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April 21, 2022

The Honorable Jonathan Kanter
Assistant Attorney General
Department of Justice, Antitrust Division
950 Pennsylvania Avenue, NW
Washington, DC 20530

The Honorable Lina Khan
Chair
Federal Trade Commission
600 Pennsylvania Avenue, NW
Washington, DC 20580

Re: *Request for Information on Merger Enforcement* (FTC-2022-0003-0001)

Dear Chair Khan and Assistant Attorney General Kanter,

The Center for American Progress applauds the decision of the Federal Trade Commission and Department of Justice to revise the Merger Guidelines in order to improve antitrust enforcement. We appreciate the invitation to comment on this project, and respectfully offer several ideas for your consideration.

Sincerely,

Marc Jarsulic
Senior Fellow and Chief Economist

Adam Conner
Vice President of Technology Policy

Erin Simpson
Director of Technology Policy

Introduction

The current effort to rewrite the Federal Trade Commission/Department of Justice Merger Guidelines offers an opportunity to improve merger enforcement and our understanding of the impacts of mergers. There are several points that ought to be considered for inclusion:

1. The Guidelines should include relevant financial market measures to establish presumptions about competitiveness, as indicia of market power in complex and multisided markets, and as indicia of barriers to entry.

2. The Guidelines should explicitly consider the competitive harms of monopsony power, especially in labor markets, where racial and community impacts are pronounced.

3. Consummated mergers should be the subject of systematic review, and data gathering should facilitate analysis of racial and community impacts of mergers.

4. Disguised surveillance and algorithmic manipulation by digital communication platforms are sources of market power, and these violations of privacy should be identified in the Guidelines as barriers to entry and sources of harm to competition.

5. The Guidelines should seek to preserve dynamic competition in digital markets, which are prone to tipping toward oligopoly or monopoly.

6. The Guidelines should recognize the potential for competitive harm arising from digital platforms with strong network effects acquiring other competitors with network effects, especially if either firm enjoys social graph network effects.

7. The Guidelines should explicitly consider the competitive dynamics and market power arising from aggregated data, which is a critical input to digital services.

8. Proposed mergers of independent third-party analytics firms by their gatekeeper platforms of focus harm competition and should be presumed to be anticompetitive.

9. The Guidelines should recognize that acquisition of a platform which offers interoperability by one without it can have negative competitive effects. Agencies should carefully weigh the technical and governance realities of API maintenance when determining related conduct remedies.

Each of these recommendations is discussed in detail below.

1. **The Guidelines should include relevant financial market measures to establish presumptions about competitiveness, as indicia of market power in complex and multisided markets, and as indicia of barriers to entry.**

    - **Financial market valuations of firms can measure market power and barriers to entry.[1]**

There is now significant evidence that the competitive environment in the U.S. economy has changed dramatically since the late 1970s, with a significant share of corporations earning returns that exceed competitive levels.

Under competitive conditions—in which capital owners with funds to invest maximize their profits, and there are no barriers that prevent these funds from flowing to the projects with the highest rates of return—it is expected that rates of profit on invested capital will converge across firms and industries to a common, equilibrium value. The logic behind this expectation is simple: supranormal rates of return in any line of business create the incentive for their own elimination, since profit-maximizing investors will have extra incentive to enter that business, replicate the productive process used by incumbent firms, and earn some of the higher profits for themselves. Entry should continue until the effects of increasing supply reduce prices and eliminate rents—that is to say, the difference between competitive and supranormal profits.[2]

Current evidence shows that, in the aggregate, the share of rents in corporate income is positive and has trended upward since the late 1970s. To visualize this, consider the ratio of the market value of a corporation to the replacement cost of the physical and intangible capital stock that it employs. This ratio, called Tobin's Q, should be equal to 1 under competitive market conditions. (See Appendix for an explanation of this metric.) However, Q values for many nonfinancial corporations have been trending upward since the late 1970s and are now significantly greater than 1. Using firm-level data from a large sample of publicly traded U.S. corporations for the period 1975–2015—excluding regulated utilities, financial firms, public service firms, and some others—economists Ryan H. Peters and Lucian A. Taylor construct measures of firm-level Q values. These measures include the replacement costs of both tangible and intangible capital.[3] The average and 90th percentile values of the Peters-Taylor Q ratios are presented graphically in Figure 1.

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[1] This section draws on M. Jarsulic, "Antitrust Enforcement for the 21st Century", *Antitrust Bulletin*, 64 (4) (2019).

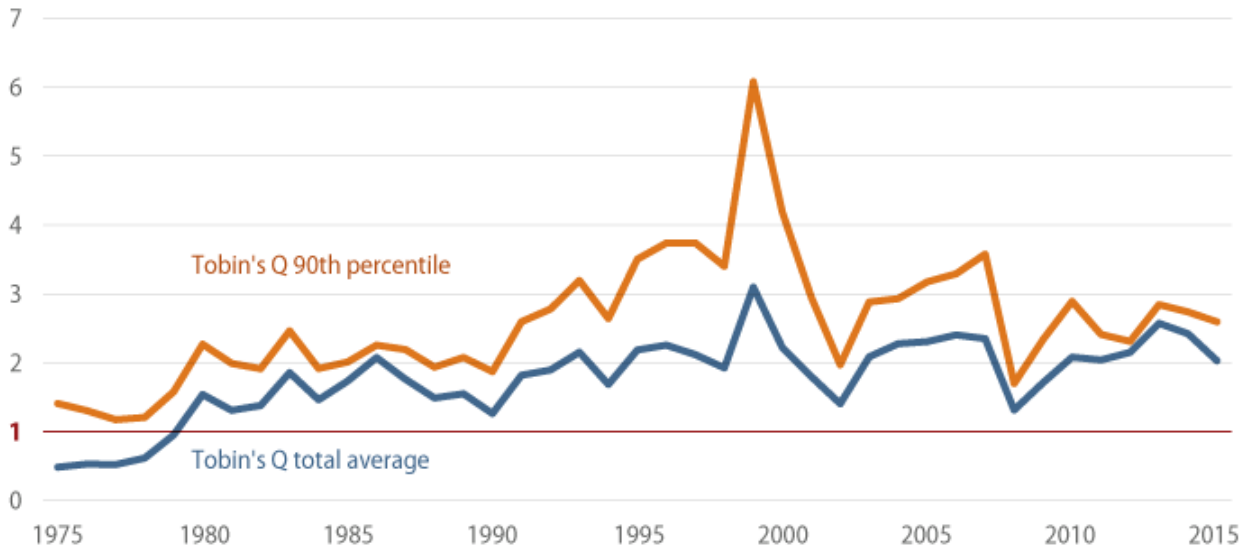
[2] W. Kip Viscusi, Joseph E. Harrington Jr., and David E. M. Sappington, *Economics of Regulation and Antitrust, Fifth Edition* (Cambridge, MA: MIT Press, 2018).

[3] See Ryan H. Peters and Lucian A. Taylor, "Intangible Capital and the Investment-q Relation," *Journal of Financial Economics* 123 (2) (2017), available at https://www.sciencedirect.com/science/article/pii/S0304405X16301969. The Peters-Taylor sample includes all Compustat firms except for regulated utilities (Standard Industrial Classification codes 4900–4999); financial firms (6000–6999); and firms categorized as public service, international affairs, or nonoperating establishments (9000+). They also exclude firms with missing or nonpositive book value of assets or sales and firms with less than $5 million in physical capital. Q values have been top-coded at 20.

FIGURE 1

Economic rents have grown as a share of corporate net earnings

Average and 90th percentile firm-level Tobin's Q values by year



Notes: Economic rents are earnings exceeding levels expected in a competitive market. Tobin's Q is the ratio between a firm's market value and the replacement cost of capital.

Sources: Construction of Ryan H. Peters and Lucian A. Taylor's sample is described in the report text. Center for American Progress analysis of data from Ryan H. Peters and Lucian A. Taylor, "Intangible capital and the investment-q relation," Journal of Financial Economics 123 (2) (2017): 251–272, available at https://www.sciencedirect.com/science/article/pii/S0304405X16301969; Standard & Poor, "Standard & Poor's Compustat (1960-2014)," available at https://wrds-web.wharton.upenn.edu/wrds/ (last accessed January 2019).

Figure 1 recreated from "Toward a Robust Competition Policy" by Marc Jarsulic, Ethan Gurwitz, and Andrew Schwartz (Washington, D.C.: Center for American Progress, 2019), available at https://www.americanprogress.org/article/toward-robust-competition-policy/

Q values greater than 1 suggest that the rent component, or excess profit, of total U.S. corporate income is now quite large. Applying a model-based approach to national income accounts data, economist Simcha Barkai reaches a similar conclusion for the nonfinancial corporate sector as a whole.[4]

Without the presence of barriers to entry, this change in Q values is difficult to explain. The existence of rents should provide a strong incentive for the entry of new competitors, and rising rents should provide increasingly strong incentives as well. However, the expected competitive mechanism does not appear to be functioning.

This interpretation of the data is supported by the fact that it has become easier for firms to earn rents in successive years. Figure 2 displays the share of firms in the Peters-Taylor sample with a Q greater than 1 in a given year which then maintained a Q greater than 1 in the next year. This number rises from around 10 percent of firms in 1980 to around 40 percent of firms in 2015, suggesting increased inertia around rent extraction. In other words, it has become more likely that a firm that earns measurable

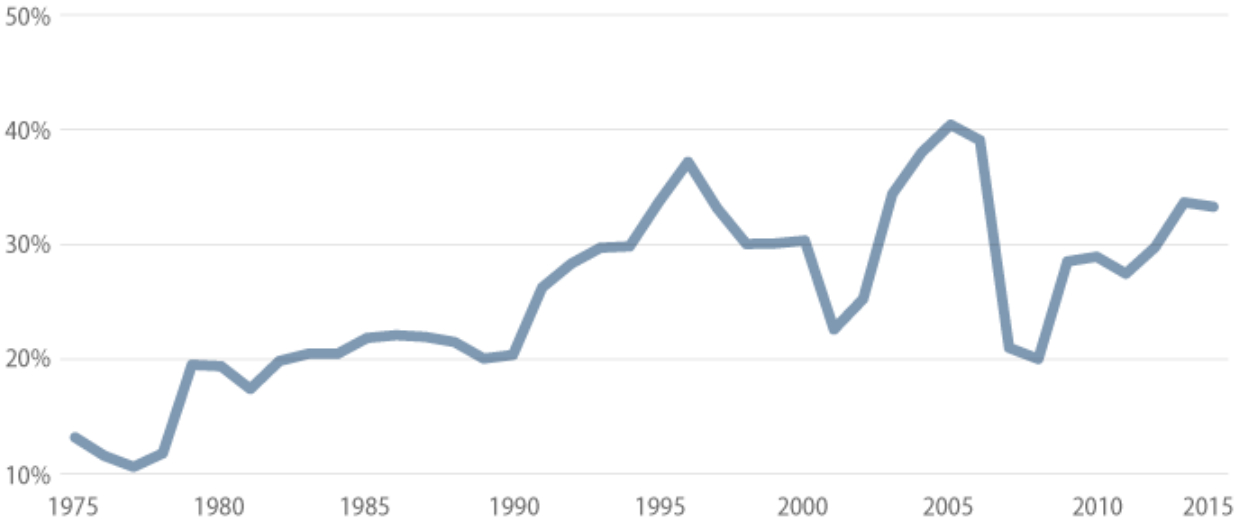
[4] Simcha Barkai, "Declining Labor and Capital Shares" (Chicago: University of Chicago, 2016), available at http://home.uchicago.edu/~barkai/doc/BarkaiDecliningLaborCapital.pdf.

rent will be able to do so in a subsequent year. This is consistent with the expected effects of a decline in competition.

