

ANTITRUST IN THE CONSUMER PLATFORM ECONOMY: HOW APPLE HAS ABUSED ITS MOBILE PLATFORM DOMINANCE

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ABSTRACT

Apple's iOS smartphone platform wields de facto monopoly power thanks to its dominant revenue share and Apple's sticky product ecosystem. Apple has abused this power to tie the distribution of digital goods on iOS to its proprietary in-app purchase payment system to impose a 30% tax and extract supracompetitive profits. Moreover, Apple has blocked rivals and favored its own apps using its control of the App Store, distorting competition both on the iOS platform and between smartphone platforms. Courts today are increasingly hostile to lawsuits against dominant firm behavior, however, creating doctrinal obstacles that impede antitrust enforcement against tech platforms such as Apple.

This Note makes the antitrust case against Apple and explores why features of consumer tech platforms Apple represents demand a reform of the current antitrust regime.

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I. INTRODUCTION

In March 2019, Spotify filed an antitrust complaint with the European Commission alleging that Apple's various tactics to impair competitors on Apple devices such as the iPhone violated European competition law.¹ Spotify argued that Apple gave its Apple Music streaming service unfair advantages over rivals including Spotify through Apple's control of its App Store. Apple's rules "purposely limit[ed] choice and stifle[ed] innovation at the expense of the user experience—essentially acting as both a player and referee to deliberately disadvantage other app developers," wrote Spotify CEO Daniel Ek.²

Spotify's complaint against Apple came at a time when big technology companies were also under increasing scrutiny in the United States due to their growing dominance. Just days before Spotify announced its legal battle against Apple, Senator Elizabeth Warren published her ambitious plan to break up U.S. tech giants.³ Later in 2019, both the Department of Justice (DOJ) and the Federal Trade Commission (FTC)—America's two federal agencies enforcing antitrust law—as well as the House Antitrust Subcommittee, launched broad investigations into potential anticompetitive practices of Google, Apple, Facebook, and Amazon (collectively, "GAFA").⁴ Earlier, the Supreme Court

1. See Daniel Ek, *Consumers and Innovators Win on a Level Playing Field*, SPOTIFY (Mar. 13, 2019), <https://newsroom.spotify.com/2019-03-13/consumers-and-innovators-win-on-a-level-playing-field>.

2. *Id.*

3. Elizabeth Warren, *Here's How We Can Break Up Big Tech*, MEDIUM (Mar. 8, 2019), <https://medium.com/@teamwarren/heres-how-we-can-break-up-big-tech-9ad9e0da324c>.

4. See Brent Kendall, *Justice Department to Open Broad, New Antitrust Review of Big Tech Companies*, WALL ST. J. (July 23, 2019), <https://www.wsj.com/articles/justice-department-to-open-broad-new-antitrust-review-of-big-tech-companies-11563914235>; Tony Romm, *House Lawmakers Ask Apple, Amazon, Facebook and Google to Turn Over Trove of Records in Antitrust Probe*, WASH. POST (Sept. 13, 2019), <https://www.washingtonpost.com/technology/2019/09/13/house-lawmakers-ask-apple-amazon-facebook-google-turn-over-trove-records-antitrust-probe>. The House Antitrust Subcommittee released the results of its investigation on GAFA in October 2020 (after the writing of this Note's substantially completed manuscript), relying in part on this Note's sister paper on Apple. See MAJORITY STAFF OF H. SUBCOMM. ON ANTITRUST, COMMERCIAL & ADMIN. L. OF THE H. COMM. ON THE JUDICIARY, 116TH CONG., INVESTIGATION OF COMPETITION IN DIGITAL MARKETS 369, <https://int.nyt.com/data/documenttools/house-antitrust-report-on-big-tech/b2ec22cf340e1af1/full.pdf> (citing Babu Kotapati, Simon Mutungi, Melissa Newham, Jeff Schroeder, Shili Shao & Melody Wang, *The Antitrust Case Against Apple*, YALE UNIV., THURMOND ARNOLD PROJECT, DIGIT. PLATFORM

approved a group of iPhone consumers' legal standing to sue Apple for its anticompetitive practices.⁵ Epic Games, distributor of one of the most popular applications ("apps") on iPhone, filed a lawsuit challenging Apple's allegedly anticompetitive practices in August 2020; similar actions by other third-party developers against Apple are also going through the courts.⁶

Apple represents a particularly interesting example of tech platform dominance. While all of GAFAM command enormous size and profitability, Apple controls a critical gateway to the modern digital economy on which all the other tech giants sit: the iPhone mobile platform. Although Google's Android provides limited competition, the iPhone mobile platform's dominant position in capturing mobile revenue means that most of the mobile economy's innovations happen first, if not exclusively, on the iPhone.⁷ Apple's control over the App Store, where all iPhone apps such as Spotify are distributed, thus gives it extraordinary power to dictate the terms of the digital economy.

To say Apple's iPhone has been a blockbuster success is a gross understatement. Apple has sold more than 1.4 billion iPhones since it introduced the device in 2007, reaching about a quarter of the world population.⁸ According to long-time Apple analyst Ben Thompson, the iPhone may have been "the most successful product of all time."⁹ The iPhone's success has given rise to a vibrant app ecosystem. Its App Store hosts over two million apps and 20 million registered developers and generates \$50 billion in

THEORIES OF HARM PAPER SERIES: PAPER 2, 22 (2020), <https://som.yale.edu/sites/default/files/DTH-Apple-new.pdf>.

5. Apple Inc. v. Pepper, 139 S. Ct. 1514 (2019).

6. See Nick Statt, *Epic Games Is Suing Apple*, THE VERGE (Aug. 13, 2020, 3:46 PM EDT), <https://www.theverge.com/2020/8/13/21367963/epic-fortnite-legal-complaint-apple-ios-app-store-removal-injunctive-relief>; Stephen Nellis, *Developers Sue Apple over App Store Practices*, REUTERS (June 4, 2019), <https://www.reuters.com/article/us-apple-antitrust/developers-sue-apple-over-app-store-practices-idUSKCN1T5249>. Released after a substantially completed manuscript of this Note and the completed version of its sister paper, both of which were widely circulated publicly starting in May 2020, Epic Games' complaint against Apple parallels many of this Note's arguments. See generally Complaint, Epic Games v. Apple, 2020 U.S. Dist. LEXIS 154231 (N.D. Cal. Aug. 24, 2020) (No. 20-05640); Kotapati et al., *supra* note 4 (making SSRN Top Ten downloaded papers in multiple antitrust categories in May 2020 through August 2020).

