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Facebook, Welfare, and Natural Monopoly: A Quantitative Analysis of Antitrust Remedies

Felix B. Chang
University of Cincinnati College of Law, felix.chang@uc.edu

Seth Benzell
Chapman University - Argyros School of Business & Economics

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SETH G. BENZELL *
FELIX B. CHANG †

This Article advances a novel theoretical model for assessing policy interventions against Facebook. As prosecutors barrel forward against digital platforms, soon it will fall upon courts and, eventually, regulators to devise remedies. We argue that any sensible solution must include quantification of the welfare effects on the platform's various constituents. Our model prioritizes the effects upon total societal welfare—or, in economists' terms, social welfare. Applied to Facebook, the model calculates social welfare as the sum of four components: (i) consumer welfare; (ii) advertising profits; (iii) tax revenues; and (iv) the value of a large user base.

Drawing on surveys of over 57,000 Facebook users, the model captures the nuances of demand for the social network to predict the consequences of reforms such as taxes, divestitures, and user rebates. This approach is based on the theoretical and empirical

* Assistant Professor of Management Science, Argyros School of Business and Economics, Chapman University. Fellow, Stanford Digital Economy Lab, Stanford Institute for Human Centered Artificial Intelligence, and MIT Initiative on the Digital Economy. The quantitative model featured in this Article was devised with Avinash Collis, Assistant Professor, McCombs School of Business, University of Texas.

† Professor and Co-Director, Corporate Law Center, University of Cincinnati College of Law. Fellow, Thurman Arnold Project, Yale School of Management. We thank Jonathan Baker, Erika Douglas, Daniel Francis, Hiba Hafiz, Maria Marcia, Fiona Scott Morton, Menesh Patel, Sanjukta Paul, Sean Sullivan, Sam Weinstein, and Ramsi Woodcock for their insightful comments. This article benefitted greatly from the Thurman Arnold Project workshop series.

literature on multisided platforms from economists, including most prominently the Nobel laureate Jean Tirole. We find that breakups which undercut the platform's network effects are among the most damaging solutions. By contrast, properly designed taxes and user-unionization might raise the total surplus of the platform, even without creating more competition. We also canvass other interventions, gauging their abilities to maximize the benefits to consumers of engaging with Facebook.

This Article's primary contribution is to ground debates over digital platforms in tangible, quantifiable terms rather than grand, open-ended aspirations. Each of the estimates in our formulation of welfare is subject to pushback, but by embracing quantification, we aim to elevate the theoretical discourse in antitrust. Ultimately, we hope that our model forces remedy designers to confront—and publicize—how they quantify welfare effects upon consumers and, more broadly, society.

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I. INTRODUCTION

Disputes over digital platforms, though intense, are rarely accompanied by measures of social welfare. On market definition, critics and defenders of a two-sided platform might clash over whether the relevant market is one or both sides but then fail to calculate the platform's welfare effects.[1] More fundamentally, scholars are debating antitrust's very goals—such as how broadly to conceptualize consumer welfare and whether antitrust should advance noneconomic objectives.[2] These debates are qualitative, often eschewing definable and measurable variables for polemic. Quantitative contributions, by contrast, are scant.

The unwillingness to gauge social welfare hampers objective assessment of proposals to rein in digital platforms—a deficit that has taken on heightened urgency with the filings by the Department ("DOJ"), Federal Trade Commission ("FTC"), and state attorneys-general (collectively, the "State AGs") against Google and Facebook.[3] Prior to their dismissal,[4] these went further than any prior government intervention against a digital

[1] *See* Ohio v. American Express Co., 585 U.S. ___, 138 S.Ct. 2274 (2018) (offsetting losses on the merchant side of American Express with gains on the consumer side). *See also* John B. Kirkwood, *Antitrust and Two-Sided Platforms: The Failure of* American Express, 41 Cardozo L. Rev. 1805 (2020); David S. Evans, *The Antitrust Economics of Multi-Sided Platform Markets*, 20 YALE J. ON REG. 325 (2003); Lapo Filistrucchi et al., *Market Definition in Two-Sided Markets: Theory and Practice*, 10 J. Competition L. & Econ. 293, 301-02 (2014).

[2] *See, e.g.*, John B. Kirkwood & Robert H. Lande, *The Fundamental Goal of Antitrust: Protecting Consumers, Not Increasing Efficiency*, 84 NOTRE DAME. L. REV. 191 (2008); Barak Orbach, *How Antitrust Lost Its Goal*, 81 FORDHAM L. REV. 2253 (2013); Sandeep Vaheesan, *The Twighlight of the Technocrats' Monopoly on Antitrust?*, 127 Yale L.J. Forum 980 (2018).

[3] U.S. v. Google, Compl., Case 1 1:20-cv-03010 (D.C. Dist. Ct. 2020); FTC v. Facebook, Inc., Compl. No. 2020-cv-3590 (Dist. Ct. D.C. 2020); New York v. Facebook, Inc., Compl. No. ___ (Dist. Ct. D.C. 2020).

[4] FTC v. Facebook, Inc., Mem. Opin. No. 2020-cv-3590 (Dist. Ct. D.C. 2021).

platform.[5] Among other remedies, the FTC and the State AGs called for divestiture of Instagram and WhatsApp.[6]

However, not all remedies are the same: happy breakups maximize social welfare, but botched ones uniquely limit platform usage without offsetting gains to competition.[7] Deprived of the proper tools, courts and regulators risk adopting policies that only marginally improve welfare—or, worse, destroy it. We argue that any sensible solution must be based on a quantitative evaluation of the welfare effects of remedies on different parties. In particular, the effects upon total societal welfare—or, in economists' terms, *social welfare,* should be prioritized—and we suggest a way forward for doing so.

We advance a model for quantifying social welfare in digital platforms, whose value stems from their network effects.[8] The economist on our team created the model to account for price discrimination and demand heterogeneity,[9] two traits that are often overlooked in the amorphous concept of network effects.[10] As an illustration, we apply the model to Facebook, using data

[5] FTC v. Facebook, Inc., Compl. No. 2020-cv-3590 (Dist. Ct. D.C. 2020); New York v. Facebook, Inc., Compl. No. ___ (Dist. Ct. D.C. 2020).

[6] *See* FTC v. Facebook, Inc., Compl. No. 2020-cv-3590, § X. *See also* Menesh S. Patel, *Merger Breakups*, 2020 WISC. L. REV. 975, 1023–27.

[7] To paraphrase the oft-quoted beginning of Leo Tolstoy's *Anna Karenina* ("All happy families are alike; each unhappy family is unhappy in its own way.").

[8] Network effects refer to a platform's increasing value as it draws more users. *See* Michael L. Katz & Carl Shapiro, *Network Externalities, Competition, and Compatibility*, 75 Am. Econ. Rev. 424, 424 (1985); Mark A. Lemley & David McGowan, *Legal Implications of Network Economic Effects*, 86 CALIF. L. REV. 479, 481 (1998).

[9] *See* Seth Benzell & Avinash Collis, *Multisided Platform Strategy, Taxation and Regulation: Model and Application to Facebook* (2020), https://papers.ssrn.com/sol3/Papers.cfm?abstract_id=3619535.

[10] For a classic study of the nuances of multisided platforms, see Jean-Charles Rochet & Jean Tirole, *Platform Competition in Two-Sided Markets*, 1 J. EUR. ECON. ASSOC. 990 (2003).

gathered from 57,000 users.[11] The model can be calibrated to myriad data sources, which enables us to evaluate proposals to constrain digital platforms, such as taxes,[12] breakups,[13] and mandatory interoperability.[14]

Elsewhere, Seth Benzell and Avinash Collis have articulated the model's contributions to the theoretical and empirical literature on digital platforms.[15] Here we extend the discussion to law and policy circles, providing a tool that can be verified or disproven to move discussions beyond theory and polemics and closer toward implementation. Applied to Facebook, the model calculates social welfare as the sum of four components: (i) Facebook's consumer welfare;[16] (ii) the platform's after-tax advertising revenue;[17] (iii) tax revenues raised from Facebook;[18] and (iv) the value to Facebook of maintaining a large user base.[19] Each of these elements is subject to pushback (some more than others), but all of them can be reduced to numbers. With further research, we can even insert estimates of Facebook's negative

[11] Although the company has now rebranded itself "Meta," we refer to its old name because of the close association with its core app, Facebook Blue, which is also the Article's focus.

[12] Paul Romer, *A Tax That Can Fix Big Tech*, N.Y. TIMES, May 6, 2019; Paul De Grauwe, *Why Facebook Should Be Taxed And How To Do It*, SOCIAL EUR., Oct. 30, 2017.

[13] Elizabeth Warren, *Here's How We Can Break Up Big Tech*, Medium, Mar. 8, 2019; Chris Hughes, *It's Time to Break Up Facebook*, N.Y. TIMES, May 15, 2019.

[14] Fiona Scott Morton et al., Report from the Comm. for the Study of Digital Platforms, Stigler Center for the Study of the Economy and the State (2019).

[15] Seth G. Benzell & Avinash Collis, *How to Govern Facebook: A Structural Model for Taxing and Regulating Big Tech* (2020).

[16] We quantify this by figuring out how much users would hypothetically be willing to pay for the platform. *See infra* Section IV.

[17] If no marginal costs are assumed, an assumption that more or less holds steady for platforms exhibiting network effects, then this variable should be equivalent to Facebook's pre-corporate tax profits. *See infra* Section IV.

[18] This implicitly assumes that the government puts tax revenues to productive use.

[19] We attribute this value to future expected profits that will flow from maintaining a large user base now. *See infra* Section IV.

externalities (e.g., misinformation and political polarization) into the equation, though these parameters are presently more speculative.[20]

Going through the motions of parametrization forces us to articulate what we measure and how.[21] For instance, we capture Facebook's consumer utility, an expression of its network effects, through a combination of surveys, government sources, and data from Facebook's advertising and quarterly reports.[22] More importantly, distilling social welfare to a set of variables highlights what we do not know and cannot quantify. By separating loyal Facebook users from casual ones, for example, we can gauge (and therefore know) Facebook's profits in a world where the platform advertises more heavily to inelastic users to squeeze out profits. The fact that Facebook does not do so suggests that it prizes a large user base beyond a certain threshold—or, put differently, that another strategy (which we do not know) is driving the decision to forego intense advertising to inelastic users. This importance of a large user base feeds into our model of social welfare, but its quantification is subject to challenge.

The greatest contribution of a model that measures social welfare is its practical application for policy assessment. Like many scholars and regulators, we are convinced of the anticompetitive tendencies of the technologies underlying the digital economy.[23] Yet as the conversation barrels toward solutions, we see that breakups, taxes, and interoperability are

[20] *See, e.g.*, FRANK PASQUALE, THE BLACK BOX SOCIETY: THE SECRET ALGORITHMS THAT CONTROL MONEY AND INFORMATION (2016) (privacy); Sanjukta M. Paul, *Uber as For-Profit Hiring Hall: A Price-Fixing Paradox and Its Implications*, 38 BERKELEY J. EMP. & LAB. L. 233 (2017) (labor).

[21] Parameterization is the process of breaking down a concept into its constituent parameters.

[22] *See infra* Section IV.

[23] *See, e.g.*, U.S. HOUSE OF REPRESENTATIVES, SUBCOMMITTEE ON ANTITRUST, COMMERCIAL AND ADMINISTRATIVE LAW OF THE COMMITTEE ON THE JUDICIARY, MAJORITY STAFF REPORT AND RECOMMENDATIONS, INVESTIGATION OF COMPETITION IN DIGITAL MARKETS 133 (2020) [hereinafter HOUSE REPORT].

being proffered without much differentiation. Numerous questions remain. Which path maximizes welfare—a horizontal breakup that yields two "Baby Facebooks,"[24] or a vertical break up that might disgorge WhatsApp or Instagram?[25] And how does interoperability stack up against divestiture? Quantifying the welfare effects of each remedy can allow us to prioritize the most feasible and consequential ones for implementation.

Our model indicates that the best redress is for Facebook to compensate users for using the platform. This validates the "data as labor" framework Glen Weyl and others, who posit that user-generated data should be treated as a production input, similar to labor.[26] Data as labor cuts through the Gordian knot of antitrust in zero-price markets, where consumers do not pay fees to use a product but instead trade their attention and privacy.[27] In these markets, regulators have struggled to articulate a coherent set of solutions because they have not fully appreciated the harms. Direct compensation for usage fosters positive network effects (by encouraging more people to use the platform) while limiting advertising (which is indispensable to platform operators) to where it is most productive. Going beyond the total welfare standard, this policy would also foster desirable distributional consequences, transferring welfare from Meta shareholders to Facebook users.

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[24] This was the approach taken against the Bell System. *See United States v. AT&T*, 552 F. Supp. 131, 227 (D.D.C. 1982).

[25] This was the approach taken by the European Union against Microsoft. *See* Microsoft Corp. v. Commission, T-201/04 (2007) 2007 EUR. CT. REP. 289. *Cf.* U.S. v. Microsoft Corp., 253 F.3d 34 (D.C. Cir. 2001).

[26] *See* ERIC A. POSNER & E. GLEN WEYL, RADICAL MARKETS: UPROOTING CAPITALISM AND DEMOCRACY FOR A JUST SOCIETY (2018). *See also* Radical Exchange Foundation, *The Data Freedom Act, Draft Legislation and Commentary* (2020), https://www.radicalxchange.org/files/DFA.pdf; Erik Rind & Matt Prewitt, *If Data Is Labor, Can Collective Bargaining Limit Big Tech?*, TECHCRUNCH, Oct. 12, 2020, https://techcrunch.com/2020/10/12/if-data-is-labor-can-collective-bargaining-limit-big-tech/.

[27] *See* John M. Newman, *Antitrust in Zero-Price Markets: Foundations*, 164 U. PENN. L. REV. 149 (2015).