FIGURE 2

Firms have found it easier to sustain supranormal profits since the late 1970s

Percentage of firms that have a Q value of more than one that have maintained a Q value above one from the prior year



Notes: Economic rents are earnings exceeding levels expected in a competitive market. Tobin's Q is the ratio between a firm's market value and the replacement cost of capital.

Sources: Construction of Ryan H. Peters and Lucian A. Taylor's sample is described in the report text. Center for American Progress analysis of data from Ryan H. Peters and Lucian A. Taylor, "Intangible capital and the investment-q relation," Journal of Financial Economics 123 (2) (2017): 251–272, available at https://www.sciencedirect.com/science/article/pii/S0304405X16301969; Standard & Poor, "Standard & Poor's Compustat (1960-2014)," available at https://wrds-web.wharton.upenn.edu/wrds/ (last accessed January 2019).

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Figure 2 recreated from "Toward a Robust Competition Policy" by Marc Jarsulic, Ethan Gurwitz, and Andrew Schwartz (Washington, D.C.: Center for American Progress, 2019), available at https://www.americanprogress.org/article/toward-robust-competition-policy/

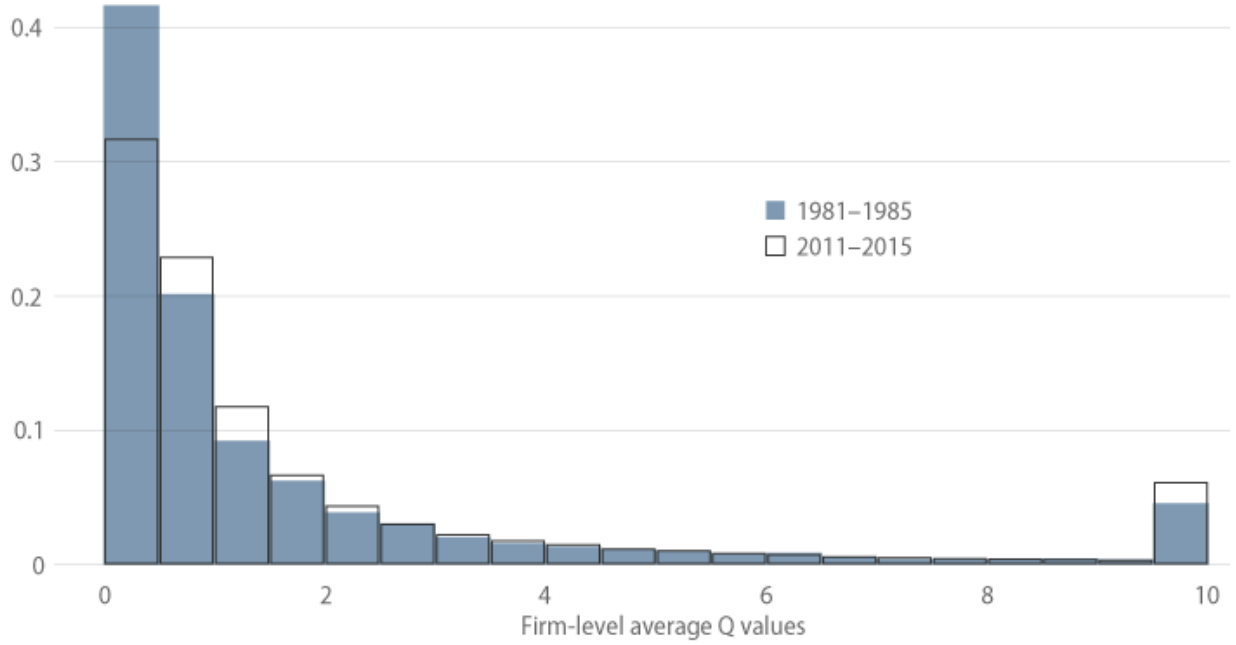
There is, of course, heterogeneity in the relative market power of firms. While the mean value of Q has trended upward, Q values for many firms reflect competitive returns. Figure 3 shows the distribution of Q values for individual firms in the Peters-Taylor sample averaged across 1981–1985 and 2011–2015. Both mean and median values have shifted right, and the right-hand tail of the distribution is more heavily populated, although many firms have Q values at or below 1.[5]

[5] Q values have been top-coded at 10 for the purpose of this figure.

FIGURE 3

The distribution of firms' Q values has shifted toward higher values since the 1980s

Distribution of Q values for individual firms in the sample, 1981–1985 and 2011–2015



Note: Tobin's Q is the ratio between a firm's market value and the replacement cost of capital. Average Q values greater than 10 were outliers; they were replaced with a value of 10 to aggregate them with the data.*

***Correction, January 7, 2020:** This figure has been updated to correctly state that average Q values greater than 10 were outliers.*

Sources: Construction of Ryan H. Peters and Lucian A. Taylor's sample is described in the report text. Center for American Progress analysis of data from Ryan H. Peters and Lucian A. Taylor, "Intangible capital and the investment-q relation," Journal of Financial Economics 123 (2) (2017): 251–272, available at https://www.sciencedirect.com/science/article/pii/S0304405X16301969; Standard & Poor, "Standard & Poor's Compustat (1960-2014), https://wrds-web.wharton.upenn.edu/wrds/ (last accessed January 2019).

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Figure 3 recreated from "Toward a Robust Competition Policy" by Marc Jarsulic, Ethan Gurwitz, and Andrew Schwartz (Washington, D.C.: Center for American Progress, 2019), available at https://www.americanprogress.org/article/toward-robust-competition-policy/

There is also evidence of differing degrees of market power across sectors of the economy. Figure 4 displays the average Q values for the 200 largest U.S. corporations by market capitalization in the Peters-Taylor sample, sorted into several broad Global Industry Classification Standard sectors.[6] While there was a general upward trend in Q values across most sectors during the years 1981–1985 and 2011–2015, not all sectors ended the period with values significantly larger than 1.

[6] The Global Industry Classification Standard (GICS) is a code taxonomy for grouping similar firms into sectors, industry groups, industries, and subindustries. An alternative to the North American Industrial Classification System (NAICS) and its predecessor, the Standard Industrial Classification (SIC), the GICS is more internationally focused for finance and investment communities.

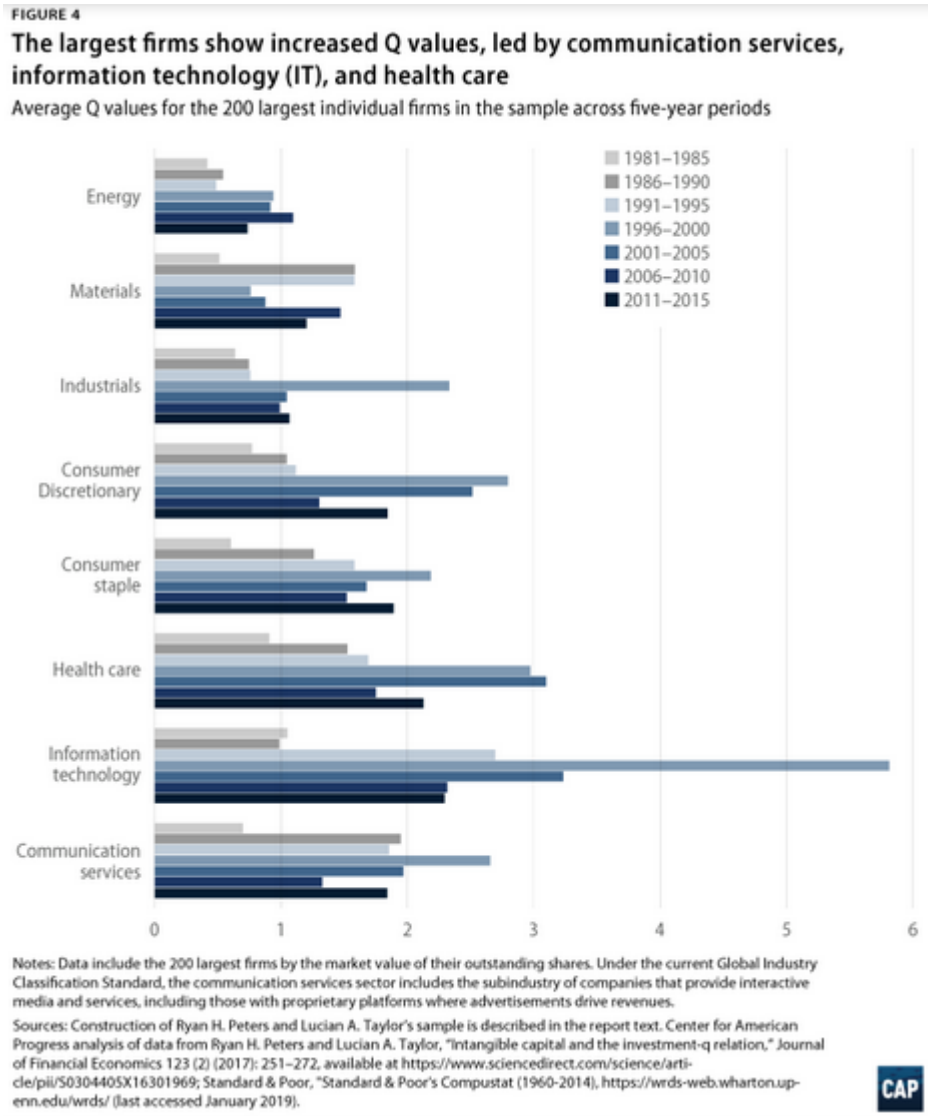

Figure 4 recreated from "Toward a Robust Competition Policy" by Marc Jarsulic, Ethan Gurwitz, and Andrew Schwartz (Washington, D.C.: Center for American Progress, 2019), available at https://www.americanprogress.org/article/toward-robust-competition-policy/

Given the information contained in Q ratios, it makes sense to include them when establishing presumptions about competitiveness, as indicia of market power in complex and multisided markets, and as indicia of barriers to entry. These ratios can be calculated using available, reliable data for publicly traded firms. They can be integrated into the Guidelines in a manner analogous to Herfindahl concentration indices. For example, the Guidelines could identify a multi-year average value of Q, greater than 1, which can be taken to show the existence of market power in at least one of the relevant markets in which a firm operates.