7. See *infra* Section IV.A.

8. Jack Nicas, *Apple Is Worth \$1,000,000,000,000. Two Decades Ago, It Was Almost Bankrupt*, N.Y. TIMES (Aug. 2, 2018), <https://www.nytimes.com/2018/08/02/technology/apple-stock-1-trillion-market-cap.html>.

9. Ben Thompson, *Amazon's New Customer*, STRATECHERY (June 19, 2017), <https://stratechery.com/2017/amazons-new-customer>.

sales a year.¹⁰ These apps have “ignited a cultural, social and economic phenomenon that changed how people work, play, meet, travel and so much more” according to Apple.¹¹

Apple’s increasing abuse of its dominance, however, threatens to enfeeble this vibrant market as it leverages its control over a mobile economy bottleneck to extract rent and tilt the app market in its favor. In the ostensible U.S. mobile platform duopoly between Apple’s iOS and Google’s Android, significant differentiation has already reduced head-to-head competition: Apple emphasizes privacy, security, and user experience while Google offers lower price points at the expense of monetizing user attention.¹² The strength of Apple’s ecosystem further gives the iPhone maker de facto monopoly power: Apple holds 71% of the mobile app platform market by revenue; iPhone users’ switching costs are over 50 times higher than a 5% app price increase; and Apple has been able to raise iPhone prices by 33% without losing sales.¹³

Thanks to Apple’s control of iOS and the App Store, the only place iPhone users can legally download apps, the company is able to mandate all third-party in-app purchases of digital goods to go through its payment system and charge a 30% tax on all these transactions.¹⁴ This “Apple tax” extracts extra profits from users already paying for an expensive phone, even as it leads to higher app prices and reduced innovation in an increasingly important mobile economy.¹⁵

Moreover, Apple has disadvantaged rivals and favored its own apps by blocking certain rivals entirely, downgrading competitors’ discovery and

10. Jack Nicas & Keith Collins, *How Apple’s Apps Topped Rivals in the App Store It Controls*, N.Y. TIMES (Sept. 9, 2019), <https://www.nytimes.com/interactive/2019/09/09/technology/apple-app-store-competition.html>; Ingrid Lunden, *App Store Hits 20M Registered Developers and \$100B in Revenues, 500M Visitors per Week*, TECHCRUNCH (June 4, 2018), <https://techcrunch.com/2018/06/04/app-store-hits-20m-registered-developers-at-100b-in-revenues-500m-visitors-per-week>.

11. *The App Store Turns 10*, APPLE (July 5, 2018), <https://www.apple.com/newsroom/2018/07/app-store-turns-10>.

12. *See Market Study into Mobile App Stores*, NETH. AUTH. FOR CONSUMERS & MKS 27–28 (Apr. 11, 2019), <https://www.acm.nl/sites/default/files/documents/market-study-into-mobile-app-stores.pdf> [hereinafter *Dutch ACM Study*].

13. *See infra* Part IV.

14. *See infra* Part V. As of the last substantive update of this Note but after the writing of its substantially completed manuscript, Apple announced that it would reduce its tax rate to 15% for developers earning less than \$1 million per year starting January 1, 2021. *See* Jack Nicas, *Apple Halves Its App Store Fee for the Smaller Companies*, N.Y. TIMES (Nov. 18, 2020), <https://www.nytimes.com/2020/11/18/technology/apple-app-store-fee.html>. Although a welcome change, this move will affect only 5% of Apple’s App Store revenue and thus does not make a significant difference to Apple’s policy overall. *See id.*

15. *Id.*

promotions, and limiting others' access to key iPhone features, in some cases right after copying their apps.¹⁶ As Apple aggressively pushes into services, rival apps face growing risks of distorted competition. Since around 2016, Apple's business model has gradually shifted from primarily making and selling smartphone hardware towards relying more on the services iPhone users consume.¹⁷ It has launched video streaming, news, and video-game subscriptions and piloted its own mobile payment and music apps.¹⁸ Apple's services revenue has more than quadrupled in absolute terms over the past decade to over \$50 billion annually, now representing 22.8% of Apple's total sales from 8.3% in 2011.¹⁹ It is also a much more profitable segment with a 65.4% gross margin, more than doubling the hardware products' 30.3% margin.²⁰ As Apple increasingly relies on its services revenue and more frequently attempts to tilt the mobile platform playing field to protect this cash cow, the threat from its exclusionary, self-preferencing conduct looms larger than ever. In conjunction with the discriminatory²¹ application of its 30% tax, Apple's conduct not only harms competition on the iOS platform but also weakens major multihoming apps such as Spotify who are critical to competition between mobile platforms. Apple's conduct further deters the rise

16. See *infra* Section VI.A.

17. See Ben Thompson, *The iPhone and Apple's Services Strategy*, STRATECHERY (Sept. 11, 2019), <https://stratechery.com/2019/the-iphone-and-apples-services-strategy>.

18. Chaim Gartenberg, *How Apple Makes Billions of Dollars Selling Services*, THE VERGE (Mar. 20, 2019, 9:00 AM EDT), <https://www.theverge.com/2019/3/20/18273179/apple-icloud-itunes-app-store-music-services-businesses>; Mark Gurman, *Apple Reinvention as Services Company Starts for Real Monday*, BLOOMBERG (Mar. 23, 2019), <https://www.bloombergquint.com/technology/apple-s-reinvention-as-a-services-company-starts-for-real-monday>.

19. See Kif Leswing, *Apple Issues New Rules for App Store that Will Impact Streaming Game Services from Google and Microsoft*, CNBC (Sept. 11, 2020, 1:00 PM EDT), <https://www.cnbc.com/2020/09/11/apple-app-store-new-rules-will-affect-google-stadia-microsoft-xcloud.html>; Press Release, Apple, *Apple Reports Second Quarter Results* (Apr. 30, 2020), <https://www.apple.com/newsroom/2020/04/apple-reports-second-quarter-results> (showing \$13.3B services revenue and \$58.3B total revenue in 2020 Q2); Neil Cybart, *The Apple Services Machine*, ABOVE AVALON (May 15, 2018), <https://www.aboveavalon.com/notes/2018/5/15/the-apple-services-machine> (estimating \$9B services revenue for 2011 Q4 trailing twelve months); *Apple Reports Fourth Quarter Results*, APPLE (Oct. 18, 2011), <https://www.apple.com/newsroom/2011/10/18Apple-Reports-Fourth-Quarter-Results> (showing \$108B revenue for 2011).

20. See APPLE, CONDENSED CONSOLIDATED STATEMENTS OF OPERATIONS (UNAUDITED) (2020), https://www.apple.com/newsroom/pdfs/FY20_Q2_Consolidated_Financial_Statements.pdf (disclosing sales and costs of products and services respectively for three months ended on March 28).