We find that the worst approach is a breakup that compromises platform quality and network effects without fostering competition. A botched horizontal breakup would result in Baby Facebooks, each monopolizing a market segment.[28] A vertical breakup with no procompetitive effects would also degrade welfare. A generation ago, when the 1982 consent decree split up the Bell System, the Department of Justice also required that the post-divestiture Bell Operating Companies provide competing carriers access to their infrastructures that was "equal in type, quality, and price."[29] For the modern analog, digital platforms, the lesson is that divestiture by itself is an incomplete and counterproductive panacea; at a minimum, it must be paired with nondiscriminatory access.[30]

By contrast, the first-best solution is a nationalized platform that subsidizes usage and runs at a loss, thereby maximizing network effects. Yet although nationalization responds to the reality that digital platforms have become an indispensable infrastructure, this approach is politically infeasible. It may also entail unpredictable inefficiencies due to government control. Therefore, we settle on the host of possibilities between nationalization and botched breakups. These include interoperability, taxes on users, taxes on revenue, and data as labor, all of which harness network effects while restricting advertising.

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[28] For an example of market division, see Palmer v. BRG of Georgia, Inc., 498 U.S. 46 (1990). *See also* Kenneth M. Davidson, *The Competitive Significance of Segmented Markets*, 71 CALIF. L. REV. 445 (1983).

[29] *See* U.S. Dept. of Justice, Modification of Final Judgment § II.A, *reprinted in* United States v. AT&T, 552 F.Supp. 131, 227 (D.D.C. 1982) [hereinafter MFJ]. *See also* Joseph D. Kearney & Thomas W. Merrill, *The Great Transformation of Regulated Industries Law*, 98 COLUM. L. REV. 1323, 1330-34 (1998).

[30] Even then, judicial or regulatory mandates may need to be accompanied by continuing oversight. *See* HOUSE REPORT, *supra* note 23, at 35 ("even after the MFJ, the [1992 House Committee] report found, the FCC had failed to prevent the RBCOs [post-divestiture Baby Bells] from using their local monopolies to commit a number of anticompetitive violations, many eerily reminiscent of pre-divestiture Bell System abuses") (internal quotations omitted).

Before this Article proceeds further, a discussion of nomenclature is in order. We use "social welfare" to mean *total welfare*, comprised in our model of four parts. Economists and many antitrust scholars embrace social welfare because of its comprehensiveness.[31] As a fulsome gauge of welfare, it captures more than just the effect on consumers. For digital platforms in particular, a consumer welfare standard can be particularly deceptive because prices hover at zero.[32] In settling on social welfare, however, we have also staked a position in the heated debate over whether losses to consumers should be offset against gains to other groups, such as advertisers and workers.[33] Either stance is controversial: antitrust's fixation with consumer welfare is partially responsible for how big tech has amassed market power, but social welfare can be imprecise due to its attempt at inclusiveness. Nonetheless, quantifying a producer's effects on total societal welfare has always been a holy grail in both antitrust and economics. Viewing our model as a first step in that direction, we try to strike a balance between the overly narrow consumer welfare standard and a maximally broad conception of allocative efficiency. However, we argue that even those who reject the total welfare standard should embrace quantitative estimates of the effect of remedies on certain groups.

We must also confront another basic question: in deciding what to model, we are making assumptions that may signal certain normative stances. More concretely, our model does not factor in externalities such as internet addiction, political

[31] *See, e.g.*, Alan J. Meese, *Debunking the Purchaser Welfare Account of Section 2 of the Sherman Act: How Harvard Brougth Us a Total Welfare Standard and Why We Should Keep It*, 85 N.Y.U. L. REV. 659 (2010). *See also* HERBERT HOVENKAMP, FEDERAL ANTITRUST POLICY: THE LAW OF COMPETITION AND ITS PRACTICE § 2.3C (5th ed. 2011).

[32] *See, e.g.*, Lina M. Khan, *Amazon's Antitrust Paradox*¸ 126 YALE L.J. 710, 737 (2017).

[33] This was prominently addressed in *Ohio v. American Express*, 585 U.S., where the Court *did* factor in the gains to merchants as a counter to the losses to consumers from the credit card's anti-steering provisions.

polarization, encroachment on privacy, and the spread of fake news. The omission should not suggest that these concerns are unimportant, or impossible to model. Rather, lack of data precludes their computation in our model. Ultimately, we hope to nudge regulators and platform operators toward releasing their own models of social welfare, to reveal what they value and how they quantify it. Greater transparency on the welfare effects of digital platforms would significantly advance the conversation around their regulation.

Finally, our model raises interesting implications for multisided infrastructures in other industries, such as finance and utilities. While every industry is unique,[34] our findings suggest—qualitatively—that interoperability is crucial to maximizing a platform's welfare effects. Extended to financial markets, this may mean that back-office utilities such as clearinghouses should allow inputs from many different exchanges—and, more controversially, they could even settle trading activity across more varied asset classes, as some commentators have suggested.[35]

Section II of this Article canvasses the theoretical considerations of natural monopolies. At its core, multisided platforms are natural monopolies that harness economies of scale and scope. While natural monopolies are the most efficient single providers in their markets, they can also distort competition. In addressing those distortions as well as traditional solutions under antitrust, we dive into the debates over antitrust's very goals.

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[34] *See* Arup Bose, *On the Merits of Antitrust Liability in Regulated Industries*, 59 J. L. & ECON. 359 (2016).

[35] *See* Darrell Duffie & Haoxiang Zhu, *Does a Central Clearing Counterparty Reduce Counterparty Risk?*, 1 REV. ASSET PRICING STUD. 74 (2011) (netting efficiency benefits of one giant clearinghouse). For a tongue-in-cheek proposal of nationalization as a backstop to clearinghouse default, see Stephen J. Lubben, *Nationalize the Clearinghouses!* (2014), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2458506&rec=1&srcabs=2425187&alg=1&pos=7.

Against this backdrop, Section III then connects Facebook to the theoretical literature on digital platforms and natural monopolies. The antitrust community has begun to move from its exhaustive treatment of "platform monopoly" harms to remedies.[36] Proper remedies are notoriously difficult in antitrust to devise;[37] for digital platforms, proposals span heavy-handed breakups to less intrusive interoperability mandates.[38] We contend that quantifying the welfare effects of each intervention is indispensable to its assessment.

To that end, the remainder of this Article introduces a model of Facebook's social welfare devised by Seth Benzell and Avinash Collis. The Benzell-Collis model captures the nuances of user demand for the social network in order to predict the consequences of reforms such as taxes, divestitures, and user rebates. Drawing on surveys of over 57,000 Facebook users, the model calculates Facebook's social welfare as the sum of four components: (i) consumer welfare; (ii) advertising profits; (iii) tax revenues; and (iv) the value of a large user base. Section IV introduces the Benzell–Collis model and unveils the results when the model is calibrated to data from Facebook. Here we also

[36] On harms, see, e.g., *See* David S. Evans, *Antitrust Issues Raised by the Emerging Global Internet Economy*, 102 NW. U. L. REV. COLLOQUY 285, 302 (2008); Erika M. Douglas, *Monopolization Remedies and Data Privacy*, 24 Va. J.L. & TECH. 1 (2020); John M. Newman, *supra* note 27. On remedies, see, e.g., Herbert Hoveniamp, *Antitrust and Platform Monopoly*, 130 YALE L.J. 1952 (2021); Patel, *supra* note 6.

[37] For instance, injunctive remedies may themselves stifle competition by forcing rivals to share technologies and infrastructures. Philip Areeda, *Essential Facilities: An Epithet in Need of Limiting Principles*, 58 ANTITRUST L.J. 841 (1990) (decrying essential facilities).

[38] *See, e.g.*, ZEPHYR TEACHOUT, BREAK 'EM UP: RECOVERING OUR FREEDOM FROM BIG AG, BIG TECH, AND BIG MONEY 12, 19, 56–57, 223–25 (2020) (breakups); Herbert Hovenkamp, *Antitrust and Platform Monopoly*, 130 YALE L.J. 1952 (2020) (interoperability); Patel, *supra* note 6 (rescinding merger approval years afterward); Jonathan B. Baker & Fiona Scott Morton, Antitrust Enforcement Against Platform MFNs, 127 YALE L.J. 2176 (2018) (limiting the use of most favored nations provisions); Morton et al., *supra* note 14 (interoperability).

explain the calibration process while noting what the model leaves out.

The Benzell–Collis model provides a tool to estimate changes in social value (compared to the current welfare levels) in response to any number of antitrust solutions to Facebook's dominance. Section V categorizes the proposals to curtail dominant tech platforms and assesses their application to Facebook. As the most extreme possibility, running the platform at a loss, as a government-subsidized utility, might maximize social welfare by attending to *inframarginal*, or committed, users. Yet this approach is infeasible in a for-profit enterprise, which tends to focus only on the welfare of *marginal* users, who are on the fence about a product. By contrast, the worst possible solutions are breakups that gut social welfare. Botched breakups can be horizontal, which in our case may mean two Baby Facebooks, or vertical, such as the forced sale of WhatsApp and Instagram. Between these two bookends is a plethora of solutions, each succeeding or failing in its own way.

Section V concludes. Our extension of the Benzell and Collis model shows how courts and regulators might sift through the possibilities for relief from Facebook. Ultimately, we hope that our model forces regulators to confront—and also publicize—how they quantify welfare effects upon consumers and, more broadly, society.

II. THEORETICAL CONSIDERATIONS FOR NATURAL MONOPOLIES

Like other digital platforms, Facebook's value derives from its network effects—benefits conferred to a platform as it draws more users. Significant network effects, combined with the large fixed cost of entry to potential competitors, render Facebook a natural monopoly—a single, gargantuan producer that serves a market more efficiently than multiple smaller firms.[39]

[39] ALFRED E. KAHN, THE ECONOMICS OF REGULATION: PRINCIPLES AND INSTITUTIONS 123–24 (The MIT Press 1988) (1971).

Traditionally, natural monopolies were subjected to extensive regulation such as rate setting, but today's regulatory climate prefers general principles that set the ground rules for fair competition.[40] These principles are notoriously open-ended,[41] so their invocation in the FTC and State AG complaints may lead to wildly divergent approaches. Worse yet, their application to dynamic markets is rarely straightforward.

This Section lays the foundation for the treatment of Facebook as a natural monopoly by discussing the anticompetitive propensities of natural monopolies. Anticipating a related—and fraught—debate on the proper remedies of naturally monopolistic digital platforms, the Section also summarizes the discourse on antitrust standards. This groundwork is unavoidable: any model of social welfare must clearly and honestly convey the goals that policy interventions are designed to advance. The Section begins with an analysis of antitrust standards before delving into the distortions of monopolies generally and digital platforms specifically.

A. Debates over Antitrust Standards

Because antitrust law is underpinned by notoriously vague sections of the Sherman and Clayton acts,[42] the field has been beset by decades of internecine fighting over its very goals. Famously, Robert Bork proclaimed that antitrust was "the effort to improve allocative efficiency without impairing productive efficiency."[43] This stance came to be associated with the Chicago school of economics, which emphasized the positive aspects of

[40] *See* Kearney & Merrill, *supra* note 29.
[41] *See* 15 U.S.C. § 2; 15 U.S.C. § 18.
[42] *See, e.g.*, Sherman Act §§ 1, 2; Clayton Act §§ 2, 3.
[43] ROBERT H. BORK, THE ANTITRUST PARADOX 3 (1993).

monopoly such as facilitating innovation and enabling economies of scale.[44]

The inheritors of this tradition would dominate antitrust for decades, heralding efficiency above all other goals.[45] Curiously, Bork arrived at efficiency through a sleight of hand, by advocating initially for "consumer welfare."[46] In Bork's formulation, consumer welfare encompassed the profits of monopolies and cartels, so supracompetitive prices could be offset if dominant firms produced more efficiently.[47] The additional profits enabled by monopoly, if large enough, could offset a reduction in consumers' welfare. Over time, however, the antitrust community came to adopt consumer welfare as the reigning standard.[48] Under this standard, judges use modern economic theory to evaluate whether a given monopoly or action harms consumers in the relevant market.[49] In economic theory, consumer welfare is defined as the difference between what consumers are willing to pay for a product and its price. Monopolies are understood to be bad for consumers insofar as they make this difference smaller,

[44] *See* JONATHAN B. BAKER'S THE ANTITRUST PARADIGM: RESTORING A COMPETITIVE ECONOMY (2019); William E. Kovacic, *The Intellectual DNA of Modern U.S. Competition Law for Dominant Firm Conduct: The Chicago/Harvard Double-Helix*, 2007 COLUM. BUS. L. REV. 1; Lanny Ebenstein, *The Increasingly Libertarian Milton Friedman: An Ideological Profile*, 11 ECON. J. WATCH 81, 95 (2014).

[45] Even the Harvard school, which rose as an answer, adopted many of the same methods. *See* Kovacic, *supra* note 44.

[46] The rest of the quote above reads. . . "the effort to improve allocative efficiency *without impairing productive efficiency so greatly as to produce either no gain or a net loss in consumer welfare*." BORK, *supra* note 43, at 3.

[47] Kirkwood & Lande, *supra* note 2, at 199.

[48] *See* Barak Orbach, *The Antitrust Consumer Welfare Paradox*, 7 J. COMPETITION L. & ECON. 133 (2011); Roger D. Blair & D. Daniel Sokol, *The Rule of Reason and the Goals of Antitrust: An Economic Approach*, 78 ANTITRUST L.J. 471, 480 (2012).

[49] *See, e.g.*, Ohio v. American Express Co., 138 S. Ct. 2274, 2284 (2018) ("To determine whether a restraint violates the rule of reason . . . a three-step burden-shifting framework applies . . . [where] the plaintiff has the initial burden to prove that the challenged restraint has a substantial anticompetitive effect that harms consumers in the relevant market. . .").

leading some consumers to buy the product at a higher price[50] and others to forgo buying the product at all.[51]

Recently, scholars have disputed that consumer welfare should be the only or main antitrust standard. Some claim that the reliance on economic theory to determine harms gives too much of an advantage to powerful monopolists, who can hire the most expensive experts, and argue for more reliance on bright per se lines.[52] Others, such as former FTC Chair Christine S. Wilson, argue that the consumer welfare should be replaced or supplemented with a total welfare standard.[53] The total welfare standard would add the surplus of firms in the relevant market to those of consumers.[54] In other words, if a certain action raised the total profits of all relevant firms (including the platform monopolist) by more than it decreased consumer welfare, the total welfare standard would see it as acceptable. Because wealth, a major type of which is business equity, is more unequal than consumption,[55] a total welfare standard would typically be more

[50] Leaving them less resources to purchase other things they like, or forcing them to work longer hours than they'd like to, either of which would reduce their welfare as understood by economists

[51] This leaves some consumers fewer resources to make desired purchases and forces others to work more than otherwise preferred. Both options reduce consumer welfare. *See* Christine S. Wilson, FTC Comm'ner, *Welfare Standards Underlying Antitrust Enforcement: What You Measure is What You Get*, Keynote at *George Mason Law Review* 22nd Annual Antitrust Symposium, at 5 (2019), *transcript available at* https://www.ftc.gov/system/files/documents/public_statements/1455663/welfare_standard_speech_-_cmr-wilson.pdf.