It is worthwhile noting that Q ratios for some recognizably dominant firms are substantially above 1. The 2011-2015 average Q values for Apple, Facebook (now "Meta," but referred to as "Facebook" in this document"), Alphabet (also referred to as

"Google" in this document), Amazon, and Microsoft were 9.2, 8.4, 4.0, 3.1 and 1.9, respectively, as calculated using Peters-Taylor data.

- **Financial market responses to past acquisitions can indicate market power and barriers to entry.**

Firms enjoying the gains created by entry barriers have every incentive to maintain and expand them. One excellent way to do so, made possible by large flows of rent, is to acquire potential competitors before they can fully establish themselves by acquiring users and providing them with network externalities. Firms such as Google and Facebook have been very active acquirers, and in many cases have done so at large premia to the existing revenue of the acquired. [7]

A recent event study of venture capital finance suggests that these acquisitions create "kill zones" around similar firms at similar stages of development.[8] That is, major acquisitions of firms such as YouTube and Waze by Google, and Instagram and WhatsApp by Facebook, were followed by large, statistically significant declines in venture capital funding for similar firms. That is, the acquisitions had the effect of deterring subsequent entry. This outcome can be explained by the market power of the incumbent acquirers, which are able to confer immediate network benefits to the acquired firms and radically diminish the prospects of similar firms.

Other statistical studies, examining venture capital effects following larger sets of acquisitions by large tech platforms, come to contradictory conclusions. Koski et al. find that acquisitions have a negative effect on the number of venture capital investments and funding levels, consistent with "kill zones," while Prado finds positive effects.[9]

Taken together there is sufficient empirical evidence to suggest that the Federal Trade Commission (FTC) and Department of Justice (DOJ) ought to conduct systematic statistical analyses of previous acquisitions by the large digital platforms and similarly situated firms to look for evidence of "kill zones." Where kill zones can be shown, the

[7] The acquisition history of Google, Facebook, Apple and Amazon is chronicled in Chris Alcantara et al., "How Big Tech got so big: Hundreds of acquisitions', *Washington Post*, April 21, 2021, available at https://www.washingtonpost.com/technology/interactive/2021/amazon-apple-facebook-google-acquisitions/

[8] Sai Kamepali et al., "Kill Zone", NBER Working Paper No. 27146, (Cambridge: National Bureau of Economic Research, 2021), available at https://www.nber.org/papers/w27146

[9] Heli Koski et al., "Killers on the Road of Emerging Start-ups", ETLA Working Paper No. 81, (Helsinki: ETLA Economic Research, 2020), available at https://www.etla.fi/en/publications/killers-on-the-road-of-emerging-start-ups-implications-for-market-entry-and-venture-capital-financing/; Tiago S. Prado, "Kill Zones? Effects of Big Tech Start-Up Acquisitions on Innovation", 23rd Biennial Conference of the International Telecommunications Society, June 2021, available at https://www.econstor.eu/handle/10419/238049

Agencies can use this information to inform their estimates of existing market power and their judgment of potential competitive harm from acquisitions.[10]

2. The Guidelines should explicitly acknowledge the effects of monopsony power in labor markets, where racial and community impacts are pronounced.

Currently the Guidelines do not mention the creation of monopsony power in labor markets as a potential source of competitive harm from mergers. While the FTC and DOJ have challenged cartel-like labor market "no poaching" agreements among major digital firms, Agencies have not challenged a merger because it would tend to create monopsony power in labor markets.[11] Academic research on labor market monopsony suggests that this omission needs to be remedied.

As summarized in an excellent literature review by David Wasser, empirical work by labor economists shows that many employers do have measurable power over the wages they pay their workers.[12] In a competitive labor market, the wage elasticity of labor supply faced by a firm is infinite. That is, a firm that pays less than the competitive market wage cannot hire workers—who leave for other employment. However, when firms have monopsony power in a labor market, they can offer wages below the competitive level and still retain some workers. A recent meta-analysis of 53 supply elasticity studies found that many employers pay wages between 9 and 13 percent less than the competitive level, i.e., that many employers already enjoy monopsony power over labor.[13] There is also substantial empirical work which shows that increased levels of monopsony power correlate with measures of employer concentration in local labor markets.[14] Moreover, a recent paper analyzing the effects of mergers and acquisitions on wages found that mergers which significantly increase concentration in local labor markets lead to wage declines.[15]

Taken together, these empirical studies indicate that when mergers lead to local labor market monopsony, there can be significant competitive effects. The effects can include wage reductions leading to decreased output and employment, or increased work intensity for a given wage. Both result in misallocation of resources.[16]

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[10] It would also make sense to look for the unexpected creation of kill zones when conducting the post-merger reviews discussed below.
[11] Eric Posner et al., "Antitrust Remedies for Market Power", *Harvard Law Review*, 2018, 132 (2) (2018), 540.
[12] David Wasser, "Literature Review: Monopsony, Employer Consolidation and Health Care Labor Markets, (Washington, D.C.: Center for Economic Policy Research, 2022), available at https://cepr.net/wp-content/uploads/2022/01/Wasser_ConcentrationLitReview_CEPR.pdf
[13] Wasser, *ibid*,
[14] Anna Sokolova and Todd Sorenson, "Monopsony in Labor Markets: A Meta-Analysis", *ILR Review*, 74 (1) (2020).
[15] David Arnold, "Mergers and Acquisitions, Local Labor Market Concentration, and Worker Outcomes", (Princeton: 2020), available at https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3476369.
[16] Janet Currie et al., Cut to the Bone? Hospital Takeovers and Nurse Employment Contracts, *ILR Review*, 58 (3).

It is important to recognize that the effects of monopsony can have significant effects within labor market segments and communities. There is evidence that employer collusion and contractual manipulation are used to create monopsony power for employers in the franchise sector, who hire many low-wage workers.[17] Since people of color and women are over-represented in this segment of the labor force, they are disproportionately affected by exercise of monopsony power in these labor markets.[18] Moreover, as Bivens et al. have emphasized, employer power can have outsized effects in rural areas and small towns.[19] Given that African Americans are highly represented in counties in the South outside major cities, they can be disproportionately affected by mergers to monopsony in these areas.[20]

While these effects might be classified as "externalities" created by a merger, they can still have powerful allocative as well as distributive effects. The recent natural experiment of the "China Shock," which devastated many communities affected by the rise of Chinese manufacturing competition after the year 2000, demonstrated that labor mobility is often very low and job loss following a merger can permanently remove workers from productive work.[21,22]

Incorporating the competitive effects of labor market monopsony into the Guidelines would be novel, but some of the tools to do this are ready made. Work by Naidu et al. and Marinescu and Hovenkamp identifies ways in which the competitive effects of monopsony can be included in merger analyses.[23]

Outside the labor market context, the effects of the widely recognized existence of monopsony power in agricultural markets ought to be treated explicitly in the Guidelines. While the Guidelines apply the same concentration thresholds to analysis of buyer and seller power, monopsony literature suggests that buyer power occurs at much lower levels of concentration. Work by Peter Carstensen indicates that buyers with

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[17] Alan Krueger and Orley Ashenfelter, "Theory and Evidence on Employer Collusion in the Franchise Sector", NBER Working Paper No. 24831 (Cambridge: 2018), available at https://www.nber.org/papers/w24831

[18] Darrick Hamilton and Madeline Neighly, "The Racial Rules of Corporate Power: How Extractive Corporate Power Harms Black and Brown Communities and How Race Conscious Solutions Can Create an Inclusive Economy", (New York: Roosevelt Institute, 2019), 13, available at https://rooseveltinstitute.org/wp-content/uploads/2020/07/RI_Racial-Rules-of-Corporate-Power_Issue-brief_201911-1.pdf

[19] Josh Bivens et al., "It's Not Just Monopoly and Monopsony: How Market Power Has Affected American Wages", (Washington, D.C.: Economic Policy Institute, 2018), available at https://www.epi.org/publication/its-not-just-monopoly-and-monopsony-how-market-power-has-affected-american-wages/

[20] William H. Frey, "Mapping America's Diversity with the 2020 Census", (Washington, D.C.: Brookings Institution, 2021), available at https://www.brookings.edu/research/mapping-americas-diversity-with-the-2020-census/

[21] David Autor et al., "The China Syndrome: Local Labor Market Effects of Import Competition in the United States", *American Economic Review*, 103 (6) (2012).

[22] *See also* William Julius Williams, *When Work Disappears*, (New York: Random House, 1996).

[23] Posner et al., *op. cit.*; Ioana Martinescu and Herbert Hovenkamp, Anticompetitive Mergers in Labor Markets, *Indiana Law Journal*, 94 (3) (2019).

market shares as small as 15 percent may raise competition concerns.[24] The Guidelines would be improved by taking these differences into account when establishing presumptions and analyzing transactions.

3. Consummated mergers should be the subject of systematic review, and data gathering should facilitate analysis of racial and community impacts of mergers. [25]

Recent empirical research demonstrates the importance of systematic evaluation of merger enforcement decisions. For example, an analysis by economist John Kwoka compiled and analyzed all high-quality merger retrospectives in the economics literature.[26] His meta-analysis found that a substantial majority of these carefully studied mergers resulted in sizeable price increases, implying that merger enforcement too often fails to identify or remedy anticompetitive mergers. Further, the price increases have been substantial, averaging about 10 percent after controlling for all other factors. Other retrospectives, such as those by Matthew Weinberg as well as Orley Ashenfelter et al. come to roughly similar conclusions.[27]

Studies such as these play an important part in focusing policy attention on the role of antitrust and identifying how it can, and needs to be, strengthened. However, most of the studies on which these meta-analyses are based have been undertaken by academics who operate under extreme data constraints. Lacking access to data from the merging parties, these researchers make do with data from public sources such as the trade press or government reports, or those which are purchased from private sources. While still informative, this results in an unavoidable emphasis on cases where more data is available.

As many respected antitrust professionals note, this is a glaring limitation of the current enforcement infrastructure. Dennis Carlton, former Chief Economist at the Antitrust Division of the Justice Department for example, has written that "the dearth of such [quantitative] studies and measures means that there is no reliable guide for determining

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[24] Peter C. Carstensen, "Buyer power, competition policy, and antitrust: the competitive effects of discrimination among suppliers," *The Antitrust Bulletin* 53 (2) (2008), available at https://heinonline.org/HOL/LandingPage?handle=hein.journals/antibull53&div=28&id=&page=
Peter Carstensen, "Buyer Power and the Horizontal Merger Guidelines: Minor Progress on an Important Issue," *University of Pennsylvania Journal of Business Law* 14 (3) (2012), available at https://scholarship.law.upenn.edu/cgi/viewcontent.cgi?referer=&httpsredir=1&article=1414&context=jbl

[25] This section draws on John Kwoka and Marc Jarsulic, "Evidence-Based Policy in Antitrust: The Need for Ongoing Merger Review, (Chicago: ProMarket, 2017), available at https://promarket.org/2017/04/20/evidence-based-policy-antitrust-need-ongoing-merger-retrospectives/#footnote_25_5026

[26] John Kwoka, *Mergers, Merger Control, and Remedies: A Retrospective Analysis of U.S. Policy*, (Cambridge: MIT Press, 2015).