21. Apple's apps are not subject to the 30% cost disadvantage. See *infra* Section VI.A.III.

of future platforms, an effect reminiscent of Microsoft's exclusion of Netscape to preserve its Windows monopoly.²²

Apple's practices violate antitrust law as they damage competition and consumer welfare, the promotion of which are key objectives of the Sherman Act.²³ Apple's story is also a case study of how a platform can stand as a gatekeeper between hundreds of millions of consumers and small businesses, while garnering immense power by purposefully building a walled garden that platform participants cannot escape due to their resource limitations.²⁴ This story provides important lessons for governing all tech platforms. In particular, the vast scope and magnitude of potential and actual abuse of platform dominance in a world of ubiquitous multilayered dynamic networks, as Apple's example reveals,²⁵ ought to ring the alarm bell for anyone concerned with consumer welfare.

However, current judicial doctrines governing antitrust law present significant obstacles to enforcement against tech platforms' abuse of dominance. Influenced by traditional antitrust thinking dominated by what is known as the Chicago School, courts today espouse an overly benign view of dominant firm behavior that takes too lightly the risk of leveraging dominance in adjacent markets and denying competitors reasonable access to essential services.²⁶ These judicial doctrines limit the viability of antitrust lawsuits against tech giants, even when they are abusing their dominance to extract monopoly rents at the expense of competition and innovation.

This Note makes the antitrust case against Apple, investigates how the rise of consumer platforms like Apple poses critical challenges to the U.S. regime of competition law and policy, and calls for a rethinking of the antitrust toolbox. It proceeds in seven parts. Part II exposes the doctrinal inadequacies of current U.S. monopoly law. Part III explores the main features of the modern consumer platform economy. Part IV frames the impact of these features in antitrust terms to show Apple's market power and dominance. Part V analyzes Apple's illegal tying arrangement regarding its in-app purchase system. Part VI shows how Apple prolongs and expands its monopoly over the smartphone platform market. Part VII refutes claimed efficiency justifications for Apple's conduct. Part VIII concludes with suggestions for reforming antitrust doctrines and reprioritizing enforcement strategies for the twenty-first century.

22. *See infra* Section VI.C.

23. *See infra* Parts V–VI.

24. *See infra* Sections III.A–C.

25. *See infra* Sections III.D, VI.A.

26. *See infra* Part II.

Tech platforms have played a key role in driving innovations for the modern consumer economy, but they are now increasingly becoming obstacles. To build a future of fair competition and protect consumer welfare, antitrust law is in urgent need of transformative rethinking.

II. THE MYTHICAL BENIGN MONOPOLIST

Traditional antitrust thinking in the United States has been built on the back of an enterprise-facing manufacturing economy. Leading theorists of the Chicago School, the most influential school of thought in U.S. antitrust law, developed their expertise by analyzing big manufacturers.²⁷ As a result, a set of economic assumptions rooted in the industrial economy have become entrenched in the current antitrust thinking that do not fit the modern consumer platform economy.

In particular, traditional antitrust theories often assume rationality, market efficiency, and lack of barriers to entry²⁸ because proponents of these theories tend to focus on sophisticated firms of similar power in a world with rare network effects. For example, Robert Bork's hugely influential book *The Antitrust Paradox*, the poster child of the Chicago School,²⁹ routinely mentions rational and efficient economic models involving a "widget manufacturer" in a market of "100 firms of equal size" selling to "1,000 well-informed purchasers."³⁰ Bork also sneers at the idea of entry barriers, calling them "ghosts" that "do not exist."³¹ These assumptions have resulted in an overly benign view of dominant firms as ones that only exist because of efficiencies from scale, ones that are always at risk of being toppled by would-be competitors³²—a view inconsistent with today's increasing concentration of tech giants who maintain dominance despite their serious problems.³³

27. See, e.g., Aaron Director & Edward H. Levi, *Law and the Future: Trade Regulation*, 51 NW. U.L. REV. 281 (1956–57); Sam Peltzman, *Aaron Director's Influence on Antitrust Policy*, 48 J.L. & ECON. 313 (2005).

28. See Daniel L. Rubinfeld, *On the Foundations of Antitrust Law and Economics*, in HOW THE CHICAGO SCHOOL OVERSHOT THE MARK 51, 54 (Robert Pitofsky ed., 2008) (discussing the Chicago School's faith in efficient market and likelihood of entry).

29. See generally George L. Priest, *The Abiding Influence of the Antitrust Paradox*, 31 HARV. J.L. & PUB. POL'Y 455 (2008).

30. See ROBERT BORK, *THE ANTITRUST PARADOX* 96–97 (1978).

31. *Id.* at 310.

32. See Patrice Bougette, Marc Deschamps & Frederic Marty, *When Economics Met Antitrust: The Second Chicago School and the Economization of Antitrust Law*, 16 ENTER. & SOC'Y 313, 333 (2015).

33. See GEORGE J. STIGLER CTR. FOR THE STUDY OF THE ECON. & THE STATE, COMMITTEE FOR THE STUDY OF DIGITAL PLATFORMS MARKET STRUCTURE AND ANTITRUST

Under this sanguine view, business efficiencies rather than monopoly profits motivate monopolists to expand into adjacent markets.³⁴ Often known as the “one monopoly profit” theory, it argues that unless the monopolist’s leveraging is efficient, it cannot extract additional profit from a second market as buyers pay for the two products as a package.³⁵ Buyers will consume less of the package if the second product gets more expensive because of the leveraging. The monopolist will thus not be able to increase its profit and hurt competition under the theory unless it can save costs and sell the second product more cheaply than competitors, in which case it is not an antitrust problem.

Heavily influenced by the Chicago School, current antitrust doctrines construe monopoly leveraging and refusal to deal—two important categories of monopolistic exclusionary conduct—too narrowly, often leaving damaging anticompetitive practices untouched. Courts today thus frequently attack monopolization claims with these assumptions of yesteryear.

Under *Verizon Communications v. Law Offices of Curtis V. Trinko, LLP*, the most recent Supreme Court case on leveraging, the use of monopoly power in one market to acquire competitive advantage in another must either meet the standard of actually monopolizing or having “a dangerous probability of success” in monopolizing the second market in order to violate Section 2 of the Sherman Act.³⁶ This formulation creates a high burden for showing monopoly leveraging in two ways. First, it leaves out monopoly leveraging *without probable monopolization* of the second market even when it is nonetheless significantly harmful (including monopoly leveraging into new dynamic network markets) as Sections V.B and VI.A-C will show. Second, it wrongfully excludes the defensive leveraging discussed in Section VI.C that prolongs monopoly in the *primary* market.