[52] *See* Khan, *supra* note 32.

[53] *See* Wilson, *supra* note 51, at 18. *See also* BORK, *supra* note 43, at 3.

[54] Typically firm a firm's surplus is equal to their profits, but some firms may have goals other than maximizing profits. We discuss Facebook's potential non-immediate revenue-maximizing goals in Section IV *infra.*

[55] Wealth in the US is highly unequal, with 34.9% of US wealth held by the top 1%. Consumption in the US is much more equal, with 38% of expenditures made by the top 10% of households in 2020. *See* Thomas Piketty et al., *Distributional National Accounts: Methods and Estimates for the United States*, 133 Q. J. ECON. 553 (2017); Drew Silver, *The Many Ways to Measure Economic*

beneficial to the rich than a consumer welfare standard. Nonetheless, Wilson argues that dividing surplus is a role for Congress or other agencies, and the FTC and antitrust law should consider the total welfare standard "which would maximize efficiency and give those who wish to engage in redistribution a larger pie to share."[56] Other scholars advocate for a mixed approach, where judges may take into account multiple interests including but not limited to consumer and producer surplus.[57]

Whatever standard is ultimately applied in the Facebook antitrust complaint, designing remedies requires understanding the nature, distribution, and magnitude of the harm created by the platform's market power.

B. How Monopolies Distort Competition

In a perfectly competitive market, every good is priced at its marginal cost of production.[58] Such a market guarantees a Pareto-efficient distribution of resources, in which no individual can be better off without making another individual worse off.[59] The fact

Inequality, PEW RESEARCH CENTER (Sept. 22, 2015), https://www.pewresearch.org/fact-tank/2015/09/22/the-many-ways-to-measure-economic-inequality/; Robert Gebeloff, *Who Owns Stocks? Explaining the Rise in Inequality during the Pandemic*, N.Y. TIMES, Jan. 26, 2021, https://www.nytimes.com/2021/01/26/upshot/stocks-pandemic-inequality.html.

[56] Wilson, *supra* note 51, at 18.

[57] Such considerations might include "preserving a deconcentrated industry structure, dispersing economic power, and promoting fairness in economic dealings." *Id.* at 9.

[58] *See* ANDREU MAS-COLELL ET AL., MICROECONOMIC THEORY, Vol. 1, at 318 (1995) (seminal macroeconomics textbook discussing perfectly competitive versus monopolized markets). In a competitive market, firms are "price takers" who have no control over the price of what they sell. Accordingly, the profit-maximizing strategy is to produce more of the good until the price of the good equals its marginal cost. This is the opposite of wielding market power.

[59] *Id.* at Ch. 16. Pareto efficiency has several limitations. Notably, an economy that is extremely unequal may still be efficient in Pareto's sense. Therefore, this state has come under attack as a desideratum for policymakers.

that, under a set of technical assumptions,[60] competitive markets are guaranteed to produce a Pareto-efficient result is enshrined in the "first fundamental theorem" of welfare economics.[61] Notably, the assumptions underpinning this theorem are unlikely to hold when production technologies with high fixed costs and strong demand and supply side economies of scale (e.g., network effects) are in place, leading to only one or a few dominant firms. This is the instance of a natural monopoly or winner-take-all market.[62]

Monopolies depress social welfare by creating artificial scarcity of goods in the monopolized markets. This scarcity raises the price of goods above their marginal cost. For the monopolist, the difference between actual price and marginal cost (as well as between quantities of goods produced in a monopoly versus a perfectly competitive market) represents a profitable exchange. However, monopoly profits come at the expense of consumers, who now face a shortage of goods and a surplus of prices—a notion known as "deadweight loss."[63]

If a monopolist wants to sell more product, it must lower its prices.[64] While on the margin it may be profitable for the monopolist to make an additional unit and sell it just above marginal cost, it cannot do so without reducing its *inframarginal* profit.[65] If a monopolist could perfectly price discriminate (that is,

[60] The most important being local non-satiation of preferences—i.e., the notion that life for every agent in an economy can improve by they are conferred more resources. This is a relatively non-onerous assumption relative to the assumption of perfect price-taking behavior.

[61] *Id.*

[62] *See id.* at 570 ("Large nonconvexities caused by the presence of fixed costs or extensive increasing returns lead to a world of a small number of large firms (in the limit, production efficiency may require a single firm, a so-called 'natural monopoly'), making the assumption of price taking less plausible.").

[63] *Id.* at 385. Deadweight loss from monopoly can be calculated as the difference in the Marshallian aggregate surplus between the competitive and monopolized states of the world.

[64] *Id.*

[65] I.e., the profit a monopolist makes on goods that it would sell whether or not it attempts to manipulate prices.

charge different prices to different consumers)[66] there would be no reduction in social efficiency. Yet this would incur a problem with equity, with the monopolist would gaining all the surplus and consumers gaining nothing.

Hence, monopolies are a social ill for at least two reasons. First, they capture a larger share of the fruits of society than might be considered equitable. Second, and more importantly, they shrink the size of the social pie.[67] To the extent the firm can price discriminate, it exacerbates the first problem but softens the latter. Beyond this classic list of economic distortions, we can also tack on sociopolitical criticisms of monopolies such as overconcentration of economic, and therefore political, power as a failure in and of itself.[68]

To rein in the economic and sociopolitical distortions of monopolies, antitrust devised a slew of interventions that, over time, have become more nuanced. The blanket prohibition on "combinations" and "restraints of trade" softened over time.[69] This evolution came in part because the focus on consumer welfare directed courts and regulators to inquire whether alleged practices harmed consumers; if not, then those practices tended to survive challenge, even if they engendered other harms, such as to labor or the competitive process. Further, economists have even

[66] Perfect price discrimination entails charging every user with a private valuation of the good less than the marginal cost of producing their exact private value. Note that price discrimination is only possible when a firm has market power; otherwise, another firm would enter with lower costs and compete down the price to all customers down to the marginal cost of production. *See id.* at 387 ("if the monopolist were able to perfectly discriminate among its customers in the sense that it could make a distinct offer to each consumer, knowing the consumer's preferences for its product, then the monopoly quantity distortion would disappear").

[67] That said, the Sherman and Clayton act also ban "unreasonably low" prices and price predation, which are designed to destroy competition and enable monopolistically high prices in the future.

[68] *See* Barak Orbach, *The Antitrust Curse of Bigness*, 85 S. CAL. L. REV. 605 (2012).

[69] Compare, e.g., U.S. v. Trans-Missouri Freight Organization, Brown Shoe, and Alcoa,

proposed caveats to the traditional condemnation of monopolies. Unifying these disparate approaches, economists nevertheless concluded that at least two situations may benefit from regulation: natural monopolies and products which constitute a social ill (e.g., polluting or addictive products).

C. Challenges to Regulating Digital Platform Monopolies

Apart from exhibiting traits of natural monopolies, digital platforms also implicate the dynamism and challenges of multisided platforms. The theory of multisided platforms originates from two important insights dating to the 1970s. First, Metcalfe's Law notes that if the value of a connection on a platform is constant, then the total value of all connections on a platform grows with the square of the number of participants.[70] This means that the value of platforms increases rapidly as the number of participants on the platform grows. With two users of a platform, there is only one possible connection; with three users, there are three possible connections. Four users produce six possible connections; and five users, ten connections. A platform with N users has $N^*(N - 1)/2$ possible connections.[71] Metcalfe's Law contained the kernel of what would become the fundamental challenge in digital platform regulation: From a social perspective, we want the platform to be as large as possible; however, if platform profits are linear in relation to the number of users, the platform's operator may be incentivized to restrict the platform to a smaller size than socially optimal.

Another important early contribution came from Jeffrey Rholfs, who defined the concept of a recursive network equilibrium, one in which every user's participation on a platform is a function of everyone else's expected participation.[72] Professor

[70] *See* CARL SHAPIRO & HAL R. VARIAN, INFORMATION RULES (1999).
[71] *Id*.
[72] Jeffrey Rohlfs, *A Theory of Interdependent Demand for a Communications Service*, 5 BELL J. ECON. 16 (1974).

Rholfs noted that some equilibria are stable while others are unstable. An equilibrium is stable when small changes in prices or participation garner small changes in equilibrium participation. By contrast, in an unstable equilibrium, a platform is balanced on a knife's edge—the departure of a single user could cause a chain reaction of lowered platform quality and other user departures that completely erodes platform participation.[73]

Subsequently, the Nobel Laureate Jean Tirole,[74] alongside Marshall Van Alstyne, Geoffrey Parker, Jean-Charles Rochet, Marc Rysman, Andrei Hagiu, and others, would develop the theory of "two-sided platforms."[75] In a two-sided platform, participation on one side of the platform creates spillover effects on the other side. Classic examples of two-sided markets are credit cards (which require both vendors and card-users to adopt), online search (which requires users to provide data and eyeballs and advertisers to provide revenue), and desktop computer operating systems (which require developers to make and sell applications and consumers to purchase and use them).[76] One key insight of this literature is that platforms must price-discriminate across sides to maximize platform value. In particular, platforms should charge higher prices to the side with less positive network effects and lower prices to the side with more elastic demand. For credit cards, this means charging vendors (whose demand usage tends to be inelastic because they need to accept many cards to be competitive) and subsidizing consumers (whose usage tends to be highly elastic because any consumer only needs a single card). Extended to the online search context, a platform would charge advertisers (who create negative network effects for users) and provide free search results for users

[73] *Id.*

[74] Key to his prize was the seminal article Jean-Charles Rochet & Jean Tirole, *Platform Competition in Two-sided Markets*, 1 J. EUR. ECON. ASS'N 990 (2003).

[75] Marc Rysman, *The Economics of Two-Sided Markets*, 23 J. ECON. PERSP. 125 (2009).

[76] For an interesting take on operating systems, see NEAL STEPHENSON, IN THE BEGINNING . . . WAS THE COMMAND LINE (1999).

(who provide positive network effects by creating data to improve products and services).[77]

Because platforms harbor an incentive to charge more for users who provide negative network effects than users who provide positive network effects, their monopolists might maximize social welfare more effectively than a competitive market. In a competitive market, for example, no firm has an incentive to subsidize users whose positive network effects mostly benefit people not on the platform. Glen Weyl, in the first paper to develop a solution for a version of the multisided platform problem, shows that a monopoly platform's interests are not entirely misaligned with society's.[78] Weyl's model was extended by Julian Wright and Hongru Tan, who classified distortions from monopolist platforms versus social welfare maximization.[79] For example, in addition to the distortion from ignoring the welfare of inframarginal users, Professors Wright and Tan identify a potential "eternal September" effect, whereby, as the internet grows, the average quality and tone of discourse on the internet worsened.[80] They point out that if earnest users of platforms are more likely to use the platform and trolls are more loosely attached, then larger platforms are likely to have more users with utility-destroying network effects.

III. FACEBOOK AS NATURAL MONOPOLY

[77] *See, e.g.*, Andrei Hagiu, *Strategic Decisions for Multisided Platforms*, MIT SLOAN MGMT. REV. (Dec. 19, 2013), https://sloanreview.mit.edu/article/strategic-decisions-for-multisided-platforms/.

[78] E. Glen Weyl, *A Price Theory of Multi-sided Platforms*, 100 AM. ECON. REV. 1642 (2010).

[79] Hongru Tan & Julian Wright, *Pricing Distortions in Multi-sided Platforms*, 79 INT'L J. INDUS. ORG. 102732 (2021).

[80] WENDY M. GROSSMAN, THE YEAR SEPTEMBER NEVER ENDED 4–17 (2006).

Meta, as the U.S.'s most dominant social media company today,[81] poses special challenges to legal and economic analyses of harms. Like other media companies, Facebook provides services at zero monetary cost to consumers, subverting the traditional argument that monopolies restrict consumer surplus by charging supracompetitive prices.[82] Second, like other digital platforms, Facebook exhibits the traits of a natural monopoly, including high barriers to entry, low marginal costs, and strong network effects. As the prior Section explores, a natural monopoly is a dominant firm in a market where the equilibrium number of providers is one.[83] This definition suggests that welfare might be best served by avoiding a breakup or shrinking of Facebook.

Finally, Facebook may engender a set of social ills that are not covered in traditional measures of consumer surplus. The platform has been charged, for instance, with subverting democracy, polarizing the political discourse,[84] and augmenting addictive behavior and its psychological effects.[85] To the extent that the platform's services constitute a "public evil" rather than a "public good," any remedy that enhances Facebook usage and quality may in turn impair social welfare.

This Section explores the nuances of the claim that Facebook is abusing its market power to the detriment of consumers and society. This claim requires parsing the platform's natural monopoly features, such as its network effects and strategies to maintain a large user base. Accordingly, this Section begins by analyzing the purposes and consequences of that large user base before moving onto the distortions from its network effects.

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[81] Statistica Research Dept., *U.S. market share of leading social media websites 2021* (Jan. 28, 2022), https://www.statista.com/statistics/265773/market-share-of-the-most-popular-social-media-websites-in-the-us/.

[82] John M. Newman, *supra* note 27.

[83] ALFRED E. KAHN, THE ECONOMICS OF REGULATION: PRINCIPLES AND INSTITUTIONS 123-24 (MIT Press 1988) (1971).

[84] *See* Hovenkamp, *supra* note 38, at 1969.

[85] James Niels Rosenquist et al., *Addictive Technology and its Implications for Antitrust Enforcement* (2020) (manuscript on file with author).

A. Tactics and Fallout from Achieving a Large User Base

For any multisided platform, attaining and maintaining a user base is a central goal. Most importantly, a large user base can be monetized by advertisements or fees. Additionally, even users who are not directly monetized may create a positive network effect induces other, profitable, users to use the platform. Yet a platform's operator may value a large user base for several reasons beyond the users' direct contribution to profits. This complicates the total welfare standard because these non-pecuniary motivations may fall into two categories: pro-competitive and anticompetitive.[86]

One benign motivation for a large user base is that it may enable data collection for analysis that will lead to new or better products. Alternatively, or additionally, a large user base may create opportunities for profiting off future products. For Meta, the latter motivation may derive from the desire to maximize sales of Libra digital currencies as well as Metaverse and Oculus VR services. This motivation is analogous to investing in future products and should be viewed positively (to the extent these future projects are themselves socially positive).