[27] Matthew Weinberg M., The Price Effects of Horizontal Mergers, *Journal of Competition Law and Economics*, 4 (2) (2008); Orley Ashenfelter et al., "Did Robert Bork Understate the Competitive Impact of Mergers? Evidence from Consummated Mergers," *Journal of Law and Economics*, August (2014).

whether our antitrust policy is too lax in some areas and too stringent in others."[28] Similarly, William Kovacic, then-commissioner of the FTC, has urged greater attention on the evaluation of the economic effects of enforcement decisions especially by developing better quantitative measures of actual economic effects.[29]

There is now an opportunity for antitrust Agencies to establish a world-class data collection program for use in evaluating the effects of antitrust policy and providing insight into needed changes. Since systematic data collection will be novel, the DOJ and FTC should establish a program that is broad in scope. Data should allow analysts to study the effects on competitive conditions, price, product quality, privacy and innovation.

Moreover, as many commentators have noted, merger-related increases in market power can have profound negative racial and community impacts.[30] While antitrust statutes do not now consider these effects, there is an opportunity to design data collection to answer questions about racial impacts and effects on local communities. The resulting data could play an important role in an ongoing evaluation of merger law.

While a permanent data collection and analysis effort may seem like a luxury to agencies that are already resource constrained, its creation would be a vital asset with outsized benefits for future policy making. Existing analytic infrastructure within enforcement agencies, however, makes pinpointing the requisite investments particularly challenging. The FTC, for example, already has as many as fifty economists within the Bureau of Economics reviewing mergers and/or assisting antitrust investigations, but has no formal, robust data collection division or monitoring function.[31] Similarly, while the DOJ has an Economic Analysis Group that analyzes the

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[28] Dennis Carlton, "Why We Need to Measure the Effect of Merger Policy and How To Do It," NBER Working Paper No.14719, (Cambridge: NBER, 2009), available at https://www.nber.org/system/files/working_papers/w14719/w14719.pdf

[29] William Kovacic, "Assessing the Quality of Competition Policy: The Case of Horizontal Merger Enforcement," (Chicago: Competition Policy International, 2009), available at https://www.biicl.org/files/4205_kovacic.final.pdf . *See also* William Kovacic, "Using Ex Post Evaluations to Improve the Performance of Competition Policy Authorities," *Journal of Corporation Law*, 31 (2) (2006).

[30] *See* Hamilton and Neighly, op. cit., Rosa Morales, "Can Antitrust Enforcement Be a Tool for Racial Equity", (New York: Competition 360, 2021), available at https://www.crowell.com/files/20210330-Can-Antitrust-Enforcement-Be-A-Tool-For-Racial-Equity.pdf; Marshall Steinbaum et al., "Powerless: How Lax Antitrust and Concentrated Market Power Rig the Economy Against American Workers, Consumers and Communities", (New York: The Roosevelt Institute, 2018), available at https://rooseveltinstitute.org/wp-content/uploads/2020/07/RI-Powerless-201802.pdf; Dani Kritter, "Antitrust as Anti-racist", (Berkeley: California Law Review Online, 2021), available at https://www.californialawreview.org/antitrust-as-antiracist/

[31] Federal Trade Commission, "About the Bureau of Economics," available at https://www.ftc.gov/about-ftc/bureaus-offices/bureau-economics/about-bureau-economics

potential competitive effects of proposed mergers, it lacks any explicit mandate or system to collect and analyze outcomes and trends data.[32]

By contrast, other federal data collection efforts offer guidance for what would be required. The Federal Reserve, for example, has a large research staff which uses macroeconomic, financial market, and banking data to help calibrate monetary and regulatory policy.[33, 34] These models provide a sense of the likely scope and scale of the required investment.

4. Disguised surveillance and algorithmic manipulation by digital communication platforms are sources of market power, and should be considered in evaluations of the existence of barriers to entry and harm to competition. [35]

Both Facebook and Alphabet operate free internet services that are widely used. The Facebook social media platform has nearly two billion daily active users worldwide, and hundreds of millions in the U.S. Alphabet provides a variety of free services including the dominant Google search and YouTube video platforms.

Facebook and Alphabet provide these services for free because users are online ad targets. Together Facebook and Alphabet have a large share of the market for online advertising: they sell over half of all online advertising in the U.S. Their dominance in this market delivers monopolistic returns, reflected in the persistently high valuations financial markets place on each company.

Online ad sales depend on the ability of these platforms to individually target ads and messages to huge numbers of people. Targeting is made possible by digital surveillance of users' behavior. Although the digital platforms operated by Facebook and Alphabet limit disclosures about their operations, there are data to indicate that their surveillance of the online activity of consumers who use their free services is large in scale, scope, and effectiveness.[36]

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[32] The United States Department of Justice, "Economic Analysis Group", available at https://www.justice.gov/atr/about-division/economic-analysis-group.

[33] Board of Governors of the Federal Reserve System, Economic Research & Data, available https://www.federalreserve.gov/econres.htm.

[34] Office of Financial Research, "Strategic Plan Fiscal Years 2015-2019" available at https://www.financialresearch.gov/strategy-budget/files/Office-of-Financial-Research-Strategic-Plan-2015-2019.pdf.

[35] This section summarizes the analysis in M. Jarsulic, "Addressing the Competitive Harms of Opaque Surveillance and Recommendation Algorithms", *The Antitrust Bulletin*, 67 (1) (2022), available at https://doi.org/10.1177/0003603X211066983

[36] Marc Jarsulic, "Addressing the Competitive Harms of Opaque Surveillance and Recommendation Algorithms", *The Antitrust Bulletin*, (January 19) (2022), available at https://doi.org/10.1177/0003603X211066983.; Erin Simpson and Adam Conner, "How to Regulate Tech: A Technology Policy Framework for Online Services," Center for American Progress, November 16, 2021, available at https://www.americanprogress.org/article/how-to-regulate-tech-a-technology-policy-framework-for-online-services/.

User engagement, which helps determine target numbers, is stimulated and directed by platform "recommendation" algorithms. Both the "Newsfeed" algorithm—which determines what posts, videos, and news reports are served to Facebook users—and the "watch-next" algorithm—which presents videos to YouTube users—can affect what users read and view and can influence their attitudes, emotions, and behavior.

While surveillance has negative effects on user privacy, and algorithms have had powerful effects on user attitudes and behavior, platform users have limited knowledge about the operation and impact of these practices. As survey evidence about online privacy shows, users are uncomfortable about the way the online platforms may be gathering and using data about them, yet know little about how surveillance operates. Understanding the operation and effects of recommendation algorithms requires an additional level of technical sophistication.

These information asymmetries between platforms and users have important competitive effects. They divert users from competing platforms that do not engage in these business practices, and inhibit entry and the innovation it would stimulate, thereby helping sustain the monopoly power of dominant incumbents.

The publicly available information about recommendation algorithms and their effects, the extent of surveillance, and users' dislike and confusion over surveillance is compelling. However, DOJ and FTC are ideally situated to significantly expand what is known about these matters. Proprietary platform data might well add to what is already known about algorithms and the extent of surveillance, and additional public opinion and focus group research can refine what is known about user awareness and attitudes.

Assuming that the results of DOJ and FTC inquiries are consistent with what is already known, the effects of disguised surveillance and algorithmic manipulation should be recognized as sources of platform market power and barriers to entry, in addition to concentration measures and other indicia. These factors ought to be considered when the competitive effects of acquisitions by platform companies are evaluated.

5. The Guidelines should seek to preserve dynamic competition in digital markets, which are prone to tipping toward oligopoly or monopoly.

Digital markets face significant competitive challenges. Agencies must update the Guidelines to adequately account for the competitive implications of network effects, aggregate data, information asymmetry, and interoperability restrictions. Each of these challenges and accompanying recommendations is outlined below. Given the significant development of digital markets since the Guidelines were last updated, some extended background is provided.

Numerous scholars and government bodies have identified the unique characteristics of digital market power. In 2021, the Center for American Progress surveyed more than a dozen of these major research reports and government inquiries around digital

gatekeepers.[37] It identified several common characteristics of digital markets that make them vulnerable to tipping. These characteristics include economies of scope and scale, data advantages that give rise to asymmetry in competitively valuable information, first-mover advantages, and network effects.[38] None of these characteristics are necessarily new, but the co-existence and degree to which they exist in digital markets poses acute challenges to market function.[39] The term "gatekeepers" will be used throughout this section to refer to digital market firms who have market power and serve as critical trading partners online.

The preservation of competition in networked online environments requires that Agencies engage in more expansive thinking on the dynamic effects of mergers in digital markets. Theories of harm must recognize the enhanced risk of long-term competitive harm when firms with significant network effects and data assets merge. They must incorporate consideration of non-price, competitive harms to privacy, innovation, and quality. Aggregate, private data must be assessed as a valuable and scarce competitive asset.

Merger review has an important role to play in disrupting a cycle of market capture, tipping, and expansion into adjacent markets by dominant digital firms. These firms leverage assets to create barriers of entry, bury rivals, and frustrate the competitive process.

6. The Guidelines should recognize the potential for competitive harm arising from digital platforms with strong network effects acquiring other competitors with network effects, especially if either firm enjoys social graph network effects.

Network effects make competitive entry of new digital platforms difficult. The Guidelines should recognize the potential for competitive harm when digital platforms with strong network effects acquire other competitors with network effects. Extra scrutiny should be given when gatekeepers attempt to acquire nascent competitors with social graph networks of their own. New social graph networks are difficult to develop and may represent the best competitive threat to existing gatekeepers. But the addition of a nascent, complementary social network to an incumbent one offers dominant

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[37] Erin Simpson and Adam Conner, "How to Regulate Tech: A Technology Policy Framework for Online Services," Center for American Progress, November 16, 2021, available at https://www.americanprogress.org/article/how-to-regulate-tech-a-technology-policy-framework-for-online-services/.

[38] *Ibid.*

[39] For an expanded discussion on digital market characteristics that may frustrate innovation, see Stigler Committee on Digital Platforms, Final Report" (Chicago, IL: September 2019), available at https://www.chicagobooth.edu/-/media/research/stigler/pdfs/digital-platforms---committee-report---stigler-center.pdf; and see Stigler Committee on Digital Platforms, "Market Structure and Antitrust Subcommittee Report" (Chicago IL: July 2019), available at https://research.chicagobooth.edu/-/media/research/stigler/pdfs/market-structure-report.pdf?la=en&hash=E08C7C9AA7367F2D612DE24F814074BA43CAED8C.

companies a chance to multiply the competitive advantage of their network while simultaneously removing a competitive threat.