The Court’s demand for at least a dangerous probability of monopolization creates a practical requirement to define the relevant secondary market(s) affected by leveraging.³⁷ Market definition is required to show alleged

SUBCOMMITTEE REPORT 11 (2019), <https://research.chicagobooth.edu/-/media/research/stigler/pdfs/market-structure-report.pdf>.

34. See Richard A. Posner, *The Chicago School of Antitrust Analysis*, 127 U. PA. L. REV. 925, 927 (1979) (“[V]ertical integration must be motivated by a desire for efficiency rather than for monopoly.”).

35. See HERBERT HOVENKAMP, *FEDERAL ANTITRUST POLICY: THE LAW OF COMPETITION AND ITS PRACTICE* 426, 565 (5th ed. 2016).

36. *Verizon Commc’ns v. Law Offs. of Curtis V. Trinko, LLP*, 540 U.S. 398, 415 n.4 (2004) (citing *Spectrum Sports, Inc. v. McQuillan*, 506 U.S. 447, 459 (1993)).

37. See *Spectrum Sports*, 506 U.S. at 455–56; *United States v. Microsoft Corp.*, 253 F.3d 34, 81 (D.C. Cir. 2001).

monopolization under current antitrust doctrine.³⁸ Such inquiries can be fact-intensive and costly even for cases involving merely one market,³⁹ let alone the several if not dozens of markets often affected by monopoly platforms' leveraging as Apple's example in Section VI.A will show. Requiring market definition in this context can thus significantly dampen antitrust plaintiffs' incentives and weaken their ability to bring suits against dominant platforms, despite the substantial anticompetitive harm caused by dominant platforms' conduct. Economists and dissenting Justices on the Supreme Court have already pointed out that market definition in general is but an imprecise tool for helping to find anticompetitive harm and is thus unnecessary when there is proof of actual detrimental effects.⁴⁰ To maintain such a superfluous but costly threshold for plaintiffs, in particular for leveraging claims involving multiple markets, would likely further give tech platforms significant leeway to abuse their dominance.

The Supreme Court's undue skepticism springs from its concern that allowing monopoly leveraging as an independent claim of exclusionary conduct "might chill competition, rather than foster it."⁴¹ Lower courts have shared this sentiment. The Seventh Circuit, for example, has stated that "[t]he problem with 'monopoly leveraging' as an antitrust theory is that the practice cannot increase a monopolist's profits."⁴² Both statements bear clear hallmarks of the Chicago School's charitable view of monopolists, which this Note will show is misplaced. Courts' outdated views threaten to leave anticompetitive conduct untouched, impacting hundreds of billions of economic activities on platforms such as Apple, Amazon, Google, and Facebook, to the detriment of consumers.

Like the leveraging doctrine, courts today strongly disfavor refusal to deal claims. Illegal refusal to deal occurs when a monopolist refuses to engage with customers, suppliers, or competitors or only offers very unreasonable terms, with the effect of excluding rivals from the market and thereby harming consumers.⁴³ Although a common intuition is that firms should be free to

38. See *United States v. Grinnell Corp.*, 384 U.S. 563, 570–71 (1966).

39. See Patrick R. Ward, *Testing for Multisided Platform Effects in Antitrust Market Definition*, 84 U. CHI. L. REV. 2059, 2070–73 (2017).

40. See *Ohio v. Am. Express*, 138 S. Ct. 2274, 2296 (2018) (Breyer, J., dissenting); Steven C. Salop, *The First Principles Approach to Antitrust, Kodak, and Antitrust at the Millennium*, 68 ANTITRUST L.J. 187 (2000); Jonathan B. Baker, *Market Definition: An Analytical Overview*, 74 ANTITRUST L.J. 129, 131 (2007); Louis Kaplow & Carl Shapiro, *Antitrust*, in 2 HANDBOOK OF LAW AND ECONOMICS 1073, 1091 (A. Mitchell Polinsky & Steven Shavell eds., 2007).

41. *Spectrum Sports*, 506 U.S. at 458.

42. *Schor v. Abbott Lab'ys.*, 457 F.3d 608, 611 (2006).

43. See HOVENKAMP, *supra* note 35, at 387–96.

choose with whom they want to deal, the Supreme Court itself has held that this “does not mean that the right is unqualified.”⁴⁴ *Aspen Skiing Co. v. Aspen Highlands Skiing Corp.*,⁴⁵ the beginning of modern refusal to deal cases, offers an example of how such conduct can be problematic. In that case, Skiing Co., a monopolist ski resort, suddenly ended a joint marketing program with a rival despite the arrangement’s long-standing history, which suggested the arrangement’s likely profitability.⁴⁶ Finding no valid business reason behind the abrupt change which sacrificed Skiing Co.’s profits, the Supreme Court concluded that it was used to exclude the competitor and therefore violated antitrust law for illegal monopolization.⁴⁷

Increasingly, however, courts recognize refusal to deal claims only in very limited circumstances after the Supreme Court’s decision in *Trinko*.⁴⁸ In that case, the Court also pondered over a refusal to deal claim and announced a general right for a firm “freely to exercise [its] own independent discretion as to parties with whom [it] will deal,” casting doubt on the “uncertain virtue of forced sharing” and focusing on “the difficulty of identifying and remedying anticompetitive conduct by a single firm.”⁴⁹ The *Trinko* Court severely curtailed *Aspen Skiing*: it placed the case “at or near the outer boundary of § 2 liability” and emphasized the importance of showing the end of a prior course of dealing contrary to a firm’s short-term profitability in *Aspen*.⁵⁰ As the Eleventh Circuit has observed, “*Trinko* now effectively makes the unilateral termination of a voluntary course of dealing a requirement for a valid refusal-to-deal claim.”⁵¹ Such a narrow interpretation of the doctrine focuses on but one instance of harmful refusal to deal, missing the broader underlying principle of *Aspen* against anticompetitive exclusionary conduct. As the rest of the Note will show, this narrow view again ignores the risks of tech platforms’ denial of service. These risks stem from both tech platforms’ importance as today’s digital infrastructure, upon which economic activities worth hundreds of billions of dollars rely, and the kind of installed-base opportunism in which entrenched platforms can engage.

The remaining Parts of the Note highlight the problem with courts’ narrow interpretation of monopolization by studying how the new market dynamics

44. *Aspen Skiing Co. v. Aspen Highlands Skiing Corp.*, 472 U.S. 585, 601 (1985).