On the other hand, a large user base may be pursued for anticompetitive reasons. A platform may cultivate a large user base by keeping prices artificially low (or quality artificially high) to deter the entry of competitors or to fend off regulators.[87] In either view, Facebook's courtship of a large user base at the expense of profits is a sign that the threat of entry (or regulation)

[86] Benzell & Collis, *supra* note 9.

[87] This tactic is a variation of predatory pricing—i.e., suppressing prices in the short term to drive competitors out of business, so as to raise prices afterward. *See Brooke Group Ltd. v. Brown & Williamson Tobacco Corp.*, 509 U.S. 209 (1993). Given the short-term benefits to consumers, the Supreme Court has viewed price squeezing claims skeptically. *See* C. Scott Hemphill & Philip J. Weiser, *Beyond* Brooke Group*: Bringing Reality to the Law of Predatory Pricing*, 127 YALE L.J. 204 (2018).

induces its actions. Neither strategy renders the platform's low level of advertising harmful, though it suggests that an even more socially beneficial outcome might arise if not for the anticompetitive pricing (e.g., a more competitive or differently regulated social media industry).[88]

Finally, a large user base might be cultivated to prevent the network from "unraveling." Unraveling is the process by which a shock to a platform or market leads to increasingly larger cascades of user departures.[89] A network in an unstable equilibrium is closer to this result. In essence, this is the opposite process of the positively reinforcing network effects driving the growth of large platforms. Instead of additional users reinforcing the network and one another's value, a steady withdrawal of users leads to a run on the platform. Such a cascade could hypothetically be triggered by even a moderate departure of users. We can assume, then, that Facebook has estimated its point of collapse once its user base falls below a critical threshold, and might speculate, further, that the platform has built up many more users than that threshold to serve as a buffer. Whether strategies to prevent unraveling are anticompetitive is unclear. Although some scholars have argued that staving off unraveling is Pareto-efficient, a more competitive or socially beneficial industry could emerge from the ashes of a fallen dominant platform.[90]

A platform can utilize many tools to attain a large user base. It may invest (or not invest) in new products or features. Alternatively, it may reduce or increase the intensity with which it monetizes customers by altering fees, the level of advertising, or amount of data sold to third parties.[91] The Benzell-Collis model

[88] *See, e.g.*, Schor v. Abbott Labs., 457 F.3d 608, 611 (7th Cir. 2006) ("[I]f a manufacturer cannot make itself better off by injuring consumers through lower output and higher prices, there is no role for antitrust law to play.").

[89] Benzell & Collis, *supra* note 9, at 25.

[90] Hanna Hałaburda, *Unravelling in two-sided matching markets and similarity of preferences*, 69 GAMES & ECON. BEHAV. 365 (2010).

[91] Andre Veiga et al., *Multidimensional Platform Design*, 107 Am. Econ. Rev. 191 (2017).

assumes that Facebook maximizes twin goals—maximizing profit while maintaining a large user base. It assumes that the platform pursues these goals efficiently, making optimal, cost-minimizing tradeoffs among monetization and product quality tactics. More concretely, the company sets the average expected revenue per user and adheres to an efficient mix of investments, disinvestments, and advertising to realize that revenue.[92]

One of the core schemes deployed by platforms to maximize revenue is price discrimination—assigning different levels of monetization to different constituents. Conceptually, if a platform were to be able to perfectly price-discriminate (i.e., charge each user exactly their opportunity cost for participating), it would arrive at an equilibrium where the deadweight loss from monopoly is zero.[93]

Of course, a large user base might entail social costs—and even social benefits—that are not factored into consumer welfare or producer profits. For example, social media may spread fake news and foment political polarization.[94] Advertisements, too, dampen consumer welfare, though they may also help consumers find new products and increase the efficiency of the economy overall.[95] Finally, Facebook usage might spur private negative effects not captured in traditional measures of consumer surplus,

[92] Benzell & Collis, *supra* note 9.

[93] ANDREU MAS-COLELL ET AL, *supra* note 58, at 387 ("If the monopolist were able to perfectly discriminate among its customers in the sense that it could make a distinct offer to each consumer, knowing the consumer's preferences for its product, then the monopoly quantity distortion would disappear; such an outcome would be acceptable from a total welfare standard standpoint, and unacceptable to a consumer welfare standard. This equilibrium is Kaldor-Hicks efficient, even though the platform's stockholders are the sole beneficiaries of this efficiency.").

[94] See Section IV.B *infra*. Applied to the context of platform modelling, we note that we cannot determine how precisely and successfully Facebook can price-discriminate, so the model presumes that Facebook showers all users with the same frequency of advertising.

[95] See Section IV.B *infra.*

such as erosion of consumer privacy.[96] In the extreme, Facebook usage may constitute an addictive activity, which would present a major caveat to any correlation between social welfare and consumer demand.[97]

B. Modeling Network Effects

In modeling any digital platform, the primary agents are the potential users. At any given moment, potential users must decide whether to engage with the platform. Individuals are subjective utility-maximizers and will engage with the platform only when their expected value from doing so (after accounting for any fees or disutility from advertisements or data harvesting) is greater than their opportunity costs. For Facebook, those opportunity costs are the next-best alternatives for spending their time.

The distribution of opportunity costs across any population determines how sensitive platform participation is to fluctuations in the platform's price or quality.[98] For example, if the population is bifurcated into (i) a group that will use the platform no matter what and (ii) a group that will never use the platform at all, ebbs in the price of an intermediately priced platform will do little to alter the level of platform participation. On the other hand, if a large segment of the population is ambivalent about the platform, then an ebb in price can significantly affect platform participation. This elasticity will be even greater in the long run if network effects on the platform are strong.

Network effects differentiate platforms from other enterprises. With network effects, one user on the platform changes the value of the platform to other users. For the most successful platforms, network effects are strong and positive. Further, a platform can attract user bases that interact with the platform in different ways. A ride-sharing platform, for instance,

[96] Douglas, *supra* note 36.

[97] Rosenquist et al., *supra* note 85.

[98]

counts both potential drivers and potential riders as its user base. In modeling Uber or Lyft, then, we might distinguish between potential riders and drivers who live in different cities, prefer different vehicles, or any other relevant characteristics. Each of these populations can be thought of as a "side" of the platform, in the sense that the sides are heterogeneous in the network effects they give and receive. If a platform has only one "side," or if its sides do not produce network effects (e.g., because one user's participation does not directly depend on any other users' decision to participate), the model reduces to a standard monopoly, with all its attendant antitrust implications.

Translated to a model, every side of a platform creates and receives a potentially unique set of network effects.[99] In the hypothetical of a ride-sharing platform, we might distinguish between drivers (who benefit from numerous riders but *ceteris paribus* prefer fewer drivers to compete with) and riders (who benefit from numerous drivers but prefer fewer riders). For greater precision, we might distinguish the geographic markets of potential riders and drivers, increasing the number of sides modeled from two to the number of cities considered.

Each side can be distinguished further by its unique distribution of opportunity costs. The elasticity of some groups to changes in platform quality may be high (this might include young people who are all relatively blasé about Facebook), while for other groups it may be low (older, devoted users may stay on the platform even after large quality shocks, while other older individuals might be technology-resistant and refrain from use no matter what changes Facebook makes). In addition, the average opportunity cost for some groups may be high or low. If a group with strong positive network effects has a large opportunity cost of using the platform (for example, celebrities), then this group of "superstars" might become the target of efforts by the platform to induce their usage. Overall, platforms will decrease monetization

[99] Benzell & Collis, *supra* note 9.

on groups that have high elasticities of demand and create large network effects, and vice versa.

C. Social Media and Natural Monopoly

Strong network effects, which can be understood as a demand-side economy of scale (i.e., product quality increases as a good or service is more widely used),[100] are perhaps the most important reason social media is considered a "winner-take-all" market.[101] In such a market, the long-term equilibrium number of sellers is one.[102] The low marginal cost of providing social media services, coupled with high fixed costs of creating the code and user base, tends to reduce competition in the market. Winner-take-all, or winner-take-most, markets therefore tend to produce large firms with market power.[103]

The successful firm in a winner-take-all market is a *natural monopoly*, a term with two closely connected but independent meanings. First, a single firm is the most efficient outcome under a total welfare standard. Second, a natural monopoly is the equilibrium outcome of its market in the absence of any anticompetitive behavior. The value created by a digital platform arises in part because of transaction costs: without transaction

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[100] Marshall W. Van Alstyne, *Pipelines, Platforms, and the New Rules of Strategy*, HARV. BUS. REV. (Apr. 2020), https://hbr.org/2016/04/pipelines-platforms-and-the-new-rules-of-strategy

[101] *See* Daniel A. Hanley, *A Topology of Multisided Digital Platforms*, 19 CONN. PUB. INT. L.J. 271 (2020); Thomas R. Eisenmann, *Winner-Take-All in Networked Markets*, HARV. BUS. SCH. 1 (Sept. 11, 2007) (discussing online auction sites). For a fuller discussion of the scholarship on this point, see Hovenkamp, *supra* note 38, at 1970 n.67.

[102] *Id.* at 1969 ("A 'winner-take-all' market is one in which the equilibrium number of sellers at any time is one.").

[103] ANDREU MAS-COLELL ET AL, *supra* note 58, at 570 ("Large nonconvexities caused by the presence of fixed costs or extensive increasing returns lead to a world of a small number of large firms (in the limit, production efficiency may require a single firm, a so-called 'natural monopoly'), making the assumption of price taking less plausible.").

costs, users could interact with one another directly at their bargained-for pricing and terms. Given the high transaction costs of all such interactions in a market, a platform emerges to enable these connections. In doing so, the platform boosts social value by subsidizing the more elastic sides of the market—which the inelastic sides may be unable to directly pay.

Historically, natural monopolies were subjected to intrusive rate regulation.[104] A classic example is electrical utilities, which has two constituent markets—power transmission and power generation. The former is clearly a winner-take-all market bearing high sunk costs,[105] while electricity generation is usually seen as a competitive market. Due to complementarities between the two markets, the same firm often controls both power generation and power transmission. In the mold of utility-style regulation, when a local government embarks on electrifying an area, it solicits bids from firms to provide both generation and transmission. As part of the final agreement, the firm agrees to supply electricity to all consumers in the area at a set price, often determined as a fixed markup above costs.[106] This regulatory paradigm reflects tradeoffs about the relative inefficiencies of government intervention and cleaving generation from transmission.[107] Arguably, in opening up bids for electrification, competition *for* the market may be sufficient to keep monopolists in check—even

[104] Kearney & Merrill, *supra* note 29.

[105] More concretely, it is simply too wasteful to affix more than one set of electricity transmission cables to any building or dwelling.

[106] *See*, Paul L. Joskow, *Restructuring, Competition and Regulatory Reform in the U.S. Electricity Sector*, 11 J. ECON. PERSP. 119 (1997).

[107] *Id.* at __ ("vertical integration between the network functions that have natural monopoly characteristics and the generation function effectively turns the supply of generating service into a monopoly as well, even if, as is the case in the United States, there are numerous generating plants connected to the network and limited economies of scale associated with generation per se in isolation from the coordination functions performed by the network ").

if, as a result of natural monopoly, there is no competition *within* the market.[108]

Recently, Herbert Hovenkamp, widely regarded as the "dean" of modern antitrust,[109] has challenged the notion that social media platform markets are winner-take-all. Professor Hovenkamp arrives at this conclusion after evaluating five factors determining the existence of a natural monopoly: (1) the lack of stable competition or multi-homing among incumbents; (2) the durability of dominance and the ability to resist technological change; (3) declining costs or network effects relating to single-firm control; (4) the lack of significant product differentiation; and (5) the lack of interoperability or data sharing.[110] In our view, it is debatable whether these are the right criteria to determine if a market is winner-take-all—and whether these criteria are applicable to Facebook. Condition 1 is clearly the most important; by this standard, the market for social media services in the U.S. is certainly winner-take-most.[111] The smaller firms that compete with Facebook generally do so not by creating "Facebook clones" but, rather, abide by significantly different social mechanics or otherwise differentiate themselves via different quality and moderation decisions.[112] In evaluating condition 4, the existence of the smaller also-rans may be evidence that they are pursuing

[108] Harold Demsetz, *Why Regulate Utilities?,* 11 J.L. & ECON. 55, 57-60 (1968). In the case of Facebook, it too can be argued that they face competition *for* the market, and this keeps their monetization levels lower than would be the case in the absence of it. We discuss the origin of Facebook's seeming value from maintaining a large user base, and the implications for antitrust in Section III.A. *supra*.

[109] NICOLAS CHARBIT & SÉBASTIEN GACHOT (EDS.), HERBERT HOVENKAMP LIBER AMICORUM: THE DEAN OF AMERICAN ANTITRUST LAW (2021).

[110] Hovenkamp, *supra* note 38, at 1972.

[111] May 2021, Facebook wielded 71.8% of the U.S. social media market, measured by visits, with another 3.28% for Instagram. *See* Statistica Research Dept., *supra* note 83.

[112] Examples of social media services that pursue other approaches are Pinterest, Twitter and Reddit (12.4%, 9.15%, and 0.76% of the market, respectively). Examples of social media services who take different stances on content regulation include Gettr, Parler, Gab, and otaku image boards, which are generally more permissive than the large platforms.

substantially different markets[113] or, alternatively, that product differentiation does permit for stable competition.[114] As for condition 3, social media is as strong a winner-take-all market as can be imagined, with extremely strong positive network effects and low marginal costs. Finally, at this point we do not have a sufficient time period to fully evaluate condition 2, but condition 5 also renders the current market more winner-take-all, as there is currently very limited interoperability between Facebook and other platforms.

Should regulation change the landscape, the market would certainly become more competitive—and indeed, in Section V we consider the possible remedies. Nonetheless, in evaluating markets on a continuum, the market for social media is much more "winner-take-most" than most markets. This further suggests that remedies for Facebook's market power may do better by avoiding breakups that would destroy the network effects and increase marginal costs.