Direct network effects, sometimes referred to as "one-sided" network effects,[40] occur when the utility of the service increases as use increases. Indirect network effects occur when two or more distinct groups—such as users and advertisers or buyers and sellers—receive increased value as more of the other group joins. Many digital platforms enjoy one or both types: social media services, e-commerce marketplaces, digital advertising exchanges, app marketplaces, and more enjoy strong network effects.

Network effects play a decisive role in enabling early movers in digital markets to become prohibitively more successful than others. Once established, digital platforms may experience a beneficial cycle of growth and monetization: more users bring more users, which brings more data, enables better monetization, which can support development of a better product, which further encourages growth, and so on. Because digital platforms often have low marginal costs, such growth can be extremely profitable. It is difficult for rivals or new entrants who must build a network from scratch to compete effectively. It is difficult for consumer to switch to new entrants, as they face high switching costs due to limitations in skill transfer, limitations in data portability, the power of defaults, interoperability barriers, and the inability to effectively bring one's network or data to a new service.

The presence, strength, and type of network effects at play in markets with proposed mergers should be explicitly considered by the Guidelines. Agencies should approach with skepticism a digital gatekeeper who enjoys network effects proposing to acquire a company that also possesses network effects.

Agencies should give special scrutiny in cases where firm network effects are created by a "social graph:" the individualized networks of one- and two-way connections to friends, contacts, and interests created on the digital platform by each user. The social graph concept was popularized and refined by Facebook.[41] An individual's unique social graph is of significant value to the individual user but provides minimal utility to other individual users: the value is person-specific. For a platform that facilitates these connections, individual social graphs together compose a social network,[42] which provides immense aggregate value to the digital platform. Platforms use the data from an individual's social graph to target advertisements and to craft individualized content feeds or other engagement opportunities. Simultaneously, the social graph creates a

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[40] Dr. Ambrose Descamps, Dr. Helen Jenkins, "Tipping: should regulators intervene before or after? A policy dilemma," Oxera, April 28, 2021, available at https://www.oxera.com/insights/agenda/articles/tipping-should-regulators-intervene-before-or-after-a-policy-dilemma/#up_ftn8

[41] Meta, Meta for Developers, "Graph API: Overview," available at https://developers.facebook.com/docs/graph-api/overview (last accessed March 2022).

[42] Jerrold Nadler and others, "Investigation of Competition in Digital Markets: Majority Staff Report and Recommendations" (Washington: U.S. House Subcommittee on Antitrust, Commercial and Administrative Law, 2020), available at https://judiciary.house.gov/uploadedfiles/competition_in_digital_markets.pdf?utm_campaign=4493-519.

network effect for the individual user that increases the value of the platform and can result in higher engagement. This increases the time spent on the platform, which grows the size of the network, which benefits the digital platform and in turn creates stronger direct and indirect network effects. In this way, social graphs tend to create or strengthen direct or indirect network effects.

For example, Facebook User A's unique social graph of two-way connections (friends) and one-way user-initiated connections (pages or likes or interests) is most valuable to User A, for whom it may represent their connections, identity, and community. Facets of User A's social graph would be of significantly less value to User B, who does not share those friends or most of User A's common interests. However, User A and User B's unique social graphs are of immense value to Facebook. The graph provides Facebook with data for advertising and product engagement. But it is perhaps equally valuable in that it becomes incredibly sticky to users: the platform now houses their intricate web of social connections and interests, which is individually specific, somewhat Facebook-specific, and cannot easily be exported or transferred to another service.

The uniqueness of each individual social graph on a digital platform creates significant lock-in. High switching costs for social graph platforms might be far greater than for a digital platform which enjoys direct or indirect network effects *not* created through social graphs. Social graph network effects are also more defensible in that they are harder to recreate than direct network effects, given that they require actions beyond just joining and using a platform. Even a social network with the ability to export their social graph (which is often foreclosed) requires both the user and their connections on the old platform to be present on the new platform to provide any potential recreation of the existing graph.

As Facebook CEO Mark Zuckerberg, an authority on social graphs, explained to Facebook CFO David Ebersman in a 2012 email published by the House Judiciary Committee, "There are network effects around social products, and a finite number of different social mechanics to invent. Once someone wins at a specific mechanic, it's difficult for others to supplant them without doing something different."[43]

Thus, the presence of a social graph is a critical differentiator in types of platforms with market power. The 2020 House Judiciary report cites a Facebook memo, "Possible End States for the Family of Apps" (also referred to as "The Cunningham Memo"):

> The Cunningham Memo characterized the network effects of Facebook, WhatsApp, and Messenger are [sic] "very strong." The memorandum notes that social apps have tipping points such that "either everyone uses them, or no-one uses them." Importantly, it distinguishes between apps with a social graph that

[43] U.S. House Committee on the Judiciary, "Production of Facebook to H. Comm. on the Judiciary, FB-HJC-ACAL-00063222," February 27, 2012, available at https://judiciary.house.gov/uploadedfiles/0006322000063223.pdf

> are used for broadcast sharing and messaging—Facebook, Instagram, Messenger, WhatsApp, and Snapchat—and social apps for music or video consumption, such as YouTube or Spotify. In contrast, non-social apps "can exist along a continuum of adoption."[44]

The House Judiciary Committee report highlighted Facebook's internal framework differentiating between apps with a social graph for broadcast sharing and messaging versus those focused on consumption. It noted "in sum, social networking sites have a robust social graph, whereas content-centric sites do not."[45]

The process of creating new social graph network effects is extraordinarily difficult, especially now that digital social markets are already dominated by gatekeepers. The last social network that was created in the United States to reach more than 500 million monthly active users was Snapchat in 2011. Since then, only TikTok has emerged as a competitor in the social media space, yet its success was driven by highly unique circumstances that no U.S. company could conceivably replicate. Specifically, TikTok developed its algorithm in the large and protected Chinese market. It then entered global markets beyond China with the billions of dollars needed to purchase mobile app install ads from Facebook and Google, who too late recognized its status as a competitor.[46]

Today's digital gatekeepers control the key access points which potential competitors need to bring a product to market. From the cloud services they are hosted on, to the app stores that they are distributed through, to the ad networks they need to accelerate app downloads—new companies must pay their biggest competitors to start user acquisition. Thus, while social graph network effects can have an exponential growth cycle if product market fit is found, this is increasingly difficult and costly to do. Accordingly, breakouts are rare. Gatekeepers face strong incentives to acquire those few potential competitors at very early stages. As Facebook CEO Mark Zuckerberg wrote in a 2012 internal email, he was considering "…how much we should be willing to pay to acquire mobile companies like Instagram and Path that are building networks that are competitive with our own […] The businesses are nascent but the networks are established, the brands are already meaningful and if they grow to a large scale they could be very disruptive to us."[47]

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[44] U.S. House Committee on the Judiciary, "Investigation of Competition in the Digital Marketplace: Majority Staff Report and Recommendations" (Washington, DC: 2020), pp. 141-142, available at https://judiciary.house.gov/uploadedfiles/competition_in_digital_markets.pdf

[45] U.S. House Committee on the Judiciary, "Investigation of Competition in the Digital Marketplace: Majority Staff Report and Recommendations" (Washington, DC: 2020), p. 91, available at https://judiciary.house.gov/uploadedfiles/competition_in_digital_markets.pdf

[46] Adam Conner, "TikTok, the Facebook Competitor?," The Margins, July 24, 2020, available at https://www.readmargins.com/p/tiktok-the-facebook-competitor

[47] U.S. House Committee on the Judiciary, "Production of Facebook to H. Comm. on the Judiciary, FB-HJC-ACAL-00063222," February 27, 2012, available at https://judiciary.house.gov/uploadedfiles/0006322000063223.pdf

In addition to this incentive, dominant digital incumbents have the ability to predictively model threats *and* the cash to purchase them before full potential is realized. The Facebook/Instagram merger is often cited as a key example of a digital platform with social graph network effects acquiring a smaller platform also with social graph network effects. Yet given the predictive data advantages of gatekeeper platforms, it is possible that many smaller acquisitions occur before the competitor even fully comprehends their own disruptive potential. Smaller acquisitions that are exempted under the Hart-Scott-Rodino Act[48] may have included many more examples of smaller digital platforms with nascent social graph network effects that could not easily be discerned from available data.

Direct, indirect, and social graph network effects play a critical role in creating or maintaining gatekeepers in digital markets. These dynamics are relevant for Agencies in assessing likely effects of proposed mergers on competition. For firms enjoying network effects, the Guidelines should be revised to encourage close scrutiny of proposals to purchase another platform with direct, indirect, or social graph network effects. Scrutiny should examine both the potential for foreclosure of alternative networks (if they even exist) and dominance that may be entrenched with the merger. For incumbent gatekeeper firms who already enjoy strong network effects and social graph effects, the Guidelines should be revised to prohibit acquisitions of nascent platforms showing potential to build out new social graphs.

Mergers of even small firms with social graph network effects may have a disproportionate impact on competition because: 1) growing a new social graph is difficult; which means, 2) any social graph network effect platforms that are showing traction, even if still small, are rare and have a greater chance of succeeding; and 3) buying them eliminates potential competition and further entrenches dominance of the acquiring gatekeeper. In the case of Facebook's acquisition of FriendFeed[49] or Instagram,[50] the social graph is a network effect that can also be foreclosed to potential competitors or turbocharged with acquisitions.

Stratechery's Ben Thompson, a prominent analyst of tech business models, made the case around the impact of "networks buying networks" this way: citing multiple lock-ins and the strong network effects of a social network such as Facebook, he argued "I would go further and make it prima facie anticompetitive for one social network to buy another. Network effects are just too powerful to allow them to be combined."[51]

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[48] Federal Trade Commission, "FTC Staff Presents Report on Nearly a Decade of Unreported Acquisitions by the Biggest Technology Companies," Press release, September 15, 2021, available at https://www.ftc.gov/news-events/press-releases/2021/09/ftc-report-on-unreported-acquisitions-by-biggest-tech-companies

[49] Dan Frommer, "Facebook Buys FriendFeed For $50 Million For War Against Twitter," Business Insider, August 10, 2009, available at https://www.businessinsider.com/facebook-buys-friendfeed-for-war-with-twitter-2009-8

[50] Meta, "Facebook to Acquire Instagram," Press release, April 9, 2012, available at https://about.fb.com/news/2012/04/facebook-to-acquire-instagram

[51] Ben Thompson, "Manifestos and Monopolies," Stratechery, February 21, 2017, available at https://stratechery.com/2017/manifestos-and-monopolies/

Network effects play an entrenching role in digital market monopolies, but not all are the same: the different kinds of network effects and their value-potential should be considered when mergers are reviewed.

7. The Guidelines should explicitly consider the competitive dynamics and market power arising from aggregated data, which is a critical input to digital services.