45. *Id.*

46. *See id.* at 587–95.

47. *See id.* at 608–11.

48. *See Verizon Commc’ns v. Law Offs. of Curtis V. Trinko, LLP*, 540 U.S. 398, 408–10 (2004).

49. *Id.* at 408.

50. *Id.* at 410.

51. *Covad Commc’ns Co. v. BellSouth Corp.*, 374 F.3d 1044, 1049 (11th Cir. 2004).

of the consumer platform economy upend traditional antitrust assumptions. Then the Note demonstrates how Apple has abused its dominance and caused harm to consumers and competition to the extent of billions of dollars, which could go unrecognized under current antitrust law. Without substantial doctrinal reform, current antitrust law can give free rein to manipulation by giant tech platforms. Competition in the entire digital economy is at stake.

III. THE CONSUMER PLATFORM ECONOMY

The American economy in the twenty-first century is vastly different than half a century ago, when Bork and his Chicago School peers started to dominate antitrust law thinking with economic theories developed for the industrial economy. Based on its share of the gross domestic product (GDP), the manufacturing sector has more than halved between 1967 and 2017.⁵² The share of consumer-facing sectors, on the other hand, has expanded by over 40% in the same period.⁵³

Moreover, consumer-facing companies have reached unprecedented scale. The largest firms today are more likely to be consumer-oriented than not: among America's Fortune 20 firms, consumer-facing businesses jumped from 25% of the list in 1967 to 60% in 2019.⁵⁴ Big tech companies such as Apple,

52. *Compare Interactive Access to Industry Economic Accounts Data: GDP by Industry (Historical)*, BUREAU OF ECON ANALYSIS, https://apps.bea.gov/iTable/iTable.cfm?reqid=147&step=51&isuri=1&startyear=1967&table_list=5&endyear=1967&valuationtype=b&theta=1&codelist=22r (last visited Jan. 4, 2021) (hereinafter *Economic Data 1967*) (showing the 1967 manufacturing share of GDP as 25.3%), *with Industry Economic Account Data: GDP by Industry*, BUREAU OF ECON. ANALYSIS, https://apps.bea.gov/iTable/iTable.cfm?reqid=150&step=3&isuri=1&table_list=5&series=a&first_year=2017&columns=ii&scale=-99&last_year=2017&categories=gdp&xind=&thetable=&rows=22r,gdp,pvt,11,111ca,113ff,21,211,212,213,22,23,31g,33dg,321,327,331,332,333,334,335,3361mv,3364ot,337,339,31nd,311ft,313tt,315al,322,323,324,325,326,42,44rt,441,445,452,4a0,48tw,481,482,483,484,485,486,487os,493,51,511,512,513,514,fire,52,521ci,523,524,525,53,531,hs,ore,532rl,prof,54,5411,5415,5412op,55,56,561,562,6,61,62,621,622,623,624,7,71,711as,713,72,721,722,81,g,gf,gfg,gfgd,gfng,gfe,gs,gslg,gsle,pgood,pserv,ict (last visited Jan. 4, 2021) (hereinafter *Economic Data 2017*) (showing the 2017 manufacturing share of GDP as 11.2%).

53. *Compare Economic Data 1967*, *supra* note 52, *with Economic Data 2017*, *supra* note 52 (showing a decline from 48.5% to 68.3%, with sectors other than traditional and government productions considered consumer-facing sectors).

54. *Compare A Database of 50 Years of FORTUNE's List of America's Largest Corporations*, FORTUNE, https://archive.fortune.com/magazines/fortune/fortune500_archive/full/1967 (last visited Jan. 4, 2021) (including five consumer-facing auto, electronics, and telecommunications firms and fifteen energy, manufacturing, and enterprise software firms), *with Fortune 500*, FORTUNE, <https://fortune.com/fortune500/2019/search> (last visited Jan. 4, 2021) (including twelve consumer-facing retail, electronics, telecommunications, auto, healthcare, and software firms and eight energy, financial, and wholesale healthcare firms).

Microsoft, Amazon, Facebook, and Google—all with huge consumer-facing businesses—are worth trillions or hundreds of billions of dollars.⁵⁵

Technologies such as the internet and smartphones have drastically reduced transaction costs on the supply side and have created huge network effects. They have made platforms that aggregate hundreds of millions, if not billions, of consumers much more plausible than it was in the era of industrial manufacturing. On the demand side, however, this lopsided power balance introduces often prohibitive transaction costs for platform participants who are much smaller and less sophisticated than the giant platforms, preventing the former from making economic decisions solely based on the merits.

As this Part demonstrates, the rise of the consumer platform economy has brought about seismic economic changes impacting antitrust law. These changes have made dominant tech companies much more powerful and their anticompetitive conduct much more harmful than traditionally assumed.

A. CONSUMERS AS KEY ECONOMIC ACTORS

Traditional antitrust law and economics have usually assumed rational actors because of their focus on firms, which tend to have the capability of being rational due to economies of scale, repeat transactions, and competitive selection.⁵⁶ Consumers, on the other hand, may lack the transactional sophistication and informational capability to be largely rational, leaving them vulnerable to monopolistic exploitation.

First, consumers are less able than enterprises to discover market information before making purchases, especially for products with add-on attributes. Enterprises often have dedicated personnel to carry out sophisticated analysis of their purchase decisions.⁵⁷ In contrast, individual consumers do not generally have such capabilities—especially when, for example, millions of heterogeneous apps exist in the Apple App Store. This gives platforms greater power to raise add-on prices.

Second, consumers have fewer incentives to bear the information cost. Enterprise equipment is generally much more expensive than consumer

55. See Jack Nicas, *Apple Reaches \$2 Trillion, Punctuating Big Tech's Grip*, N.Y. TIMES (Aug. 19, 2020), <https://www.nytimes.com/2020/08/19/technology/apple-2-trillion.html>; Melissa Pistilli, *10 Top Technology Stocks by Market Cap*, INVESTING NEWS (Nov. 19, 2020), <https://investingnews.com/daily/tech-investing/top-technology-stocks> (showing that Apple, Microsoft, Amazon, Alphabet, and Facebook were worth \$2.08 trillion, \$1.63 trillion, \$1.58 trillion, \$1.2 trillion, and \$782 billion, respectively).

56. See Mark Armstrong & Steffen Huck, *Behavioral Economics and Antitrust*, in 1 THE OXFORD HANDBOOK OF INTERNATIONAL ANTITRUST ECONOMICS 205–06 (2015).