IV. APPLYING THE BENZELL–COLLIS MODEL TO FACEBOOK

In prior work, Benzell and Collis developed a quantitative model of consumer participation on and value from "Facebook Blue," Meta's core social media platform.[115] The model builds on the frameworks of Weyl, Wright, and Tan, who rely on a theoretical device known as an "insulating tariff" to allow the platform to choose any equilibrium it desires. This artifice also requires complete information about the setting to implement. By contrast, the Benzell and Collis approach is local, requiring only

[113] For instance, it is unclear whether Reddit and Facebook are substitutes for one another. According to the condition 1, the winner-take-all-ness of social media is currently even more extreme.

[114] This could then be a basis to challenge Facebook's dominance and thereby make the market seem less winner-take-all under condition 4.

[115] *See* Benzell & Collis, *supra* note 9. The term "Facebook Blue" distinguishes the Facebook social media platform from other social media platforms owned by the Facebook corporation, including Instagram and WhatsApp.

information about platform demand in the vicinity of the currently realized equilibrium. The calibrated model predicts the fallout from a shock to the platform equilibrium such as a change in prices, rather than selecting the global maximum directly.

More importantly, the Benzell-Collis model is designed for practical application to real-world data. Drawing on surveys of Facebook users, the model captures the nuances of user demand for the social network to predict the consequences of reforms such as taxes, divestitures, and user rebates. These results highlight areas where clarity would be particularly helpful—Facebook's externalities, its returns to connections, and its ability to price discriminate.

This Section introduces the model and applies it to Facebook. It how data can be collected to calibrate the model to estimate the harm caused by Facebook's market power. The Section begins by dissecting the four components of social welfare in the model. Then it analyzes the two main groups of agents whose interactions are relevant to the model: the platform and its users platform.

A. Components of Social Welfare

The Benzell-Collis model has four components, each incorporating how Facebook and, more broadly, social media contribute to social welfare.

1. Consumer Welfare

The first and most obvious component of social welfare is *consumer welfare*, which should be captured in any welfare analysis. We measure consumer welfare as the difference between (i) users' willingness to pay for Facebook (under various scenarios) and (ii) the actual price of Facebook (free) for all those who use the platform. The distribution of willingness-to-pay across all users is the platform's demand function, so consumer welfare is the area between the demand curve and price.

2. Corporate Profits

Facebook contributes to social welfare by paying dividends (or creating capital gains) to shareholders and taxes to the government. While these two factors are usually omitted in the current, consumer-welfare-centric iteration of antitrust, they should nonetheless be incorporated into social welfare analysis. This coheres with the income-production national accounting identity, according to which total national production must equal total national income. Income paid through taxes or dividends counts just as much as wages paid to workers, even if for egalitarian reasons we might prefer for others to be collecting the surplus.

For a comprehensive picture of social welfare, then, our formula also accounts for Meta's after-tax profits. Here the model focuses on profits from advertising, which comprise 98% of Facebook Blue's profits.

3. Tax Revenue

Consistent with the insight that Facebook enhances welfare by paying dividends and taxes, the Benzell-Collis model includes taxes paid to the government.

4. Maintaining a Large User Base

Finally, the model folds in Facebook's "shadow value" for maintaining a large user base. This corresponds to Facebook's non-pecuniary value from having lots of users. This value might be socially positive if, for example, it represents an intangible asset being developed from users' data that will allow Facebook to create new, socially positive business lines in the future. These types of investments and intangible capital accumulation should be counted as positive social contributions. On the other hand, Facebook's motivation for maintaining a larger user base than

necessary for short-term profit maximization implies a darker motivation—under-pricing to discourage entry and competition. In the remainder of this Article, we focus on the positive interpretation of this shadow value.

B. Data on Platform–User Interactions

Our model envisions interactions between two primary constituents: the platform monopolist and its potential users. Each of these agents pursues its distinct set of goals. The platform monopolist seeks to balance profit maximization with user base cultivation, even if the latter does not directly generate profits. Facebook generates profits primarily through advertising, but like many digital platforms, it prioritizes a large user base enough to operate at losses for long stretches. The model was constructed for multisided scenarios; its primary limitation is the practical constraint of collecting relevant data for all sides. This constraint becomes more daunting as the sides are defined with increasing precision.

Applied to Facebook Blue, the platform monopolist is Facebook, and the potential user base is defined as the population of the United States. While we could model the entire U.S. population as a homogeneous group with indistinguishable network effects and opportunity costs, we have opted for greater nuance by dividing the national population into twelve clusters by age and gender.[116]

For each demographic cluster the model requires estimates of the network effects received from every other group, disutility from advertising, and the group's distribution of opportunity

[116] Demographic categorization is not first-best. Rather, it is better to follow the practice of the platforms themselves, which categorize users based on social class and personality type in addition to basic demographics. This was the strategy controversially implemented by Cambridge Analytica during the 2016 election—a strategy increasingly deployed by marketers using big data machine learning techniques. We divide populations by demographics because of the convenience of collecting this information using Google Surveys.

costs. To collect this information, we conducted a series of surveys through the Google Surveys platform of a representative sample of the U.S. population. The most common questions we asked were of the form "Would give up Facebook for 1 month in exchange for $[X]? Choose Yes if you do not use Facebook." These questions take the form of a "Willingness to Accept" experiment, which is a common approach for ascertaining the value consumers receive from free digital goods.[117] We also asked questions soliciting the specific value of connections to friends in different demographic groups, the share of friends of different demographic groups, and the disutility from advertisements.

Soliciting this information through simple surveys is not ideal. Facebook itself would have the ability to measure these quantities much more precisely, either because they already have the data or through running simple small-scale experiments. However, we were able to independently confirm several of our survey findings. First, while our surveys were not "incentive compatible" (i.e., we did not test to see whether those surveyed would actually carry out the deals they agreed to hypothetically), our results on the average and median value that that U.S. users receive from Facebook are largely consistent with a study conducted with this feature.[118] Second, while they refrained from providing more comprehensive data, Meta gave us information on the share of friends to and from each demographic group by demographic group. Our survey responses on this answer correspond well with those provided by Meta.

We also needed to collect data on Facebook itself. From Facebook's quarterly reports we gathered data on Facebook's average profit per U.S. user per month ($11.62), and the relative amounts it raises from showing advertisements to different demographic groups. Using this information from Facebook's ad

[117] Erik Brynjolfsson et al., *Using Massive Online Choice Experiments to Measure Changes in Well-Being*, 116 PROC. NAT'L. ACAD. SCI. 7250 (2019).
[118] Hunt Allcott et al., *The Welfare Effects of Social Media*, 110 AM. ECON. REV. 629 (2020).

API (which tells us the relative cost to advertisers to advertise to different groups) we are able to estimate the amount of revenue generated by Facebook from individuals of different groups.[119] We combine this with our survey data on individual's disutility from advertisements on Facebook to measure the trade-off that Facebook faces between higher revenue and lower Facebook quality.[120] Finally, we collected data from the U.S. Census on the population of the U.S. by demographic group.

Once the model is fed in its key inputs, we estimate one more parameter of the agents' utility functions—specifically, the platform's motivation to maintain a large user base, over and above the profits from those users. To calculate this, we choose this value such that the platform's current pricing scheme is rationalizable as their objective maximizing choice. The way that we calculate whether a platform would like to change its monetization level (i.e., quality-revenue trade off) for some subset of its users is the way that we simulate all scenarios in the model.

C. Model Calibration and Welfare Measurements

In this section, we first describe an approach to measuring consumer demand, network effects, and other parameters needed to calibrate a model of Facebook. We then proceed to a discussion of various unpriced consequences of Facebook usage that may also be relevant to an evaluation of anti-trust remedies.

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[119] Advertising revenues were 98.2% of total Facebook revenuesm according to GAAP accounting rules in 2020. FACEBOOK (Jan. 27, 2021); FACEBOOK, *Facebook Reports Fourth Quarter and Full Year 2020 Results* (Apr. 1, 2021), https://investor.fb.com/investor-news/press-release-details/2021/Facebook-Reports-Fourth-Quarter-and-Full-Year-2020-Results/default.aspx.

[120] While Facebook has other potential methods for changing platform quality at the cost of less profit per user— for example by increasing moderation— by assuming cost minimization, we focus on just one dimension of the tradeoff Facebook faces, as at the margin Facebook will choose the same cost-benefit ratio on all dimensions of their quality-price tradeoff.

1. Calibration with Online Choice Experiments

Measuring demand for, and welfare contributions of, digital goods presents special challenges. Digital goods are often offered free to consumers,[121] but traditional techniques for measuring consumer demand and welfare rely on variations in demand as prices fluctuate. [122] Consequently, welfare gains from digital goods are not properly captured in standard macroeconomic measures such as GDP and productivity.[123] According to official statistics, the size of the information sector has remained stable at around 4-5% of national GDP over the last 40 years. Over this period, however, common sense insists that information technology has grown in social and economic importance.[124] The

[121] All major search engines (Google, Bing), social media platforms (Facebook, Instagram, TikTok, Snapchat, LinkedIn), instant messaging apps (WhatsApp), and email services (Gmail) are free to consumers. *See also* Newman, *supra* note 27.

[122] A common tool for measuring demand curves is the influential "BLP" method, named after the following source: S. Berry et al., Automobile *Prices in Market Equilibrium*, ECONOMETRICA: J. ECONOMETR. SOC. 841 (1995). In traditional demand estimation, the challenge is to find the relationship between the price and quantity sold of a good. Unfortunately, third variables (e.g., product quality, and time variation in demand) that could change price and quantity (because the firm makes pricing decisions with some knowledge of these factors) were omitted. Therefore, regressions of the effect of a price change on the demand, when they use non-experimental observational data is used, tend to be biased (because firms tend to raise their prices when unobserved product quality changes). Economists solve this problem by identifying natural experiments, such as supply shocks, that change only the quantity supplied but not the quantity demanded. There are countless approaches. The "BLP instrument" is a particularly influential method because it effectively uses an observable aspect of a product—its unusualness in the space of products—as a source of pseudo-experimental variation.

[123] Erik Brynjolfsson et al., *GDP-B: Accounting for the value of new and free goods in the digital economy*, Nat'l Bur. Econ. Res. Paper No. w25695 (2019), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3356697. Increasing the consumption of free digital goods increases welfare but might not show up in revenues, GDP, or productivity.

[124] Erik Brynjolfsson & Avinash Collis, *How should we measure the digital economy?*, 97 HARV. BUS. REV. 140 (2019).

increasing availability of zero-price digital goods is only partly captured in GDP through advertising revenues in this sector; yet those revenues are not directly connected to consumer welfare.[125]

To overcome this challenge, Avinash Collis, Erik Brynjolfsson, and others devised a novel way of measuring welfare from digital goods through massive online choice experiments.[126] To calibrate their model, Professors Benzell and Collis extended this choice experiment approach to gauge demand for Facebook as well as network effects within Facebook.

Measuring welfare gains and simulating counterfactual scenarios require estimating the demand curve for that good—specifically, the elasticity of demand to changes in Facebook's advertising level, price, or quality. In addition, modelers of Facebook must measure the change in Facebook's value to users as a function of the number of users of different types on the platform—in short, the matrix of network effects on the platform.[127]

For free digital goods where market prices are not available, online choice experiments can be used to estimate demand at a certain price. Here Benzell and Collis relied principally on a single binary discrete choice experiment, in which a user of a digital good (e.g., Facebook) is asked to make a choice between accessing the good or foregoing it for a certain period in exchange for a

[125] Erik Brynjolfsson et al., *Measuring the impact of free goods on real household consumption*, *in* AEA PAPERS AND PROCEEDINGS, Vol. 110, pp. 25-30 (2020); M. Spence & B. Owen, *Television programming, monopolistic competition, and welfare* Q. J. ECON. 103 (1977).

[126] Brynjolfsson et al., *supra* note 113; Erik Brynjolfsson et al., *Measuring welfare with massive online choice experiments: A brief introduction*, *in* AEA PAPERS AND PROCEEDINGS, Vol. 108, pp. 473-76 (2018).

[127] G. G. Parker & M. W. Van Alstyne, *Two-sided network effects: A theory of information product design*, 51 MANAGEMENT SCI. 1494 (2005). Network effect is a phenomena when the value of a good depends on the number of other users who use that good. Facebook exhibits network effects because the value a user gets from using Facebook increases with the number of other users (friends) who use Facebook.

certain payment.[128] Representative samples of US online populations were recruited from market research companies. In our study, we use Google Surveys to recruit our sample.[129] Each respondent is offered a certain price. Prices are varied across respondents. Aggregating responses across thousands of people allows us to estimate a demand curve: for any given price, we can estimate the number of people who would refuse the bargain rather than relinquishing the free good.

Over 57,000 US respondents were recruited on Google surveys to take part in the Benzell-Collis study. The surveys were hosted on various publishers online (instead of advertisements), and readers had to respond before unlocking premium content. The respondents were representative of the online population and were generally not professional survey-takers—as would be the case with many academic surveys. Google provided Benzell and Collis with the gender and age of every respondent based on their Google profiles and browsing history. From this data, they divided Facebook users into 12 market segments based on gender and age bracket (18-24; 25-34; 35-44; 45-54; 55-64; and 65+).

To measure the demand curve for Facebook, Benzell and Collis asked respondents whether they would rather maintain access to Facebook or relinquish it for one month in exchange for a certain price level. The prices we choose for this study were $5, $10, $15, and $20. In addition, they also conducted surveys to gauge respondents' number of friends on Facebook and the composition of their friends by different demographic groups.

To measure the implicit price users pay for Facebook in the form of seeing advertisements, Benzell and Collis directly asked users for their willingness to pay to not view any ads on Facebook for one month. To calculate how much ad revenue Facebook

[128] The amount of payment for a consumer to forego a good is referred to as their willingness to accept (WTA) for that good.

[129] *Custom Surveys*, GOOGLE https://marketingplatform.google.com/about/surveys/ (last accessed Mar. 5, 2022).

makes from a demographic segment, Benzell and Collis used the Facebook ad API and data from corporate annual reports on advertising revenues.

Previous analysis had uncovered heterogeneity in the valuation of Facebook by user subgroups. For example, that women and older users gained comparatively greater benefits from usage.[130] The results of the Benzell-Collis study are consistent with this insight from existing literature.