Digital markets and industries are information-rich environments. Few, if any, industries have been able to track market activity, customers, and rivals in such detail and generate extraordinary amounts of data. Yet the unprecedented "legibility" of digital markets is often one sided: these markets can be highly asymmetric, providing platform operators with a one-way mirror into every click and interaction amongst its network of business and consumer users. The data digital platforms generate is the lifeblood of digital markets. Because data is both more highly valued and exponentially more detailed than in previous eras, the Guidelines need to weigh acquisition of data or other digital information assets more carefully in assessing potential harm to competition. Data aggregation is critical in maintaining dominance in digital markets alongside network effects—especially where there are increasing returns to scope and scale of data management.[52] Given trends in digitization, artificial intelligence, and online services, the competitive importance of data is only expected to grow. Agencies must adequately account for data's value as a part of merger review for digital firms.

Aggregated data is relevant to merger review in several overlapping ways: 1) data as a valuable and scarce resource; 2) data as a related product to which merged firms can limit or foreclose supply; and 3) data collection as a significant non-price element of competition.

Nonpublic data are a central, valuable input in the provision of digital services. Large amounts of data are required for machine learning and the development of algorithmic programs which underlie the operation of many digital platforms. This may be for the purposes of digital advertising, recommendation systems, and prediction engines, among others. Machine learning or artificial intelligence (AI) products require vast amounts of data. The final report from the National Security Commission on Artificial Intelligence noted: "Data is critical for most AI systems. Labeled and curated data enables much of current machine learning used to create new applications and improve the performance of existing AI applications."[53]

Mergers that lead to the acquisition of significant amounts of private data can create market power and barriers to entry for the acquirer by strengthening data advantages. This may be especially true for firms leveraging data to enhance direct, indirect, or

[52] Stigler Center, "Stigler Committee on Digital Platforms, Final Report" (Chicago, IL: September 2019), available at https://www.chicagobooth.edu/-/media/research/stigler/pdfs/digital-platforms---committee-report---stigler-center.pdf

[53] The National Security Commission on Artificial Intelligence, "Final Report, (Arlington, CA: 2021), available at https://www.nscai.gov/2021-final-report/

social graph network effects as described above; with network effects and increasing returns to scale on data acquisition, the combined value of merged firms may be more than the sum of their parts. Even where additional value or short-term efficiencies are created, the long-term implications for competitors are stark. Markets characterized by strong network effects are prone to tipping. The maintenance of competition in these markets requires that Agencies identify those mergers where data assets play a defining role in facilitating tipping and hastening the end of meaningful competition. As the market for AI services grows, Agencies will have an important role in maintaining competition.

Second, in cases where a merged firm is acquired, in part, for its aggregate private data, Agencies should specifically consider whether such data acts as a related product to which a merged firm can now refuse supply or raise cost to rivals. Restriction of rivals' access to data or cost increases are a possible unilateral effect to be considered as a part of vertical merger review.

To illustrate the competitive importance of data in digital market mergers, consider a few of the dynamics around the growth of Google Maps. In 2013, Google Maps was already a leading online mapping tool. It was the default mapping application on Android phones and, until 2012, the default on Apple iOS devices as well.[54] Its success was likely due to a range of factors, including valuable product features like its extensive mapping or Google Earth imagery, as well as external events like Apple's bungled launch of Apple Maps the previous year.[55] However, its success may have also been bolstered by previous actions like Google Search's delisting of MapQuest links from the pre-loaded directions in search results in the years after Google entered the mapping market (see Figure 5, below).[56]

[54] Alexei Oreskovic, "Google Now comes to iPhone, challenging Siri" Reuters, April 29, 2013, available at https://www.reuters.com/article/google-iphone-apple-siri/google-now-comes-to-iphone-challenging-siri-idINDEE93S0AC20130429

[55] Poornima Gupta, "Apple CEO apologizes for Maps flaws, recommends rivals" Reuters, available at https://www.reuters.com/article/us-apple-cook/apple-ceo-apologizes-for-maps-flaws-recommends-rivals-idINBRE88R0SN20120929

[56] Greg Sterling, "A eulogy for Mapquest," Search Engine Land, October 4, 2019, available at https://searchengineland.com/a-eulogy-for-mapquest-322945; for one observer's comparison visual of this change, see Google Blogoscoped, "Google Removes Links to Competing Maps Systems," January 16, 2007, available at http://blogoscoped.com/archive/2007-01-16-n66.html

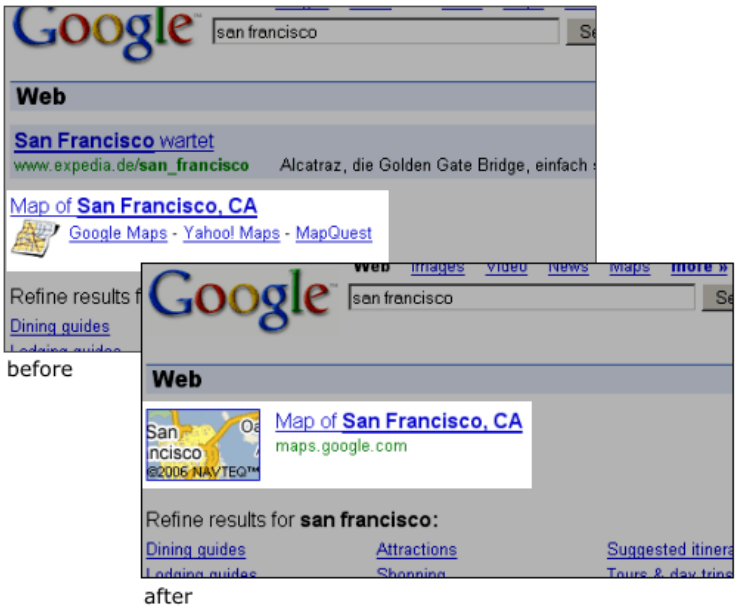

Figure 5: Image showing a "before" state, wherein a Google search for San Francisco includes Google Maps, Yahoo! Maps, and MapQuest links in the suggested "Map of San Francisco, CA" result, and an "after" state, wherein only the Google Maps result is suggested. Source: Google Blogoscoped, "Google Removes Links to Competing Maps Systems," January 16, 2007, available at http://blogoscoped.com/archive/2007-01-16-n66.html.

In 2013, Google announced its acquisition of Waze, a mobile-only mapping and traffic app that was a direct competitor to Google Maps, for just over one billion dollars.[57] The FTC approved the acquisition. At 50 million users, the start-up's user base was considered modest next to Google's. Analysts speculated that the move was in-part defensive: buying Waze kept it out of rivals' hands, particularly those of Apple and Facebook, who had also reportedly made recent acquisition attempts. But experts also identified the move as a data play: Waze was distinct from other mapping applications in its crowd-sourced, live data on routes, traffic, road conditions, and more.[58] Waze, with its extensive and growing crowd-sourced data corpus, offered Google Maps a complementary set of data. Presumably, it enabled Google to update Maps' extensive but static, pre-programmed mapping and directions with Waze's dynamic rerouting, live updates, and social features.

[57] Google, "Google Maps and Waze, outsmarting traffic together." June 11, 2013, available at http://blogoscoped.com/archive/2007-01-16-n66.html. https://blog.google/products/maps/google-maps-and-waze-outsmarting/

[58] Rip Empson, "WTF Is Waze And Why Did Google Just Pay A Billion+ For It?" *TechCrunch*, June 12, 2013, available at https://techcrunch.com/2013/06/11/behind-the-maps-whats-in-a-waze-and-why-did-google-just-pay-a-billion-for-it/

Prior to the acquisition, Waze was providing data to Apple. It was not immediately clear whether, and at what price, data sale to Apple would continue.[59] But just shy of one month later, whether in pursuit of an independent live-data feed or anticipating being cut off from Waze's, Apple filed a patent for collecting Waze-like live location data for mapping routes and alerts.[60]

Reflecting on the deal in 2021, Noam Bardin, Waze's CEO at the time of Google's acquisition and for the following years, wrote:

> "We quickly learned, the hard way, that we could not get distribution from Google. Any idea we had was quickly co-opted by Google Maps. The Android app store treated us as a 3rd party, there was no pre-installation option and no additional distribution. We did have a lot more marketing dollars to spend but had to spend them like any other company, except we were constrained in what we could do and which 3rd parties we could work with due to corporate policies. All of our growth at Waze post acquisition was from work we did, not support from the mothership. **Looking back, we could have probably grown faster and much more efficiently had we stayed independent**." (Emphasis added).[61]

The limited available estimates in recent years have suggested that Google Maps is used by about two-thirds of smartphone users.[62] For business users and developers who rely on Maps products and APIs, such a lack of competition in the mobile mapping space is a threat to competitive pricing and services.[63] For consumers, the lack of competitive pressure hurts innovation and quality in competitive, non-price areas like privacy from intrusive location-based surveillance.

To be clear, it is impossible to say what would have happened to a MapQuest that wasn't removed from Google Search's mapping suggestions, a Waze that wasn't acquired, and the would-be rivals who were kept away by Google's data advantages, market power, and the investment kill zone in its wake. But predicting whether there would be harm to competition in this particular case would have required accounting for

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[59] Charles Arthur, "Google acquisition of Waze traffic app sparks OFT inquiry" *The Guardian,* August 27, 2013, available at https://www.theguardian.com/technology/2013/aug/27/google-waze-app-sparks-oft-inquiry.

[60] Jorge S. Fino, *User-Specified Route Rating and Alerts,* July 4, 2013 (U.S. Patent Application No. 20130173155), available at https://appft1.uspto.gov/netacgi/nph-Parser?Sect1=PTO2&Sect2=HITOFF&u=%2Fnetahtml%2FPTO%2Fsearch-adv.html&r=6&p=1&f=G&l=50&d=PG01&S1=%28apple.AS.+AND+20130704.PD.%29&OS=an/apple+and+pd/7/4/2013&RS=%28AN/apple+AND+PD/20130704%29.

[61] Noam Bardin, "Why did I leave Google or, why did I stay so long?" February 17, 2021, available at https://paygo.ghost.io/why-did-i-leave-google-or-why-did-i-stay-so-long/; see also Matt Stoller, "How Google Ruined Waze and Consolidated Mapping," *BIG,* March 2, 2021, available at https://mattstoller.substack.com/p/how-google-ruined-waze-and-consolidated?s=r.

[62] Riley Panko, The Popularity of Google Maps: Trends in Navigation Apps in 2018, *The Manifest,* July 2018, available at https://themanifest.com/app-development/trends-navigation-apps.

[63] Jules Wang, "Google Maps revenue expected to increase, following API price hikes and planned ads," *Android Police,* April 11, 2019, available at https://www.androidpolice.com/2019/04/11/google-maps-revenue-expected-to-increase-following-api-price-hikes-and-planned-ads/.

the value of Waze's aggregated data on its own, in combination with Google's, and relative to the other potential rivals who existed at the time.

