Doing so often results in challenges and budget constraints in terms of updating and improving the software, as well as in creating new agency-specific tools for data analytics—including for data generated as part of filings and across filings. The agencies should also increase their collaboration with other government offices, such as the Patent and Trademark Office, to better identify broader market trends (Cheng et al., 2023). The dependency on outsourcing for the development of core filing systems introduces hurdles in the ability of the agencies to digitize and optimize their operations.

Importantly, the FTC is missing an opportunity to serve as a thought leader in substantive antitrust reforms. The agency could do so by (i) initiating a much-needed technological overhaul and digital transformation to serve as a model for all government agencies, particularly antitrust agencies; and (ii) leading a productive public discussion on how to modernize antitrust enforcement to be more consistent with the vibrant digital economy.

4.5 Optimizing Resource Allocation

While some of the FTC's policy changes, including actual and proposed changes, may be motivated by rigorous academic research — for example, on killer acquisitions (Cunningham, Ederer and Ma, 2021), kill zones (Kamepalli, Rajan and Zingales, 2022) and stealth consolidation (Wollmann, 2019) — the agency has yet to provide a detailed plan regarding how a resource-demanding policy change can be implemented efficiently, and how lessons learned in highly-specialized markets (for instance, regarding killer acquisitions in pharmaceutical markets; see Cunningham, Ederer and Ma, 2021) can be extended to different areas, such as the technology space.

In particular, the proposed policy changes, including the HSR-related changes and the proposed merger guidelines, can add significant burdens for both industry stakeholders and the agency.

For instance, assuming the agencies can revise Proposed Merger Guideline #4 to address the issues we highlighted, a systematic consideration of potential entrants will effectively require DOJ and FTC staff to function as a venture capitalist, predicting future market structure, future product development and future consumer preferences. The extent of resources that the agencies would require to match the capabilities of the VC industry (which manages over \$1 trillion in assets) is unclear. Moreover, Guideline #4 specifically provides a tool for a dominant incumbent to request the assistance of the antitrust agencies in deterring and handicapping current and potential rivals, potentially significantly increasing the number of cases that require such resources.

As far as the proposed HSR rule changes, the FTC itself estimates they could increase the time required to prepare and submit an HSR filing by a likely-underestimated average of 107 hours, with a range of 12 to 222 additional hours per filing depending on the particulars of the deal.⁴⁹ The proposed HSR changes would also encumber investors, requiring a minimum

⁴⁹ https://www.ftc.gov/system/files/ftc_gov/pdf/p239300_proposed_amendments_to_hsr_rules_

of 12 additional hours to prepare filings for even the simplest of transactions with no competitive issues. Investors with complex fund and transaction structures may need weeks instead of days to prepare their HSR filings, and possibly even months if the transaction involves any competitive overlaps between the parties.⁵⁰

Added costs for the agency do not necessarily carry negative implications. That depends on whether the FTC can utilize resources effectively. For example, the Commission may consider expending resources on areas ranging from its own digital transformation, to better understanding an industry by engaging with the right stakeholders, to obtaining access to the most conducive data for research and investigation, to using the most advanced technologies and developing new theories of harm that can be supported by data.

Added costs for the industry, particularly investors, may cause unnecessary frictions that deter investment, harm entry and innovation, and thus go counter to the FTC's own mission and objectives.⁵¹ Therefore, those must be carefully considered against any potential benefits.

Overall, the FTC under Chair Khan has introduced rapid changes in antitrust policies and enforcement, many of which are closely related to the tech sector and technology and innovation in general. While these changes have raised public attention and broadened the intellectual debates regarding antitrust reforms, they represent some significant departures from the academic literature, legal precedents, and antitrust practices developed over the past forty years. This “new” approach, resting on decades-old arguments but without a coherent overarching framework regarding what is wrong with the consumer-welfare standard and how to fix it, is unlikely to fit a fast-growing digital economy powered by technological innovation. Within two and half years, it has already introduced significant

form_instructions_2023.pdf.

⁵⁰ <https://www.srz.com/resources/proposed-hsr-changes-what-fund-managers-need-to-know.html>.

⁵¹ An example of how a sweeping regulation may affect venture investors can be found in Jia, Jin and Wagman (2021), which demonstrates the effects of European Union's General Data Protection Regulation (GDPR) on venture investments.

uncertainty for practitioners and generated substantial dissatisfaction from staff and senior personnel inside the agency. It is of concern that these FTC actions may have and will continue to tarnish the reputation of the agency as a research-driven public institution with bipartisan support. By devoting time and resources to rapid policy shifts and landmark cases, despite some clear rejections from the courts, the agency is also missing an opportunity to pursue its own much-needed technological overhaul and digital transformation.