As one novel innovation, the Benzell-Collis study adapted choice experiments to measure Facebook's network effects. The economists measured not only the total value created by Facebook but also the value created by linkages between various age-gender demographic groups. Respondents were asked whether they would choose to unfriend a certain demographic group for one month in exchange for a range of monetary compensations. Figure 1 displays the estimated matrix of relative network effects provided to and from Facebook users who are 65+ and female and those who are 18-25 and male.

[130] Brynjolfsson et al., *supra* note 113.

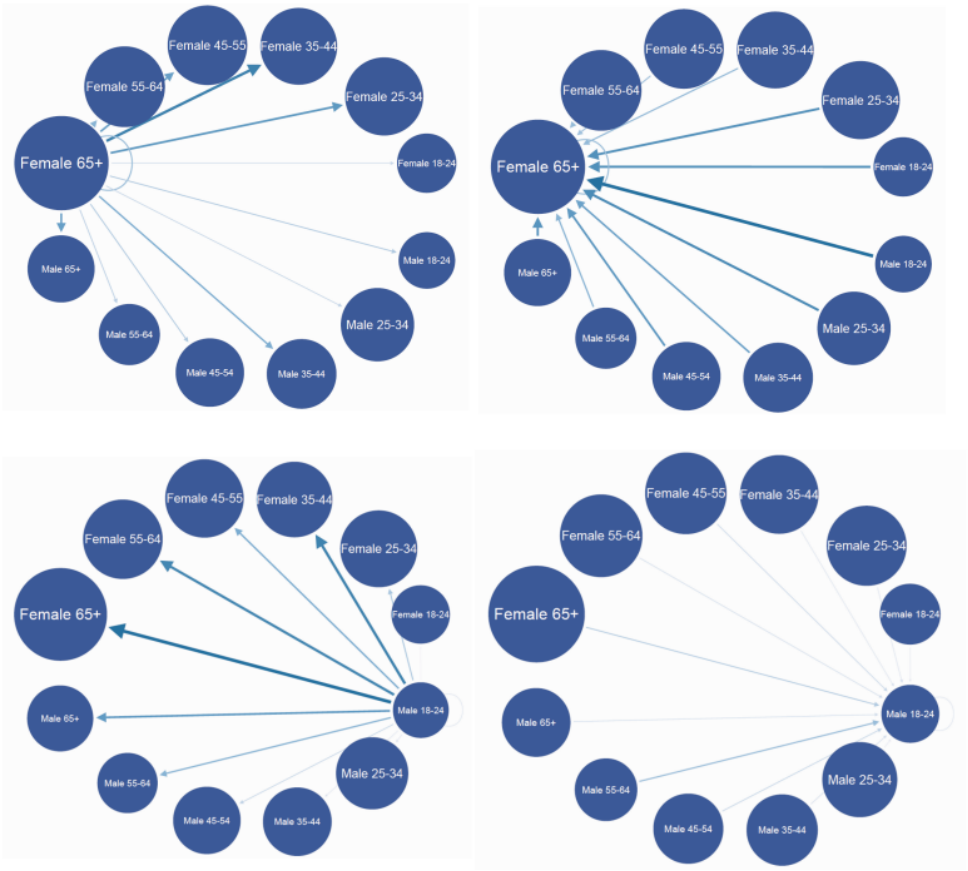

Figure 6: Facebook usage and network externalities by market segment. The size of each node represents the relative current size of the Facebook user base by demographic. The thickness of the arrows corresponds to the relative value received by a Facebook user of the demographic the arrow is pointing towards from a friendship with a user of the source demographic (i.e., $U_i(j)$ with i being where the arrow is pointing towards, and j being the source of the arrow). Only some friend valuations displayed. Clockwise from the top left, the friend values displayed are the value from women aged 65+ to Facebook users of different demographics, to women aged 65+, to men aged 18-24, and from men aged 18-24.

The final piece of data to calibrate the Benzell-Collis model is the Facebook's potential user base. For this, the authors used census data on the U.S. population, broken down by the demographic groups from surveys, as the potential market sizes.

2. Quantifying "Internalities" of Facebook

In the baseline Benzell-Collis model, social welfare is the sum of consumer welfare and Meta's corporate profits (monetary and

non-monetary) from Facebook. However, Facebook undoubtedly incurs certain costs. The next two Subsections explores such costs and whether they are quantifiable; these Subsections proceed by distinguishing between costs to users ("internalities") and to nonusers ("externalities").

In standard economic welfare models, consumers choose whether to utilize a good based on their goals and their assumptions about how the good might further their goals. Of course, this no longer holds if consumers' beliefs are systematically wrong or if consumers act irrationally. One of the most striking instances of irrational decision-making stems from addition.[131] At least one study has uncovered evidence of Facebook addiction, attributing it to mechanisms common to other types of problematic Internet use (e.g., lack of self-presentational skill and preference for online interactions, which augments deficits in face-to-face communication).[132] Indeed, self-control problems have been found to drive 31% of social media use.[133] Other scholars counter that Facebook addiction is not clearly distinguished from Internet addiction generally and that there are so many uses for Facebook that the general label is unhelpful.[134]

If Facebook is being used irrationally, then its negative consequences may not factor into users' engagement. This would

[131] Economists distinguish between rational and irrational addiction. Rational addiction is when a consumer consciously chooses a product, with the understanding that they will experience greater benefits from consuming over time (or, conversely, experience pain from withdrawal). Irrational addiction is when this long term impact on the welfare function is not internalized in the individual's decision, or when the individual makes intertemporally inconsistent decisions due to a short-term temptation.

[132] Tracii Ryan et al., *The Uses and Abuses of Facebook: A Review of Facebook Addiction*, 3 J. BEHAV. ADDICTIONS 133 (2014).

[133] Hunt Allcott et al., *Digital Addiction*, National Bureau of Economic Research Pap. No. w28936 (2021).

[134] Mark D. Griffiths, *Facebook Addiction: Concerns, Criticism, and Recommendations – A Response to Andreassen and Colleagues*, 110 PSYCH. REP. 518 (2012).

constitute an "internality" that a policymaker might wish to account for. Bolstering such concerns, a recent leak of Meta's internal documents divulged concern within the company that Facebook and Instagram have led to mental health issues among many users, especially young women.[135]

In correlational studies, independent researchers have revealed both negative[136] and positive associations[137] between social media use and subjective well-being. Yet these analyses suffer from endogeneity issues—that is, whether individuals with negative life events or poor subjective well-being disproportionately choose to engage with social media.[138] A meta-analysis of popular large-scale datasets found a trivial and economically insignificant association between social media use and well-being.[139] According to this set of researchers, social

[135] *The Facebook Files*, WALL ST. J., https://www.wsj.com/articles/the-facebook-files-11631713039 (last accessed Mar. 6, 2022).

[136] H.B. Shakya & N.A. Christakis, N. A., *Association of Facebook use with compromised well-being: A longitudinal study*. 185 AM. J. EPIDEM. 203 (2017). For a causal analysis using observational data from the early days of Facebook's rollout between 2004-2006, see Luca Braghieri et al., *Social Media and Mental Health* (2021), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3919760.

[137] M. Burke et al., *Social network activity and social well-being, in* PROCEEDINGS OF THE SIGCHI CONFERENCE ON HUMAN FACTORS IN COMPUTING SYSTEMS 1909-1912 (2010). W.R. Hobbs et al., *Online social integration is associated with reduced mortality risk*, 113 PROC. NAT'L ACAD. SCI. 12980 (2016).

[138] Another issue could be reverse causality—negative well-being causes increased Facebook usage. *See* J. Cheng et al., *Understanding perceptions of problematic Facebook use: When people experience negative life impact and a lack of control*, *in* PROCEEDINGS OF THE 2019 CHI CONFERENCE ON HUMAN FACTORS IN COMPUTING SYSTEMS 1-13 (2019).

[139] Specification curve analysis involves running all possible combinations of models and reporting the frequency of a significant effect. *See* A. Orben & A.K. Przybylski, *The association between adolescent well-being and digital technology use*, 3 NAT. HUM. BEHAV. 173 (2019); A. Orben et al., *Social media's enduring effect on adolescent life satisfaction*, 116 PROC. NAT'L ACAD. SCI. 10226 (2019).

media use explains at most 0.4% of the overall variation in subjective well-being.[140]

To analyze the relationship between Facebook use and well-being causally, one experiment made subjects deactivate Facebook for one month and found that deactivation led to an increase in some metrics of subjective well-being.[141] However, this effect is modest and may not be lasting. Another experiment had subjects reduce their social media usage for a longer period (2.5 months) and found no significant effect on subjective well-being.[142] Altogether, the evidence is inconclusive on whether social media use has a significant effect on subjective well-being.[143]

Apart from addiction, another internality from Facebook is the hassle of dealing with advertisements. Users likely value privacy more than precisely targeted ads.[144] Moreover, ads might be perceived as annoying and obtrusive if they take up screen space.[145] Indeed, one experiment varying the level of annoyance in ads found that the cognitive cost of being subjected to advertising is $1 to $1.50 per thousand impressions. However, targeted ads which are not obtrusive are received better by consumers, i.e. there is a tradeoff between targeting and obtrusiveness.() When consumers do opt out of targeting when given a chance, it results in a loss of about $8.58 in ad spending

[140] Orben & Przybylski, *supra* note 135. The authors find that this effect is comparable to the association between seemingly neutral activities such as eating potatoes on well-being.

[141] Hunt Allcott et al., *The welfare effects of social media*, 110 AM. ECON. REV. 629 (2020).

[142] Avinash Collis & Felix Eggers, *Effects of restricting social media usage* (2020), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3518744.

[143] Other negative externalities could include mis-information and increased political polarization. A recent causal study suggests that Facebook usage causes increased political polarization. *See* R.E. Levy, *Social media, news consumption, and polarization: Evidence from a field experiment*, 111 AM. ECON. REV 831 (2021).

per consumer in the US. However, only a small percentage of users opt out of targeting (0.23% of all ad impressions in the US). Johnson, G. A., Shriver, S. K., & Du, S. (2020). Consumer privacy choice in online advertising: Who opts out and at what cost to industry?. Marketing Science, 39(1), 33-51.

Although Facebook does not charge users money, it generates revenues through advertising—which constitutes an indirect price that consumers pay for access. To account fully for Facebook's welfare, we must measure the welfare effects of advertising. Advertising generates welfare advertisers and the platform, of course, but it can also benefit consumers.

We measure the net private effect of advertising on consumers using surveys as discussed above, but we should also be mindful of the external effect of ad views on advertisers and society. Here, though, definitive evidence is lacking. Existing literature indicates that measuring the return on investment ("ROI") for advertising is challenging without large-scale, randomized controlled trials; yet the majority of the ad campaigns do not garner samples large enough to detect ROI.[146] Another meta-analysis of 15 advertising field experiments on Facebook comprising of 500 million users and 1.6 billion ad impressions found that the average lift (i.e., the conversion rate from ads in the treated group as a proportion of the conversion rate if they had not been treated) from ad campaigns can range from -15% to 1,517%, implying a wide range of welfare estimates for the advertiser and consumer (from better matching) depending on the campaign.[147] We conclude, similarly to our analysis of the other externalities below, that the net social effect of advertising

[146] R.A. Lewis & J.M. Rao, *The unfavorable economics of measuring the returns to advertising*, 130 Q. J. ECON. 1941 (2015). This particular study analyzed twenty-five large field experiments with major U.S. retailers on Yahoo involving millions of users and generating $2.8 million in advertising expenditures (which went to Yahoo).

[147] B.R. Gordon et al., *A comparison of approaches to advertising measurement: Evidence from big field experiments at Facebook*, 38 MARKETING SCI. 193 (2019) =.

is difficult to estimate—beyond its direct impact on Facebook profits and consumer welfare, which are included.

3. Quantifying Externalities from Facebook

Facebook can also benefit or harm members of society who do not use the platform. One of the most potent critiques of social media, and of Facebook in particular, has been the promotion and dissemination of fake news.[148] The spread of fake news on Facebook has been accused by the president of abetting efforts to undermine elections[149] and of confusing the public about COVID-19.[150] Although the FTC and state AGs did not focus on fake news and misinformation in their complaints against the tech giant,[151] scholars and policymakers have clamored for antitrust to attend to noneconomic goals.[152]

Whether Facebook's propensity to spread fake news is deleterious to society is beyond the scope of this Article.[153] While

[148] Alexix C. Madrigal, *What Facebook Did to American Democracy*, ATLANTIC (Oct. 12, 2017), https://www.theatlantic.com/technology/archive/2017/10/what-facebook-did/542502/.

[149] *Open Letter to Facebook*, BIDEN HARRIS, https://joebiden.com/2961-2/ (last accessed Mar. 6, 2022).

[150] *Covid Misinformation on Facebook Is Killing People – Biden*, BBC NEWS (July 17, 2021), https://www.bbc.com/news/world-us-canada-57870778.

[151] Misinformation did not feature in the FTC complaint and only barely registered in the state AG complaint, in part because of the narrow focus on competition. *See* New York v. Facebook, Inc., Compl. No. ___, § 254 (Dist. Ct. D.C. 2020) ("Due to Facebook's unlawful conduct and the lack of competitive constraints resulting from that conduct, there has been a proliferation of misinformation and violent or otherwise objectionable content on Facebook's properties.").

[152] ZEPHYR TEACHOUT, BREAK 'EM UP: RECOVERING OUR FREEDOM FROM BIG AG, BIG TECH, AND BIG MONEY 12, 19, 56–57, 223–25 (2020); DAVID DAYEN, MONOPOLIZED: LIFE IN THE AGE OF CORPORATE POWER 9–12 (2020); TIM WU, THE CURSE OF BIGNESS: ANTITRUST IN THE NEW GILDED AGE 20–22 (2018).

[153] For a brief literature review on the science of fake news, see David M.J. Lazer et al., *The Science of Fake News*, SCIENCE (Mar. 9, 2018), https://www.science.org/doi/10.1126/science.aao2998.

misinformation certainly circulated on Facebook during the 2016 and 2020 U.S. presidential elections,[154] some scholars do not perceive fake news playing a decisive role in electoral results.[155] There has also been distribution of both valuable public health information and misinformation about COVID-19 on social media.[156] It is difficult to conclude, however, whether this information improved or degraded the public health response to the pandemic.[157] As First Amendment scholars deliberate the

[154] The average American saw and remembered 1.14 fake news articles about the 2016 election. *See* Hunt Allcott & Matthew Gentzkow, *Social Media and Fake News in the 2016 Election*, 31 J. ECON. PERSP. 211 (2017).