The competitive dynamics in mobile mapping applications undoubtedly included numerous other factors not covered here. But in seeking to understand why data aggregation has competitive relevance to Agency review, these limited details echo a broader pattern of competitive concern. Theoretically, that pattern is as follows: an already-dominant company uses its vast resources to enter an adjacent market. It self-preferences its new services across its legacy digital properties to get ahead, leveraging existing market power to advantage the new service. It acquires complementary data from rivals, and then enhances its own data products while either absorbing the once-rival or demoting the now-internal acquisition as secondary to the primary platform. Externally, it combines its legacy data products and dominant digital properties, new digital properties, and acquired rival data to create a barrier to entry so high that only other large technology companies can compete, if at all. Data acquisition and restriction plays a central role in this process of achieving and maintaining dominance in new markets.

Third, privacy and control—or lack thereof—are tangible non-price elements of competition. This is especially, but not exclusively, true for zero-price digital markets. Privacy as a key manifestation of quality, service, and innovation makes sense in digital markets; in industries that rely wholly or in part on surveillance and data extraction to create value, greater exploitation of customer and business partner data will occur in a vacuum of competition, wherein few alternatives and little choice exist.[64] Here, the cost to consumers can be significant, but it is not immediately financial. Such a pattern in digital markets has been repeatedly observed by experts: in early days, a firm competes in part on privacy provision, but once market tipping is achieved and viable alternatives for consumers wither (often accelerated by acquisitions), privacy protections are relaxed and data is exploited. Within digital markets, experts including Howard Shelanski have argued that "one measure of a platform's market power is the extent to which it can engage in [data usage that consumers dislike] without some benefit to consumers that offsets their reduced privacy and still retain users."[65] Dina Srinivasan noted this pattern in the rise of Facebook, likewise advancing a persuasive conceptualization of privacy exploitation as a rent-seeking behavior.[66]

Many industries have reoriented around the value of digital data extraction, aggregation, analysis, prediction, and sale. Agencies, too, must reorient to consider data aggregation as a radically more valuable competitive asset, attending to the ways in which it differs

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[64] Marc Jarsulic, "Addressing the Competitive Harms of Opaque Surveillance and Recommendation Algorithms", *The Antitrust Bulletin*, (January 19) (2022), available at https://doi.org/10.1177/0003603X211066983

[65] Howard A. Shelanski, "Information, Innovation, and Competition Policy for the Internet," University of Pennsylvania Law Review 161 (2013): 1663–1705, available at https://scholarship.law.upenn.edu/penn_law_review/vol161/iss6/6

[66] Dina Srinivasan, "The Antitrust Case Against Facebook: A Monopolist's Journey Towards Pervasive Surveillance in Spite of Consumers' Preference for Privacy," Berkeley Business Law Journal 16 (1) (2019): 39, available at https://lawcat.berkeley.edu/record/1128876?ln=en

from traditional or paid service models. The Guidelines should analyze restrictions around data exchange or rent-seeking behaviors that involve data exploitation and extraction as significant competitive strategies. Whether as a scare and valuable resource acquired at a non-monetary cost to consumers, as a product to which a firm can limit supply, or as a key factor in non-price elements of competition, the Guidelines need to explicitly grapple with the risks that data aggregation via mergers can pose to competition.

8. Proposed mergers of independent third-party analytics firms by their gatekeeper platforms of focus harm competition and should be presumed to be anticompetitive.

As described above, many gatekeepers operate their digital properties like a one-way mirror—collecting for themselves detailed private data on the interactions amongst consumer users, business users, rivals, and more. Because of this opaqueness, entire industries have been created in response to the demand for business tools that provide insight, analytics, and monitoring of performance or activities on digital platforms. Such tools are used by their customers to better understand and adjust their participation on the platform, perhaps allowing for greater differentiation or competition. Such services operate in a difficult market position. They require either cooperation from platforms of focus or creative techniques that gather on-platform information in unauthorized (if not actively opposed) methods.[67] Some of these data collection strategies are now being examined by the courts.[68] Amidst these odds, numerous products have withered or shut down. The remainder of the industry focuses on social media content tracking, advertising analytics, and more. For the purposes of this section, these will be referred to as "third-party analytics firms."

When third party analytics firms are acquired by the very platforms to which they seek to provide insight, the already limited visibility into digital platforms is significantly harmed or reduced. Acquisition removes a key independent source of information, which customers, regulators, researchers, and the public may rely on to understand activity and competition in major digital spaces. Therefore, mergers or acquisitions of tools that provide independent analysis or tracking of digital markets by their firms of focus harm competition and should be presumed to be anticompetitive.

The acquisition of a third-party analytics firm called CrowdTangle is illustrative of this risk. CrowdTangle was purchased by Facebook in 2016. CrowdTangle allowed companies to gather insights across multiple social media platforms including

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[67] The Associated Press," Facebook Shuts Out NYU Academics' Research on Political Ads," NBC News, August 5, 2021, available at https://www.nbcnews.com/tech/tech-news/facebook-shuts-nyu-academics-research-political-ads-rcna1602

[68] Jeffrey D. Neuburger, "Supreme Court Vacates LinkedIn-HiQ Scraping Decision, Remands to Ninth Circuit for Another Look," The National Law Review, June 16, 2021, available at https://www.natlawreview.com/article/supreme-court-vacates-linkedin-hiq-scraping-decision-remands-to-ninth-circuit

Facebook, Twitter, Instagram, and Vine.[69] Facebook adapted CrowdTangle into a tool that allowed for monitoring, searching, and analyzing content primarily on Facebook and Instagram (though it also added Reddit later). It was made available for free to certain Facebook partners, media organizations, non-profits, and others. It was used by academics[70] and activists[71] to help support their work identifying disinformation and other harmful content on the Facebook platform. As it is a product owned by Facebook, it had better access than any other third-party analytics or monitoring tool.

In 2020, *New York Times* reporter Kevin Roose began to use CrowdTangle to identify the top ten posts containing URLs from Pages on Facebook.[72] A Facebook Page is distinct from a Facebook Profile in that it is optimized for broadcast communication to large audiences on the platform. Pages facilitate one-way connections and are primarily used by celebrities, athletes, businesses, and politicians. Roose began by pulling this information manually from CrowdTangle, assembling the lists, and posting them to Twitter. He eventually automated this process, publishing daily to a dedicated Twitter account: Facebook's Top 10.[73]

At the time, the nature of the top trending posts on Facebook garnered significant public attention, especially when those lists were dominated by political commentators. Use of CrowdTangle by Roose, journalists, academics, and researchers provided important public interest insights—which sometimes appeared to contradict what Facebook was telling the public.[74] Facebook seemed uncomfortable with the transparency and the results. Even the limited data transparency about Facebook that CrowdTangle enabled was regularly creating negative narratives for its parent company.[75]

Facebook began to argue in public that while the CrowdTangle data was technically accurate, as it was pulling from Facebook's own data as a Facebook product, it was misleading. They argued that CrowdTangle tools only measured engagement on public

[69] Casey Newton," Facebook buys CrowdTangle, the tool publishers use to win the internet," The Verge, November 11, 2016, available at https://www.theverge.com/2016/11/11/13594338/facebook-acquires-crowdtangle

[70] Christina Fan, "CrowdTangle for Academics and Researchers," CrowdTangle, updated March 2022, available at https://help.crowdtangle.com/en/articles/4302208-crowdtangle-for-academics-and-researchers

[71] Chris Miles, "Using CrowdTangle for Elections Coverage," CrowdTangle, updated March 2022, available at https://help.crowdtangle.com/en/articles/2346958-using-crowdtangle-for-elections-coverage

[72] Will Oremus, "The Battle Over Facebook's Top 10 List," OneZero, November 14, 2020, available at https://onezero.medium.com/the-battle-over-facebooks-top-10-list-dc3fca3d799

[73] Kevin Roose and Fabio Giglietto, @FacebooksTop10, Twitter, available at https://twitter.com/FacebooksTop10

[74] Kevin Roose, "Inside Facebook's Data Wars," The New York Times, July 14, 2021, available at https://www.nytimes.com/2021/07/14/technology/facebook-data.html

[75] The Economist, "Facebook offers a distorted view of American news," The Economist, September 10, 2020, available at https://www.economist.com/graphic-detail/2020/09/10/facebook-offers-a-distorted-view-of-american-news

posts[76] (a user interacting with the content on Facebook in the form of commenting, liking, or sharing) and that the actual internal Facebook metrics showed a very different picture of the most popular content on the site. For a period of time, to rebut the picture painted by Roose's publication of the CrowdTangle data, Facebook attempted to release its own list of top performing content on the site, culled from its internal data.[77] The *New York Times* later reported that even with data broader than engagement, political commentators still dominated the most viewed content.[78]

In 2021, Facebook dissolved the CrowdTangle team. The founder and head of CrowdTangle left the company[79] and CrowdTangle announced it would pause new sign-ups for the service in 2022.[80] If CrowdTangle is shut down by Facebook, there are few, if any, tools with visibility into the site with access to officially sanctioned Facebook data. In August 2021, Facebook announced the creation of a widely viewed content report,[81] a quarterly report that aimed to provide data on the most widely viewed content on the platform in the last quarter. In March 2022, Facebook released its Q4 2021 Widely Viewed Content Report.[82] The most widely viewed page for Q4 2021 was unnamed with the notation "This Page was removed by Facebook for violating Community Standards" and no additional information or insight provided for the 121 million content views it got in that time period.[83] Reporters have suggested that the page might have been a junk page but there is no official confirmation or elucidation.[84]

Due to their stringent data restrictions, there are few tools available to examine or understand digital platforms. Acquisitions of independent third-party analytics firms by their gatekeeper platforms of focus should be disfavored due to their immense potential to shut down some of the only available, semi-transparent tools. In a highly asymmetrical information environment, the preservation of non-sensitive insights and data access may help to promote competition and advance understanding of key public

[76] John Hegeman, @johnwhegeman, July 20, 2020, 7:38 PM ET, Twitter, available at https://twitter.com/johnwhegeman/status/1285358531214888960
[77] Alex Schultz, "What Do People Actually See on Facebook in the US?", Facebook (Meta), November 10, 2020, available at https://about.fb.com/news/2020/11/what-do-people-actually-see-on-facebook-in-the-us/
[78] Kevin Roose, "Inside Facebook's Data Wars," The New York Times, July 14, 2021, available at https://www.nytimes.com/2021/07/14/technology/facebook-data.html
[79] Kevin Roose, "Inside Facebook's Data Wars," The New York Times, July 14, 2021, available at https://www.nytimes.com/2021/07/14/technology/facebook-data.html
[80] Shivam Patel and Elizabeth Culliford, "Meta pauses new users form joining analytics tool CrowdTangle," Reuters, January 28, 2022, available at https://www.reuters.com/technology/meta-pauses-new-users-joining-analytics-tool-crowdtangle-2022-01-29/
[81] Anna Stepanov, "Introducing the Widely Viewed Content Report," Facebook (Meta), August 18, 2021, available at https://about.fb.com/news/2021/08/widely-viewed-content-report/
[82] Facebook (Meta), "Widely Viewed Content Report: What People See on Facebook" (Menlo Park, CA: 2021), available at https://transparency.fb.com/data/widely-viewed-content-report/
[83] *Ibid*, available at https://transparency.fb.com/data/widely-viewed-content-report/#widely-viewed-pages
[84] Ryan Broderick, "A Curious Facebook Mystery," Garbage Day, March 2, 2022, available at https://www.garbageday.email/p/a-curious-facebook-mystery

interest issues. The absence of such services due to platform acquisition and degradation almost certainly harms them.