57. See Carl Shapiro, *Aftermarkets and Consumer Welfare: Making Sense of Kodak*, 63 ANTITRUST L.J. 483, 493 (1995).

products, and firms tend to buy in large quantities. Relatively small enterprise investments in discovering information are thus more worthwhile, as they lead to large savings in procurement cost. Consumers, however, primarily engage in one-off purchases of consumer-price goods; extensive research is often not worth the effort for them, even as the aggregate harm from inefficient pricing for billions of consumers is comparable or greater than that for firms.

Even potential competitive price-cutting and educational advertising cannot eliminate inefficient, “shrouded” add-on prices when close substitutes exist, according to leading behavioral economics literature.⁵⁸ Low-price competitors who try to inform consumers of high add-on prices (e.g., airline bag fees) from rivals will lead them to cheaper substitutes and incur the cost of education, thereby becoming less profitable.⁵⁹ For smartphone platforms, this can occur when they offer subscription apps that are more expensive than their web counterparts due to platform fees. Even if one platform can offer cheaper options than another, it would not do so since this would only drive consumers out of smartphone platforms and to the web, hurting all industry players. Inefficient high app prices can thus persist.

Given the high costs of discovering information about platform markets, consumers will find it hard to compare *ex ante* the total costs of using the platform itself and the services provided on the platform. For example, iPhone users may not be aware of how expensive apps are on iOS when making smartphone purchase decisions. This lack of awareness impedes competition between smartphone platforms that could have resulted in lower app prices.

B. SMALL BUSINESSES AND APP DEVELOPERS

The rise of consumer platforms has also brought about many small businesses that serve individual consumers. Apple has twenty million developers creating apps for users; Amazon has about three million active marketplace sellers offering goods to buyers; and YouTube has fifty million content creators delivering videos to viewers.⁶⁰ Most of these developers,

58. See generally Xavier Gabaix & David Laibson, *Shrouded Attributes, Consumer Myopia, and Information Suppression in Competitive Markets*, 121 Q.J. ECON. 505 (2006).

59. See *id.*

60. See Ingrid Lunden, *App Store Hits 20M Registered Developers and \$100B in Revenues, 500M Visitors Per Week*, TECHCRUNCH (June 4, 2018), <https://techcrunch.com/2018/06/04/app-store-hits-20m-registered-developers-at-100b-in-revenues-500m-visitors-per-week>; *Distribution of Active Amazon Marketplace Sellers Worldwide in 2019, by Country*, STATISTA, <https://www.statista.com/statistics/1086651/amazon-3p-seller-global-distribution> (last visited Jan. 4, 2021); *YouTube by the Numbers: Stats, Demographics & Fun Facts*, OMNICORE, <https://www.omnicoreagency.com/youtube-statistics> (last updated Oct. 28, 2020).

sellers, and content creators are very small businesses (one to five people).⁶¹ These small businesses suffer from many of the same resource limitations that consumers have, giving platforms even more power for monopolistic exploitation. This Section focuses on smartphone app developers, but these lessons can apply to small businesses on other platforms as well.

First, developers invest in platform-specific skills that are hard to transfer. Mobile app developers have to learn coding skills and conventions which can vary significantly across platforms.⁶² Becoming a proficient developer for a new platform can take six to fifteen months.⁶³ This means very few developers can afford to switch platforms, much less develop for multiple ones at the same time—only 8.8% of iOS developers also work on Android or Windows, for example.⁶⁴ This friction creates significant switching costs for small businesses such as app developers—probably also YouTube creators and to a lesser extent Amazon retailers—which makes platforms much more powerful than dominant firms in traditional industries.

Second, small businesses lack the transactional sophistication to negotiate contracts. Traditional antitrust scholars have argued that buyers have strong incentives to obtain contractual protections against future seller exploitation—for example via warranty protections, rental or lease of the product, and long-term service contracts.⁶⁵ However, the average developer studio consisting of only one to five people would not have the bargaining power to negotiate with tech platforms for individually tailored terms. As a result, platforms have acquired extraordinary power to exploit small businesses and harm competition.

61. See, e.g., MACSTADIUM, TRENDS IN IOS DEVOPS: A SURVEY OF IOS DEVELOPERS FROM THE 2018 APPLE WORLDWIDE DEVELOPERS CONFERENCE (WWDC) & ALTCONF (2018), https://uploads-ssl.webflow.com/5c0953da973d4d733aab924e/5c0953da973d4d689aab9427_MacStadium-iOS-DevOps-Survey.pdf (showing that 66% of iOS developer teams have 1-10 members and that the average size is 3.8 for those having 2-10 members); *Key Metrics of Amazon.com Marketplace Sellers in the United States in 2019*, STATISTA, <https://www.statista.com/statistics/1086637/amazoncom-3p-seller-metrics-usa> (last visited Jan. 4, 2021) (noting that over 80% of Amazon active sellers have annual sales below \$100,000).

62. See, e.g., JonnyB, *What Does It Take to Become an Android Developer?*, MEDIUM (May 22, 2018), <https://medium.com/devslopes-blog/what-does-it-take-to-become-an-android-developer-fbd31d06a4f4>.

63. See Martin Campbell-Kelly, Daniel Garcia Swartz, Richard Lam & Yilei Yang, *Economic and Business Perspectives on Smartphones as Multi-Sided Platforms*, 39 TELECOMMS. POL'Y 717, 728 (2015).

64. See Sami Hyrynsalmi, Arho Suominen & Matti Mäntymäki, *The Influence of Developer Multi-Homing on Competition Between Software Ecosystems*, 111 J. SYS. & SOFTWARE 119, 123 (2016) (“[T]he number of [seller-level] multi-homers varies from 8.8% for the Apple App Store . . .”).

65. See Shapiro, *supra* note 57, at 488–91.

C. ECOSYSTEM LOCK-INS

The third feature of the consumer platform economy is the ubiquity of product ecosystems that integrate both vertically and horizontally, including software as well as costly hardware. These ecosystems can generate high switching costs and strong barriers to competition that give platforms strong market power and prevent effective competition.

Firms such as Apple have been strategically designing their product portfolios and building up walls between ecosystems to increase switching costs. In Apple's case, Steve Jobs himself strategized that the company should "[t]ie all of our products together, so we further lock customers into our ecosystem" in an internal email on "2011: Holy War with Google."⁶⁶ Further, Apple offers multiple hardware products (iPhone, iPad, Mac computer, Apple Watch, HomePod smart speaker, etc.) with data and features that work across devices to improve utility of owning multiple devices.⁶⁷ Platforms also offer downstream services unique to particular platforms, such as Apple's Apple Music, Apple Pay, and Apple's Podcasts. As a result, the average Apple user in the United States spends around \$802 per year, equivalent to the cost of owning two to three iPhones, on Apple products and services.⁶⁸ Google and Amazon employ similar tactics with offerings such as Amazon Prime Video, Echo smart speaker, Gmail, and Google Home. When users own multiple pieces of the same ecosystem, the cost of switching becomes higher. Economists found the cost of switching one's smartphone operating system (OS) is around \$250 in South Korea, for example, from "application

66. Don Reisinger, *Steve Jobs Wanted to Further Lock Customers' into Apple's Ecosystem*, CNET (Apr. 2, 2014), <https://www.cnet.com/news/steve-jobs-wanted-to-further-lock-customers-into-apples-ecosystem>.