[155] For longer literature review on the role of fake news in the US elections, concluding that it did not play a decisive role in 2016, see *id*. Allcott & Gentzkow determined that "if one fake news article were about as persuasive as one TV campaign ad, the fake news in our database would have changed vote shares by an amount on the order of hundredths of a percentage point." For a study making a similar point, see Andrew Guess et al., *Less Than You Think: Prevalence and Predictors of Fake News Dissemination on Facebook*, 5 SCI. ADV. 1 (2019), https://www.science.org/doi/pdf/10.1126/sciadv.aau4586.

[156] During April 2020 found that 64% of information shared about COVID prevention was accurate, with the remainder being misleading (most of the inaccurate content was questioning the efficacy of masks). Justyna Obiala et al., *COVID-19 Misinformation: Accuracy of Articles about Coronavirus Prevention Mostly Shared on Social Media*, 10 HEALTH POL. & TECH. 182 (2021). Similarly, information from "low credibility" sources such as the conspiracy website Infowars relating to the pandemic on Facebook and Twitter was certainly shared to a great extent, but on both websites more credible sources saw greater distribution than less credibility sources. Kai-Cheng Yang, *The COVID-19 Infodemic: Twitter versus Facebook*, BIG DATA & SOC. (2021), https://journals.sagepub.com/doi/full/10.1177/20539517211013861.

[157] We cannot locate any reliable analysis of this question. There have been scattered reports of perhaps hundreds of individuals harming themselves through quack COVID-19 remedies learned about online. *See* Adam Forrest, *Coronavirus: 700 Dead in Iran after Drinking Toxic Methanol Alcohol to "Cure Covid-19"*, INDEPENDENT (Apr. 28, 2020), https://www.independent.co.uk/news/world/middle-east/coronavirus-iran-deaths-toxic-methanol-alcohol-fake-news-rumours-a9487801.html; Alistair Coleman, *"Hundreds Dead" Because of Covid-19 Misinformatoin*, BBC NEWS (Aug. 12, 2020), https://www.bbc.com/news/world-53755067. However, these numbers are small compared to the overall harm of COVID-19.

proper framework for online discourse,[158] the analytical frameworks under antitrust would not encompass claims of social harm from misinformation.

A related consequence of social media is that it has enabled new types of political activism. For example, the Arab Spring protests that culminated in the downfall of tyrants were tied to social media.[159] On the other hand, social media may have created a new type of political unrest which is inherently destructive and nihilistic.[160] Whichever hypotheses are true, it is likely that the political consequences of a hyper-networked society are also beyond the scope of an antitrust analysis.[161]

In short, uncertainty plagues estimates of unpriced internalities and externalities from Facebook. Nonetheless, other scholars may disagree. In our discussion of remedies below in Section V, we do confront this uncertainty and note the assumptions underpinning our assessment. To the extent that we assume large negative internalities or externalities, we would favor remedies that shrink the size of social media. These include taxing the number of users of Facebook or breaking up Facebook. If, however, we assume that these effects are either insignificant

[158] *See, e.g.*, Nabiha Syed, *Real Talk About Fake News: Towards a Better Theory for Platform Governance*, 127 YALE L.J. FORUM 337 (2017).

[159] PHILIP N. HOWARD & MUZAMMIL M. HUSSAIN, DEMOCRACY'S FOURTH WAVE?: DIGITAL MEDIA AND THE ARAB SPRING (2013).

[160] MARTIN GURRI, THE REVOLT OF THE PUBLIC AND THE CRISIS OF AUTHORITY IN THE NEW MILLENIUM (2014). Gurri argues that most social protest movements have been ideologically driven and organized; the Arab Spring, Occupy Wall Street, and Indignados movements were de-centralized and purely anti-status-quo. Gurri points to social media as enabling these events, by reducing elites' monopoly on information. Decentralized social media led to the widespread discrediting of many elites and experts (by promoting the relative importance and salience of scandals) and by allowing essentially leaderless publics to coordinate large-scale protests.

[161] We are reminded of the apocryphal response of Zhuo Enlai to a question on the influence of the French Revolution—that it was "too early to say." *See Not Letting the Facts Ruin a Good Story*, SOUTH CHINA MORNING POST, https://www.scmp.com/article/970657/not-letting-facts-ruin-good-story.

or positive, or if we believe they lie beyond the scope of antitrust, then we would prioritize the other remedies.

D. Model Limitations

The Benzell-Collis approach to the welfare effects of antitrust remedies is powerful and flexible. It allows policymakers to calculate the heterogenous distributional and aggregate consequences of different policies. However, it does face limitations.

The first set of limitations on the Benzell-Collis model are practical—including, most prominently, the difficulty of measuring externalities from Facebook usage. In this context, an externality would be a social consequence of Facebook usage that does not manifest as consumer value. As explored in the prior Subsection, examples of negative externalities include fake news and political conflict. These are counterbalanced by positive externalities such as efficiencies from more targeted advertising. While our model explicitly allows for such externalities to be folded into the welfare calculus, precisely measuring these effects is incredibly difficult.

Relatedly, the Benzell-Collis model assumes that Facebook usage is rational and that its proximate personal consequences are understood by users. However, to the extent that users harbor incorrect beliefs about the platform's consequences for their own wellbeing, or to the extent that Facebook usage reflects nonrational addiction, consumer demand may not be the best gauges of social welfare. The model would therefore have to incorporate internalities—or nonpriced negative consequence of Facebook on users.[162] As with externalities, doing so does not

[162] Hunt Allcott & Cass R. Sunstein, *Regulating Internalities*, J. POL'Y ANAL. & MGMT. 698 (2015); Hunt Allcott & Cass R. Sunstein, *Counterpoint to six potential arguments against "Regulating Internalities*," 34 J. POL'Y ANAL. & MGMT. 712 (2015). Allcott and Sunstein tackle the argument for governments to attempt to measure and design regulatory policies with the goal of maximizing social

present a theoretical difficulty, but it does pose a measurement challenge.

Another practical limitation is that our current model only tackles Facebook usage in the U.S. This is incomplete, given that domestic policy could shape the habits of non-U.S. users.[163] While the model could account for such users, quantifying their demand is beset by practical difficulties.

Internal, nonpublic characteristics of Facebook are also important for the Benzell-Collis model, including details surrounding how Facebook price-discriminates among different user types (in the sense of showing different quantities of advertising). The better that Facebook can price discriminate (that is, identify how many ads a user can be shown without leaving the platform), the lower the potential distortions from monopoly power—but also the more negative the impact on inequality and distributional equity.

Theoretical ones can hobble welfare quantification as well. The Benzell-Collis model handles competition between the digital platform and other firms in a simplified way. It is well suited to simulating the extreme cases of residual monopoly and perfect competition but less adept at dynamic rivalry between Facebook and a hypothetical direct competitor providing Facebook-like

welfare net of internalities. They focus on an application to energy efficiency standards, as these are welfare-improving regulations if consumers of durable goods do not fully internalize the long-term benefits of less expensive to power devices. Brian F. Mannix & Susan E. Dudley, *Please don't regulate my internalities*, 34 J. POL'Y ANAL. & MGMT. 715 (2015). As a counterpoint, it is absurd to assume that consumers are irrational but that unaccountable regulatory bureaucracies are rational, benign, and know consumers' interests better than themselves.

[163] If non-U.S. users of Facebook also leave or join the platform in response to Americans' changing usage, and if Americans value non-U.S. participation, then our estimates of the effect of remedies below will still be directionally correct, but will be underestimates, because total participation will be more elastic overall. *See* Seth G. Benzell & Avinash Collis, *supra* note 9.

social media services.[164] Relatedly, the model is not tailored to comparing the impact on dynamism and innovation between monopolized and competitive environments.[165]

Finally, the Benzell-Collis model treats both advertisers and users as "atomistic" price-takers.[166] If users or advertisers can band together and collectively bargain, then many additional equilibria are possible. That said, despite these theoretical limitations, our model is still well suited to describing the welfare consequences of different equilibria. In Section V, we consider a scenario in which Facebook's revenues from advertisers are rebated to users, perhaps as result of collective bargaining. While our model is not ideal for determining the outcomes of a collective bargaining-based negotiation between users and a platform, it can nonetheless calculate the welfare consequences of different possible negotiated outcomes.

V. ASSESSING POSSIBLE REMEDIES

The recent filings by the FTC and State AGs can result in a variety of remedies. Courts enjoy wide discretion in selecting

[164] Because of the possibility of multi-homing, and because of their strong supply- and demand-side economies of scale, competition between platforms exhibits path dependence and multiple equilibria effects. One way this manifests is through preferential attachment, due to which platforms that have small initial advantages in user base are more like to grow to dominate the market. *See* Jérôme Kunegis et al., *Preferential attachment in online networks: Measurement and explanations*, *in* PROCEEDINGS OF THE 5TH ANNUAL ACM WEB SCIENCE CONFERENCE (2013).

[165] On one hand, allowing Facebook to make large profits might give Meta the resources to invest in additional innovations. The research labs of Xerox PARC and Bell Labs were both highly innovative and supported by electronics monopolies. The profitability of Facebook may also induce additional entrepreneurs to enter with big new ideas. On the other hand, an entrenched monopoly may become sclerotic and unable to innovate and may squash entrant's innovations. *See* Steven Berry et al., *Do Increasing Markups Matter? Lessons from Empirical Industrial Organization*, 33 J. ECON. PERSP. 44 (2019).

[166] I.e., without any power beyond personally accepting or rejecting any offer by Meta for Facebook services.

among structural and behavioral remedies, including fines, divestitures, price regulation, forced sharing, and compulsory licensing.[167] Indeed, judges can devise bespoke remedies that regulators might not be able to craft.[168] Because regulation expressly targeting digital platforms does not currently exist, antitrust provides the primary checks, and given the current sentiment toward big tech, we can expect courts and prosecutors to act boldly.

Yet effective remedies must be based on the economics of the Facebook Blue App. In this Article, we go a step further by advancing a specific calibrated model of Facebook to estimate the magnitude of effects. To those ends, this Section evaluates the remedies that courts may impose on Facebook, as well as the solutions that may flow when the legislative cavalry arrives.

To simulate the consequences of various interventions, we calculate platform participation and social welfare through a series of cascades. First, we estimate the platform's optimal level of monetization in the new environment. We calculate how platform participation would fluctuate based on the change in environment and platform monetization. This is the first "cascade" model. Second, we calculate how much users would increase or reduce their participation based both on the new environment and the initial change in usage in the first cascade. Subsequent cascades replace the usage level with that in prior cascades. If the network is stable, eventually these cascades peter out, and the network reaches a new equilibrium; if the network is unstable, that equilibrium would be an unravelling—i.e., a chain reaction that leads to most users to depart.

Metaphorically, just as a rock thrown into a pond creates a series of circular ripples outward until the pond comes to rest

[167] *See* Howard A. Shelanski & J. Gregory Sidak, *Antitrust Divestitures in Networked Industries*, 68 U. CHI. L. REV. 1 (2001). Relatedly, if the Department of Justice resolves an antitrust suit with a consent decree, the Tunney Act seldom acts as a constraint.

[168] Hovenkamp, *supra* note 38.

again, a shock to platform participation by one group has subsequent effects on other users' participation (and so on). We evaluate the platform's outcome under this estimation of their optimal strategy. We then continue anticipating new strategies iteratively and calculating the implications, until we identify the platform's optimal strategy.

To make this more concrete, consider how this simulation works when Facebook faces a new tax. Based on the new tax, we can guess what Facebook's new optimal level of advertising might be. We then evaluate how much the users subjected to the higher level of advertising reduce their participation given this price increase alone. This establishes the first cascade of the new policy. Yet we know from network effects that platform usage depends on the number of other users. Hence, this first reduction in Facebook usage from one group lowers the incentives for their friends to participate. This, in turn, reduces participation by other groups who are friends with the second set of users, and so on. Once these cascades reach users who care less about network effects from the prior groups, or hold lower opportunity costs for their time (and will use Facebook anyway, despite its reduced quality), the cascades run out of momentum. At that point, the network settles into a new equilibrium with new levels of participation, user welfare, and monopolist profit.

Facebook currently contributes approximately $14 billion a month in social welfare, with 12.7% of this surplus coming from Facebook's net-ad revenue and the remaining 87.2% accruing to consumers in the form of surplus value.[169] By this measure, Facebook is already creating a large amount of value both to its customers and to its shareholders. Could anti-trust remedies unlock even more value from an entrenched monopolist? We now turn to the welfare effects of potential interventions.

[169] Seth G. Benzell & Avinash Collis, *Modeling Effective Regulation of Facebook* (Oct. 2020), https://hai.stanford.edu/sites/default/files/2020-10/HAI_DEL_PolicyBrief_Oct20.pdf

A. Divestiture

Divestitures have played a prominent role in antitrust's attempts to constrain big tech. In 1982, the Department of Justice ("DOJ") split the Bell Operating Company into seven legacy carriers that had to compete against one another while providing upstarts access to their infrastructures.[170] This Consent Decree cleared the way for Microsoft to emerge a generation later—until Microsoft, too, abandoned some of its core business, catalyzing Yahoo and Google's eventual rise.[171]

Recently, scholars have pressed for more aggressive breakups of tech platforms. Here antitrust provides a path. Section 7(A)(i) of the Hart-Scott-Rodina Act allows the FTC and DOJ to challenge mergers even after approval.[172] Hence, the Instagram and WhatsApp acquisitions, despite FTC clearance, can be unwound.[173] And because breakups have a fairly positive track record in business and administrative law, they may not be as fearsome as antitrust scholars previously thought.[174]

To be sure, the literature on antitrust divestitures has not settled into a consensus. Chicago school adherents would unwind mergers only when there is clear evidence that it would increase consumer welfare. On the other hand, the New Brandeisians criticize regulators for not having done enough to restrain mergers, creating an economy stifled by monopolies.[175] Under

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[170] *See* U.S. Dept. of Justice, Modification of Final Judgment § II.A, *reprinted in* United States v. AT&T, 552 F.Supp. 131, 227 (D.D.C. 1982).