References

- Arora, Ashish, Sharon Belenzon, Andrea Pataconi, and Jungkyu Suh.** 2020. "The Changing Structure of American Innovation: Some Cautionary Remarks for Economic Growth." *Innovation Policy and the Economy*, 20(1): 39–93.
- Autor, David, David Dorn, Lawrence Katz, Christina Patterson, and John Van Reenen.** 2020. "The Fall of the Labor Share and the Rise of Superstar Firms." *Quarterly Journal of Economics*, 135(2): 645–709.
- Beck, Marissa, and Fiona Scott Morton.** 2021. "Evaluating the Evidence on Vertical Mergers." *Review of Industrial Organization*, 59(2): 273–302.
- Benkard, C. Lanier, Ali Yurukoglu, and Anthony Lee Zhang.** 2021. "Concentration in Product Markets." *NBER working paper #28745*.
- Cheng, Zhaoqi, Ginger Zhe Jin, Mario Leccese, Dokyun Lee, and Liad Wagman.** 2023. "M&A and Innovation: A New Classification of Patents." *American Economic Association Papers and Proceedings*, 113: 288–293.
- Cunningham, Colleen, Florian Ederer, and Song Ma.** 2021. "Killer Acquisitions." *Journal of Political Economy*, 129(3): 649–702.
- Decker, Ryan, John Haltiwanger, Ron Jarmin, and Javier Miranda.** 2014. "The Role of Entrepreneurship in US Job Creation and Economic Dynamism." *Journal of Economic Perspectives*, 28(3): 3–24.
- De Loecker, Jan, Jan Eeckhout, and Gabriel Unger.** 2020. "The Rise of Market Power and the Macroeconomic Implications." *Quarterly Journal of Economics*, 135(2): 561–644.

- Dippon, M. Christian, and Matthew D. Hoelle.** 2022. "The Economic Costs of Structural Separation, Line of Business Restrictions, and Common Carrier Regulation of Online Platforms and Marketplaces: A Quantitative Evaluation." *NERA Economic Consulting*.
- Do"pper, Hendrik, Alexander MacKay, M. Miller Nathan, and Joel Stiebale.** 2022. "Rising Markups and the Role of Consumer Preferences." *Working paper*.
- Froeb, Luke M., D. Daniel Sokol, and Liad Wagman.** 2023. "Cost-Benefit Analysis Without the Benefits or the Analysis: How Not to Draft Merger Guidelines." *Southern California Law Review*.
- Goolsbee, Austan.** 2000. "In a World Without Borders: The Impact of Taxes on Internet Commerce." *Quarterly Journal of Economics*, 115(2): 561–576.
- Gornall, Will, and Ilya A. Strebulaev.** 2021. "The Economic Impact of Venture Capital: Evidence from Public Companies."
- Greenstein, Shane.** 2015. "How the Internet Became Commercial: Innovation, Privatization, and the Birth of a New Network."
- Highfill, Tina, and Christopher Surfield.** 2022. "New and Revised Statistics of the U.S. Digital Economy, 2005–2021."
- Jia, Jian, Ginger Zhe Jin, and Liad Wagman.** 2021. "The Short-Run Effects of the General Data Protection Regulation on Technology Venture Investment." *Marketing Science*, 40(4): 661–684.
- Jin, Ginger Zhe, Daniel D. Sokol, and Liad Wagman.** 2022. "Towards A Technological Overhaul of American Antitrust." *Antitrust*, 37(1).
- Jin, Ginger Zhe, Mario Leccese, and Liad Wagman.** 2023a. "The Draft Merger Guidelines Risk Reducing Innovation." *ProMarket*.
- Jin, Ginger Zhe, Mario Leccese, and Liad Wagman.** 2023b. "How Do Top Acquirers Compare in Technology Mergers? New Evidence from an S&P Taxonomy." *International Journal of Industrial Organization*, 89.
- Jin, Ginger Zhe, Mario Leccese, and Liad Wagman.** 2023c. "M&A and Technological Expansion." *Journal of Economics & Management Strategy*.

- Kamepalli, Sai Krishna, Raghuram Rajan, and Luigi Zingales.** 2022. "Kill Zone." *NBER working paper #27146*.
- Kauffman Foundation.** 2016. "The Economic Impact of High-Growth Startups." *Entrepreneurship Policy Digest*.
- Lafontaine, Francine, and Margaret E. Slade.** 2021. "Presumptions in Vertical Mergers: The Role of Evidence." *Review of Industrial Organization*, 59(2): 255–272.
- National Science Foundation.** 2023. "U.S. R&D Increased by \$51 Billion in 2020 to \$717 Billion; Estimate for 2021 Indicates Further Increase to \$792 Billion." *National Center for Science and Engineering Statistics*.
- National Venture Capital Association.** 2023. "NVCA Yearbook."
- Ozcan, Yasin, and Shane Greenstein.** 2016. "Technological Leadership (De)Concentration: Causes in ICTE." *NBER working paper #22631*.
- Sokol, Daniel D., Marissa Ginn, Robert Calzaretta Jr., and Marcello Santana.** 2023. "Antitrust Mergers and Regulatory Uncertainty." *The Business Lawyer*, 78(4).
- Syverson, Chad.** 2019. "Macroeconomics and Market Power: Context, Implications, and Open Questions." *Journal of Economic Perspectives*, 33(3): 23–43.
- Werden, Gregory J.** 2023. "Two Bridges Too Far: First Take on the Draft Merger Guidelines." *Competition Policy International*.
- Wollmann, Thomas G.** 2019. "Stealth Consolidation: Evidence from an Amendment to the Hart-Scott-Rodino Act." *American Economic Review: Insights*, 1(1): 77–94.
- Wu, John, and Robert D. Atkinson.** 2017. "How Technology-based Start-ups Support U.S. Economic Growth."