67. See *Use Continuity to Connect Your Mac, iPhone, iPad, iPod Touch, and Apple Watch*, APPLE, <https://support.apple.com/en-us/HT204681> (last visited Jan. 4, 2021).

68. The \$802 per user spending is derived from Apple's U.S. sales in 2019 from iPhone users divided by user number (105 million), assuming the United States accounts for 80% of Apple's \$117 billion Americas revenue and 90% of Apple users own at least one iPhone. Thus, per user spending = $117M \times 80\% / (105M / 90\%) = \802 . Comparison with iPhone cost is based on iPhone average price of \$800 and a two-to three-year upgrade cycle. See APPLE INC., CONDENSED CONSOLIDATED STATEMENTS OF OPERATIONS (UNAUDITED) (2019), https://s2.q4cdn.com/470004039/files/doc_financials/2019/q4/Q4-FY19-Consolidated-Financial-Statements.pdf; *Apple Grows iPhone Share in US, Despite Overseas Challenge*, EMARKETER (Mar. 12, 2019), <https://www.emarketer.com/content/apple-grows-iphone-share-in-us-despite-overseas-challenge>; Press Release, Consumer Intel. Rsch. Partners, LLC, iPhone 11 Takes Over Where iPhone XR Left Off (Apr. 22, 2020), at 2, <https://files.constantcontact.com/150f9af2201/3ece3965-9d56-4c2e-8ed8-c7e49b73de66.pdf>; Evan Niu, *The Great Irony of Apple's iPhone Price Increases*, MOTLEY FOOL (Dec. 6, 2018), <https://www.fool.com/investing/2018/12/06/the-great-irony-of-apples-iphone-price-increases.aspx>.

purchasing cost, accessory purchasing cost, and uncertainty from the possibility of additional post-transition payment increase”—even excluding incompatibility of other platform-specific smart devices people own.⁶⁹ Given Apple's strong product ecosystem in the United States, the cost is likely higher here for iOS. Facing such high switching costs, Apple's iOS retention rate in the United States is around 90%, meaning nine in ten iPhone users do not switch to alternative smartphones.⁷⁰

D. MULTILAYERED DYNAMIC NETWORKS

Another feature of the consumer platform economy is the multilayered, dynamic network structure of tech platforms. Network effects allow a firm's market power to grow exponentially, as it scales in ways often unrelated to the quality of the underlying product offering.⁷¹ Tech platforms are special in this respect due to the ubiquity of such networks being layered on top of one another in fast-growing markets. This market structure not only gives platforms extraordinary market power but also creates perverse incentives for platforms to expand monopoly power from one network market to another, causing self-propelling and irreversible harm to competition.

Apple's smartphone platform, for example, is a two-sided market with strong network effects; more users attract more developers to a growing market, while more developers creating more apps attracts more users.⁷² This effect creates enormous collective action problems when any individual developer or user wants to exit for not liking Apple's offerings. They cannot realistically coordinate with a critical mass of fellow developers or users (who number in the hundreds of millions) to quit together unless Apple's offerings become exceptionally terrible. Furthermore, they cannot create an alternative platform to attract other developers and users even if they can improve on the product offering because the presence of other developers and users are a

69. Yuri Park & Yoonmo Koo, *An Empirical Analysis of Switching Costs in the Smartphone Market in South Korea*, 40 TELECOMMS. POL'Y 307, 313–14 (2016). The dollar value is based on the exchange rate of 1 South Korean won to 0.00081 USD on April 24, 2020.

70. Ben Thompson, *Apple's China Problem*, STRATECHERY (Jan. 7, 2019), <https://stratechery.com/2017/apples-china-problem/>.

71. See, e.g., Mark A. Lemley & David McGowan, *Legal Implications of Network Economic Effects*, 86 CALIF. L. REV. 479 (1998); David S. Evans, *The Antitrust Economics of Multi-Sided Platform Markets*, 20 YALE J. ON REG. 325 (2003).

72. See Daniel D. Garcia-Swartz & Florencia Garcia-Vicente, *Network Effects on the iPhone Platform: An Empirical Examination*, 39 TELECOMMS. POL'Y 877, 889 (2015) (finding that each extra app is associated with 271–386 additional users and that each 1000 additional users are associated with 2.5–3.6 additional apps).

critical piece of the platform's utility. This magnifies already significant user switching costs⁷³ and creates often insurmountable barriers to entry.

Moreover, other platforms can exist on top of the App Store. Apple Pay, for example, grows more popular and dominant as more merchants accept it, which spurs user adoption that again feeds back into greater merchant uptake. Spotify works similarly for music listeners and artists, where more users attract both more future users to listen to the playlists they create and more artists to make music for them, and these artists and their songs in turn attract more users. The data that platforms gather from a growing user base offers further economies of scale—as the use of platforms like Spotify and Netflix increases, they gain more insight into user preferences and are thus better able to improve their product offerings.⁷⁴

Downstream network effects can distort the competitive incentive of the platform operator upon entry into those markets. When network strength matters more than product superiority,⁷⁵ the platform operator may plausibly twist the rules of the downstream market it controls such that they favor the platform operator and help it dominate, even with inferior products, by depriving rivals of key inputs needed to acquire sufficient scale to succeed.⁷⁶ A classic example of how network effects can result in such a suboptimal market structure is the QWERTY keyboard, which was designed with an outdated technology but remains the popular format because manufacturers and users are locked into this technology, despite being 36% less efficient than modern alternatives.⁷⁷ Inefficient monopoly leveraging can thus yield higher quality-adjusted prices and fewer choices, leading to consumer welfare losses.⁷⁸

Multilayered network markets exist extensively in today's consumer platform economy. Apple's exclusionary, self-preferencing tactics in their mobile payment service, music streaming, gaming platform, and other network markets discussed in Parts V-VI demonstrate that tech platforms today can

73. See text accompanying note 69.

74. See, e.g., Jon Markman, *Netflix Harnesses Big Data to Profit from Your Tastes*, FORBES (Feb. 25, 2019), <https://www.forbes.com/sites/jonmarkman/2019/02/25/netflix-harnesses-big-data-to-profit-from-your-tastes/#55ee2c2f66fd>.