[171] Ben Thompson, *But see Where Warren's Wrong*, STRATECHERY (Mar. 12, 2019), https://stratechery.com/2019/where-warrens-wrong/ (arguing that antitrust intervention against Microsoft wasn't important to the rise of google).

[172] 15 U.S.C. § 18a(i)(1).

[173] *See* Patel, *supra* note 6.

[174] *See* Rory Van Loo, *In Defense of Breakups: Administering a "Radical" Remedy*, 105 Cornell L. Rev. 1955 (2020).

[175] Chicago school adherents would maintain that by focusing on consumer welfare alone, the new Brandeisians were biasing their analysis in favor of intervention by ignoring the role of producer welfare, or profits, in their

this view, economic analyses of the impact of mergers and acquisitions ignore important "curse(s) of bigness." These include bamboozling judges and juries with expert witnesses, aggressive lobbying, and hard-to-detect pressure on smaller competitors.[176] Further, the argument goes, even when breakups and merger preventions do not maximize short-term consumer welfare, they make markets more contested overall, increasing opportunity for new, innovative companies to enter and decreasing the distorting role of monopolies in politics.

Whatever one's stance on this debate, understanding the economic consequences of antitrust divestiture is an important first step. Using our model, we simulate the impact of three possible results of a Facebook breakup: a duopoly without cross-platform network effects; a vertical breakup that does not lead to more competition for Facebook Blue; and perfect competition.

An injunction to split up Facebook could create an oligopoly, with each firm controlling a portion of the market for Facebook Blue-like services. This is similar to the landscape of telephone service after the Justice Department broke up the Bell system into seven Regional Bell Operating Companies.

We first simulate outcomes in the case where divestiture leads to a duopoly, with no users multi-homing (i.e., using both platforms) and no communication (and therefore network effects) allowed across the two platforms. A breakup of this kind does indeed boost competition in one sense: rates of advertising decrease as the two firms are forced to fight harder for customers. This leads to a 49.5% decrease in total advertising revenues across the successor firms. However, the resulting decrease in profit per user does not increase consumer or social welfare. In fact, consumer welfare and user participation decrease by 33% and

analysis. Classical economic theory would suggest that profits must also be counted in an analysis designed to maximize social welfare. *See* Naomi R. Lamoreaux, *The Problem of Bigness: From Standard Oil to Google*, 33 J. ECON. PERSP. 94 (2019).

[176] *Id.*

21.8%, respectively, because the overall Facebook Blue experience is harmed by plummeting network effects. The average user would experience a 60.9% reduction in the number of social media connections.

Another possibility is a vertical divestiture that cleaves Facebook from Instagram or WhatsApp. This would likely not engender direct competition for Blue-like services. Indeed, the FTC noted that Zuckerberg himself viewed these entrants not as direct "Facebook Clones" but, rather, as products for alternative "social mechanics."[177] Consequently, we simulated vertical divestiture as a slight erosion in Facebook Blue quality, either through depriving Facebook of skilled social media engineers or through reducing data network effects across the two platforms.[178]

We hypothesize that a vertical breakup might mean that 5% of the U.S. population loses interest in Facebook Blue. If so, this approach somewhat reduces Facebook's rate of advertisement, as it must work harder to attract users. However, it also shaves consumer welfare in equilibrium by 5.3%. A reduction in network effects corresponding to even a slight loss (2.1%) of Facebook Blue's original userbase overwhelms the benefits from less intensive monetization. In theory, this reduction in welfare might be offset by the flourishing of an independent WhatsApp or Instagram, but those benefits are speculative. The FTC filing notes Zuckerberg's insistence that "The integration plan involves building their mechanics into our products rather than directly integrating their products if that makes sense." If Facebook is a natural monopoly, social benefits should flow from the platform's integration of innovations into its core products. [179]

[177] FTC Complaint, *supra* note 3, at para. 14.

[178] A German regulatory injunction already prevents some data sharing across these services.

[179] *See* Ben Thompson, *Why Facebook Shouldn't Be Allowed to Buy tbh*, STRATECHERY (Oct. 23, 2017), https://stratechery.com/2017/why-facebook-shouldnt-be-allowed-to-buy-tbh/.

B. Mandatory Interoperability

Less draconian than (or perhaps in combination with) complete divestiture, one proposal for a negotiated consent decree would attempt to preserve network effects across Facebook Blue's successors while reducing the cost of market entry. This alternative is known as "mandated interoperability."[180] If enough Facebook Blue competitors are induced to enter, and users can communicate freely with each other across platforms, Facebook's market power will greatly abate without destroying positive network effects on Facebook Blue-like services and, therefore, hampering consumer welfare.

Doctrinally, mandatory interoperability traces its origins to the sharing remedy in *United States v. Terminal Railroad Association of St. Louis* over a century ago.[181] This became the basis for variations on a duty to deal with rivals, such as the essential facilities doctrine.[182] This doctrine has been invoked to open up

[180] The details of how mandated interoperability would be technically achieved is beyond the scope of this Article but has recurred with increasing frequency as a solution to tech dominance. *See* Luís Cabral et al., *Stigler Center Report* (2021); Geoffrey Parker et al., *Digital Platforms and Antitrust* (2020), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3608397; Luís Cabral et al., *The EU Digital Markets Act: A Report from a Panel of Economic Experts* (2021), https://ide.mit.edu/wp-content/uploads/2021/02/jrc122910_external_study_report_-_the_eu_digital_markets_act.pdf. Outside digital platforms, it can be found in other infrastructures and multisided platforms. *See, e.g.*, National Securities Clearance Corporation.

[181] 224 U.S. 383 (1912).

[182] An essential facilities claim is established if: (1) a monopolist controls a facility that (2) a competitor is unable practically or reasonably to duplicate and (3) use of the facility is denied to the claimant, even though (4) it is feasible for the monopolist to provide access. MCI Commc'ns Corp. v. Am. Tel. & Tel. Co., 708 F.2d 1081, 1132-33 (7th Cir. 1983).

access to a railroad terminal,[183] ski slopes,[184] electricity delivery,[185] news wire membership,[186] and local telephone exchanges.[187]

Interoperability would alter Facebook's data ownership rights. It would force the company to make freely available, through APIs, the core data driving its product. Premised on the view that platforms are an essential facility or bottleneck to downstream markets, this remedy dismantles the network barrier to entry that protects social media incumbents, enabling users to access content from friends on rival platforms.[188] This is one of the most widely contemplated reforms of big tech, and it could be accomplished either by court order (to give maximum effect to divestiture) or regulation.[189]

We estimate that interoperability would raise user participation by 5.2% and consumer welfare by 6.6%, or $806.5 million dollars per month, at the cost of all advertising profits. Still, the net effect is to boost social welfare by 4.8% overall.

C. Fines and Taxes

While the FTC and State AG complaint focuses on injunctive remedies,[190] fines and monetary damages are permissible as well. Damages might be assessed only once (either because of perfect subsequent compliance or due to future lax enforcement) or recur as a cost of doing business. Relatedly, taxes comprise another mechanism to transfer some of Meta's gains, equitably

183*Terminal Railroad*, 224 U.S. at 411-12.
184*Aspen Skiing*, 472 U.S. at 609-11.
185*Otter Tail*, 410 U.S. at 380-82.
186Associated Press v. United States, 326 U.S. 1, 4-5 (1945).
187Verizon Commc'ns Inc. v. Law Offices of Curtis V. Trinko, LLP, 540 U.S. 398, 415 (2004).
188 Stigler report, *supra* note 14.
189 In fact, the EU's new draft Digital Services Act and Data Governence Acts also contemplates interoperability mandates for large-scale data gatekeepers, though details are still developing. *See* Parker et al., *Digital Platforms and Antitrust*, *supra* note 177.
190 FTC Compl., *supra* note 3, at § X.

redistributing from shareholders to government programs, and forcing it to bear costs from any sins. As an economic matter, taxation is identical to a predictably recurring fine; as a legal matter, however, taxes and antitrust fines derive from divergent authorities.[191]

Federal courts do not possess the power to tax, so this remedy will not arise from the FTC and State AG complaint. Nonetheless, because legislation expressly targeting big tech does not currently exist, the stakes in the litigation are high, and courts will face pressure to craft broad solutions as a stopgap until the legislative cavalry arrives. For the remainder of this Section, then, we shall model the effects of bold remedies, whether they derive from statute or antitrust litigation.[192]

Several counties are currently considering digital service taxes[193] to carve out a share of profits derived from "operations in" such countries. These proposals counteract the base erosion and profit shifting ("BEPS") strategies that multinational companies deploy to minimize taxation.[194] Most prominently, France recently issued a 3 percent on all revenues from digital services, which includes advertising (Facebook's dominant source of revenue) for a handful of large American companies.

The impact of these taxes depends on Meta's perceptions and reactions. If the company perceives these policies as a levy on its sheer size and number of active users, Facebook will shift its focus from cultivating a large userbase to maximizing profits per user. Alternatively, if these policies are interpreted as a tax on revenues

[191] Taxes assessed by Congress, while fines may be imposed by courts under the antitrust laws.

[192] Realistically, given Facebook's network effects, market share, and propensity to harm competition, a finding of market power under antitrust law will be straightforward. However, despite a court's wide arsenal of tools under its injunctive powers, antitrust remedies have always been limited. Divestiture may be at the outer bounds of possibilities.

[193] *See* Paul Romer, *Taxing Digital Advertising* (May 21, 2021), https://adtax.paulromer.net/.

[194] Note, though, that it can be complicated to figure out "where" a service is created for a corporation.

or profits, Meta will prioritize amassing a large userbase on Facebook. This second scenario fosters a larger Facebook with greater network effects and fewer advertisements.

We estimate that a 3% tax on Facebook Blue's U.S. revenues would generate $43 million a month for government coffers and raise consumer surplus by 1.1% a month. Users benefit directly from reduced advertising, as well as from the additional network effects of a 1.3% bump in the userbase. While Meta loses out on a share of its current profits, social welfare increases by 1.1% overall.

By contrast, a tax on the number of users that generates the same government revenues would lower post-tax Meta profits by a smaller amount. However, it would slightly depress the size of the userbase, consumer welfare, and total social surplus (each by about –0.1%). This is because Facebook would intensify advertising to squeeze more revenue out of a smaller userbase. Of course, if policymakers adopted an explicit goal of reducing social media usage, perhaps because of negative externalities that we do not model (such as disinformation and addictive capacity), then a per-user tax might be an apt tool.[195]

D. Data Unions

One innovative proposal to rein in tech platforms is the "data pools" or "data as labor" approach, which would work to enable collective bargaining between platforms and data unions.[196] Users would pool together to associate with a data union that negotiates

[195] Of course, taxes have been assailed for potentially discouraging innovation *See* Berry et al., *supra* note 161, at 56.

[196] *See* ERIC A. POSNER & E. GLEN WEYL, RADICAL MARKETS: UPROOTING CAPITALISM AND DEMOCRACY FOR A JUST SOCIETY (2018). *See also* Radical Exchange Foundation, *The Data Freedom Act, Draft Legislation and Commentary* (2020), https://www.radicalxchange.org/files/DFA.pdf; Erik Rind & Matt Prewitt, *If Data Is Labor, Can Collective Bargaining Limit Big Tech?*, TECHCRUNCH, Oct. 12, 2020, https://techcrunch.com/2020/10/12/if-data-is-labor-can-collective-bargaining-limit-big-tech/.

on their behalf with digital platforms. Backed by collective action, users could demand changes to data usage or advertising practices—and even compensation.

Data as labor is a sweeping change that would likely require legislation. Yet it could solve some antitrust problems with zero-price markets, where consumers do not pay fees to use a product but instead trade their attention and privacy.[197] Currently, no mechanism exists for consumers to directly sell their attention and personal data, so we rely on barter for social media services instead. Data unions would solve two problems: they could confer users greater bargaining power, and they could fill in a missing market. Direct compensation for usage fosters positive network effects (by encouraging more people to use the platform) while limiting advertising (which is indispensable to platform operators) to where it is most productive. Like interoperability, it, too, alters the data ownership rights of digital platforms.

In our simulations, we postulate a strong data union that gives Facebook an ultimatum to rebate users for all of its advertising revenues. We find this would raise consumer surplus by 17.8%; half of this figure results from the rebates themselves, and half flows from increased network effects due to a larger userbase. More generally, a benefit of this approach would be to give users of platforms more voice in how their data is used and monetized.

Nonetheless, data as labor faces severe implementation challenges. For example, scammers can generate "fake" user data to drive compensation for platform usage. Additionally, unions must be empowered in ways that convey them actual leverage. California's recent experience with Proposition 22 suggests that many stakeholders will simply back down from demands for redistribution if the platform credibly threatens to exit.

VI. CONCLUSION

[197] *See* John M. Newman, *supra* note 27; Erika M. Douglas, *supra* note 36.

Of the feasible antitrust solutions for platform monopolies, the Benzell-Collis model suggests that data unions may be the most viable path for Facebook. Nonetheless, it requires significant alterations to how platforms and their consumers currently interact. Alternatively, taxes and fines can be couched within the existing legislative and regulatory framework; these options would still preserve positive network effects while enhancing social welfare. Finally, interoperability remains a promising compromise between the extremes of data unions and taxes or fines.

However, to fully assess the welfare impact of judicial and regulatory interventions, significant information is still required. Solutions that are too narrow will be ineffectual, but solutions that are overly broad may compromise Facebook's efficiencies while incurring excessive monitoring costs. Our analysis is based on public information and online surveys. Yet a regulator with access to Facebook's private metrics on platform usage, advertising, and costs would be able to estimate a version of our model with much more precision and confidence.

Sectoral regulators might eventually require Facebook to conduct experiments to measure relevant network effects and elasticities of demand. Such information is potentially even more useful than descriptive statistics. For example, measurements of how residual demand for the platform changes after a rival firm enters or is eliminated can help define markets and evaluate whether competition was harmed or enhanced. If Facebook's markups change without a corresponding change in residual demand, this can be evidence of strategies to counter the threats of competition or a new entrant. We can expect that digital platforms such as Facebook, with their plethora of analytic techniques, conduct these exercises frequently, so these "platform stress tests" would not be unduly burdensome to implement.

Ultimately, we hope that our work drives scholars, regulators, and policymakers to create their own models of social welfare as well. We would welcome the ensuing arguments over variables, measurements, and calibrations. These debates would

force antitrust to contend earnestly with modern economic theory, driving solutions toward greater precision and broader social benefits.