While the section below comments on the challenges of mandated interoperability as a condition of a merger, mandated public access to key, non-sensitive data on digital platforms in standardized formats should be considered as a condition of a merger. Such restrictions could contribute to the broader efforts needed to provide transparency to promote competition, especially on gatekeeper digital platforms. The FTC should consider rulemaking to require more transparency from gatekeeper platforms to prevent competitively harmful conditions.

Congress is exploring mandating increased access to data from digital platforms, mirroring a recent push by the European Union.[85] If the European Union requirements on data access in the Digital Services Act go into effect, they will be especially interesting for Agencies to monitor. In essence, multi-national gatekeeper digital platforms will be demonstrating the technical and legal ability to provide that information and will have already built the necessary products to comply with the E.U.'s new rules (like the privacy controls built to comply with the E.U.'s GDPR privacy law).[86] This means requiring additional data disclosure as a condition of any allowed merger for a gatekeeper digital platform could be imposed with comparatively lower cost to the platform, as they would have already built the features for their larger E.U. market. Further action from U.S. Agencies or Congress requiring transparency would jumpstart competition for third-party analytics firms and lead to greater transparency and insight for businesses, consumers, investors, and the public.

9. The Guidelines should recognize that acquisition of a platform that offers interoperability by one without it can have negative competitive effects. Agencies should carefully weigh the technical and governance realities of API maintenance when determining related conduct remedies.

As noted above, network effects play a key role in facilitating tipping and dominance in digital markets. Once those network effects have been established, it is difficult to compete with and easy for the gatekeeping monopoly to maintain its dominance by locking users, their data, and their connections onto the platform. Greater interoperability can lower switching costs and mitigate the challenges that network effects can pose to potential rivals. Acquisition of firms that currently offer interoperability, which is then curtailed following a merger, can create conditions for competitive harm. The Guidelines should recognize that acquisition of a platform that offers interoperability by one without it can have negative competitive effects. Acquisitions of companies with existing interoperability or public access Application Programming Interfaces (APIs), particularly those used by rivals, should be examined

[85] Social Media Disclosure and Transparency of Advertisements Act of 2021, H.R.3451, 117th Cong., (2021-2022), available at https://www.congress.gov/117/bills/hr3451/BILLS-117hr3451ih.xml

[86] Alex Engler, "Platform data access is a lynchpin of the EU's Digital Services Act," Brookings, January 15, 2021, available at https://www.brookings.edu/blog/techtank/2021/01/15/platform-data-access-is-a-lynchpin-of-the-eus-digital-services-act/

with skepticism, as the combined firm can easily end that interoperability without an enforceable legal requirement to maintain it.

In approaching mandated interoperability as a conduct remedy, however, Agencies must understand the difficulty in mandating *new* interoperability without existing technical standards or empowered decision-making standard bodies. Conduct remedies attached to an approved merger ought to carefully determine the operation of APIs given current practice of platforms operating public and private APIs.

Today, a digital firm may interoperate with numerous major, public open data standards that underlie information exchange online. Many of these standards, such as email or the syndication standard utilized by many podcasts, are not owned by a single entity, but are stewarded via multi-stakeholder internet governance or standards bodies. But a company will also need to exchange data internally between major products, and companies will develop internal standards and private APIs that are accessible only to the company itself. A company may likewise choose to make some platform data available via public APIs, often to a community of approved outside developers who utilize the data feeds to build products of their own. These public APIs are often more limited in terms of ability and data access than the private APIs used by the company for security, competitive, and privacy reasons.

Public or private interoperability of key APIs prior to and following a merger are considerations if Agencies are seeking to understand gatekeeping effects and access to markets. Acquisitions of companies that already have an existing product that is open or interoperable and widely used, including by competitors, should be viewed with considerable skepticism. This is because a firm can easily terminate that interoperability and reduce competition by removing access. Interoperability restrictions are one way that a merged firm could raise rivals' costs, foreclose rivals' access to related products, or foreclose rivals' access to consumers. Indeed, the fungible digital nature of software and data exchange online mean that merged firms have substantial *ability* to shut off access to data flows, user environments, or related products to which rivals would like access. While the incentives for interoperability restrictions may vary on a case-by-case basis, the ability of merged digital firms to foreclose on or raise rivals' costs through interoperability restrictions can be expected to be robust. During merger review, Agencies may wish to consider aggregate data, data movement, and interoperability denial strategies in their calculus around harm to competition.

In addition to enhancing interoperability, data portability requirements[87] have also been discussed as a way to enhance competition.[88] Generally, data portability is the ability to

[87] For more on interoperability, data portability, and related concepts, see Alex Petros, "Why We Can't Be Friends: We Need Interoperability in Digital Markets" (Washington, D.C.: Public Knowledge, 2021), available at https://publicknowledge.org/why-we-cant-be-friends-we-need-interoperability-in-digital-markets/

[88] Cory Doctorow, "Adversarial Interoperability," EFF, October 2, 2019, available at https://www.eff.org/deeplinks/2019/10/adversarial-interoperability

export one's data from a digital service, ideally in standardized format that can be transferred to another service. The European Union's General Data Protection Regulation (GDPR) contains a right to data portability[89] which companies that operate in the European markets must develop. As noted, in this theory of the case, interoperability and data portability will help overcome network effects by granting new rivals access to those existing networks and lower switching costs for consumers.[90] From a competitive standpoint, such provisions would be particularly important in the networks where there are large direct and indirect network effects. However, social graph network effects, which are among the most valuable, are also difficult to make portable. This is because the second party (the users' friends, connections, and followed entities) must also be on the service and additionally accept the connection for either side to see value.

While promising, interoperability requirements, particularly new requirements not grounded in any existing technical standards, are challenging to implement. They require input from numerous stakeholders and a functional governance body to make final technical determinations and determine compliance. Without existing governance processes, many companies will default to using their platform's public APIs as their unilateral definition of interoperability.[91] This strategy benefits the company that owns the platform by allowing them to maintain clear control via technical access as well as their legal rules.[92] For this reason, the imposition of entirely new interoperability requirements, particularly those untied to existing standards, should only rarely be considered a viable condition to allow a merger to proceed.

Requirements around interoperability or data portability for merging firms might generally be considered more useful as a preservation strategy. Where merging firms are already functionally interoperable internally or with rivals, Agencies may wish to consider whether, as a condition of merger approval, a new aggregate firm may not acquire and then restrict interoperability for those potential rivals, especially where the merged firm will continue enjoying those benefits at an advantage over rival firms.

Interoperability requirements may, in the long-term, contribute greatly to more competitive and usable digital environments. In the near-term, however, the utility of mandated existing or new interoperation after a merger will vary on a case-by-case basis. Agencies must be mindful of the technical challenge and administrative challenges in ensuring continued public API access or interoperability.

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[89] European Union, General Data Protection Regulation (GDPR), *Right to Data Portability* (Chapter 3, Article 20), available at https://gdpr-info.eu/art-20-gdpr/

[90] Alex Petros, "Why We Can't Be Friends: We Need Interoperability in Digital Markets."

[91] Erin Egan, "Data Portability and Privacy," Meta, September 2019, available at https://about.fb.com/wp-content/uploads/2020/02/data-portability-privacy-white-paper.pdf

[92] Mark Zuckerberg, "Opinion: Mark Zuckerberg: The Internet needs new rules. Let's start in these four areas," The Washington Post, March 30, 2019, available at https://www.washingtonpost.com/opinions/mark-zuckerberg-the-internet-needs-new-rules-lets-start-in-these-four-areas/2019/03/29/9e6f0504-521a-11e9-a3f7-78b7525a8d5f_story.html

Appendix

The Q ratio: Using financial market valuations to determine when firms are earning monopoly profits

In a competitive financial market, the value of a firm will be equal to the present value of its net revenues. If the market value exceeds the replacement cost of a firm's capital, there is an obvious way for a new entrant to make money: A new entrant would gain from purchasing an additional unit of capital and using it to produce the same good as the incumbent firm. This is because the new entrant would earn an immediate financial reward—the difference between the market value and replacement cost.

To put it another way, entry is encouraged by the existence of an arbitrage opportunity. Arbitrage opportunities exist when it is possible to buy a good in one market—in this case, the market for capital goods—and sell it for a higher price in another market. The arbitrage is between the capital goods market and the equity market—or buying a unit of capital goods at its current replacement cost and reselling it for more in the equity market by putting it to work in the appropriate line of business.

Of course, entry will increase the supply of goods. This should reduce the price of the firm's output and therefore also reduce the net revenue from every unit of capital used in that line of business. This phenomenon makes entry a self-limiting process. Entry will continue until net revenue per unit falls to the level of replacement cost per unit of capital. At this point, no incentive for additional entry exists, and the incumbent firm is then earning the competitive rate of return on its capital.

Thus, when there are no barriers to entry, the market value of a firm, V, will be equal to the replacement cost of its capital, RC.

However, entry barriers can make it possible for a firm to earn more than the competitive rate of return on its capital. The existence of such barriers means that the ability of new firms to increase supply can be imperfect, and the return to capital for an incumbent firm can remain above the competitive level. When its rate of return exceeds the competitive level, a firm is said to be earning an economic rent.

When a firm's net earnings include rent, those supranormal revenues will be included in the stock market valuation of the firm. After all, market participants do not care about the source of net revenues—only that they exist. This suggests a way to use financial market valuations and the replacement cost of capital stock to construct a measure that can signal when a firm is earning rent.

When there are no entry barriers, the market value of the firm will equal the replacement cost of its capital stock: $V = RC$. When $Q = V/RC$ is greater than 1, the firm is earning returns that exceed competitive levels. The ratio Q is referred to as Tobin's Q after the economist James Tobin who introduced its use in economics.

The excess of market valuation over replacement cost provides a quantitative measure of the rent component of net revenue. Conceptually, $V = V_k + V_r$, where V_k is the discounted value of the competitive return to capital and V_r is the discounted value of rents. Thus, it follows that $Q = V/RC = V_k /RC + V_r /RC = 1 + V_r /RC$. Hence, the excess of Q over 1 is then a measure of rents relative to replacement cost. If, for example, Q = 2, half of the earnings of the firm are from economic rent.[93]

[93] For a discussion of the relationship among Q, competitive profits, and economic rent, see Eric B. Lindenberg and Stephen A. Ross, "Tobin's Q Ratio and Industrial Organization," *The Journal of Business* 54 (1) (1981): 1–32, available at https://www.researchgate.net/publication/24102787_Tobin's_Q_Ratio_and_Industrial_Organization