75. See Lemley & McGowan, *supra* note 71.

76. See Michael D. Whinston, *Tying, Foreclosure, and Exclusion*, 80 AM. ECON. REV. 837, 838–39 (1990); Dennis W. Carlton & Michael Waldman, *The Strategic Use of Tying to Preserve and Create Market Power in Evolving Industries*, 33 RAND J. ECON. 194, 196–97 (2002); W. Brian Arthur, *Competing Technologies, Increasing Returns, and Lock-In by Historical Events*, 99 ECON. J. 116 (1989).

77. See Jan Noyes, *The QWERTY Keyboard: A Review*, 18.3 INT'L J. MAN-MACHINE STUD. 265, 278 (1983); Shumin Zhai, Michael Hunter & Barton Allen Smith, *Performance Optimization of Virtual Keyboards*, 17 HUM.-COMPUT. INTERACTION 229 (2002).

78. See Whinston, *supra* note 76, at 839.

and do take advantage of the anticompetitive opportunities offered by multilayered network markets.

IV. APPLE'S DOMINANCE: DE FACTO MONOPOLY

With often prohibitive information and switching costs on top of strong network effects, Apple holds a powerful dominance over the mobile platform market. This Part translates the features of the consumer platform economy into antitrust terms by examining Apple's dominance and showing that Apple has market power to impose anticompetitive terms on other market players.

Market power is required for both illegal tying and monopolization,⁷⁹ two legal claims that capture the core anticompetitive nature of Apple's conduct. The Supreme Court has required market definition to show market power⁸⁰ with the relevant market being the "arena within which significant substitution in consumption or production occurs."⁸¹ Here we are concerned with the U.S. market for mobile app platforms, which host services including digital goods within smartphone apps.⁸²

Power in the relevant market means "some special ability . . . to force a purchaser to do something that he would not do in a competitive market."⁸³ Courts have found indirect evidence of market power to include a high market share, barriers to entry, and locked-in customers.⁸⁴ Direct evidence of actually

79. *See* Ill. Tool Works v. Indep. Ink, 547 U.S. 28, 46 (2006); United States v. Grinnell Corp., 384 U.S. 563, 570–71 (1966).

80. *See* Ohio v. Am. Express, 138 S. Ct. 2274, 2285 (2018).

81. PHILLIP E. AREEDA & HERBERT HOVENKAMP, 2B ANTITRUST LAW ¶ 530a (4th ed. 2019).

82. Overall mobile app services include spending on IAP goods/services, paid apps, in-app advertising, and in-app physical goods and services (such as toilet paper bought on Amazon or Uber rides). *See Choosing a Business Model*, APPLE DEVELOPER, <https://developer.apple.com/app-store/business-models> (last visited Jan. 4, 2021). Both paid apps and IAP goods are included in our market definition because they are generally monetized through mobile app stores' built-in monetization tools, whereas the other two categories are excluded because they tend to go through outside third-party systems and have different business models, both of which are not easily substitutable.

83. *Jefferson Par. Hosp. Dist. No. 2 v. Hyde*, 466 U.S. 2, 13–14 (1984).

84. *See id.* at 17; *Grinnell*, 384 U.S. at 571 (inferring monopoly from dominant market share); *United States v. Microsoft Corp.*, 253 F.3d 34, 54–55 (D.C. Cir. 2001) (finding that an "applications barrier to entry" supports Microsoft's monopoly power over the computer operating system market); *Eastman Kodak v. Image Tech. Servs.*, 504 U.S. 451, 473–78 (1992) (finding monopoly power from customer lock-ins/aftermarket power).

exercising control over price or excluding competition provides further support.⁸⁵

While the monopoly power standard is more stringent than market power for tying,⁸⁶ this Part shows that Apple satisfies both tests with its 71% market share, switching costs 50 times higher than a 5% app price increase, and ability to profitably increase iPhone price by 33%.

A. MARKET SHARE

Apple owns 71% of the U.S. mobile app platform market by revenue.⁸⁷ Its 62–86% global market share for the past decade further corroborates its durable dominance.⁸⁸ Courts have found 59% and 69% market shares to be sufficient for tying.⁸⁹ For monopolization, a market share over 70% generally establishes *prima facie* monopoly power, and a market share between 50–70% can constitute monopoly power when combined with substantial barriers to entry in the market.⁹⁰ Apple's market share alone thus leads to a strong inference for sufficient market power for both tying and monopolization.

85. See *Kodak*, 504 U.S. at 477–78 (“It is clearly reasonable to infer that Kodak has market power to raise prices and drive out competition . . . [from] direct evidence that Kodak did so.”).

86. See *id.* at 480.

87. Reed Albergotti, *How Apple Uses Its App Store to Copy the Best Ideas*, WASH. POST (Sept. 5, 2019), <https://www.washingtonpost.com/technology/2019/09/05/how-apple-uses-its-app-store-copy-best-ideas>. Indeed, Apple has just about half of the installed smartphone user base in the United States. See S. O’Dea, *U.S. Smartphone Subscriber Share by Operating Platform 2012–2020, by Month*, STATISTA (Nov. 25, 2020), <http://www.statista.com/statistics/266572/market-share-held-by-smartphone-platforms-in-the-united-states>. But Apple’s revenue share is likely more important for measuring Apple’s power to control users and developers’ economic decisions. Developers care about the potential revenue from their apps as they are in the business to make money. Users, on the other hand, want to have as many apps and as many quality apps as possible. Their willingness to pay for in-app digital goods (which reveals their preferences) is thus a good sign of their demand for digital goods.

88. J. Clement, *App Spend Distribution Between Apple App Store and Google Play 2012–2018*, STATISTA (June 17, 2020), <https://www.statista.com/statistics/259510/revenue-distribution-between-the-apple-app-store-and-google-play>.

89. See, e.g., *Bodet v. Charter Commc’ns*, Civil Action No. 09-3068 Section “F,” 2010 U.S. Dist. LEXIS 87088, at *18–19 (E.D. La. 2010) (finding a 69% market share sufficient for inferring plausible market power); *In re Cox Enters., Set-Top Cable TV Box Antitrust Litig.*, No. 09-ML-2048-C, 2010 U.S. Dist. LEXIS 58417, at *19–20 (W.D. Okla. 2010) (finding 59% sufficient for inferring plausible market power); cf. *Dickson v. Microsoft Corp.*, 309 F.3d 193, 209 n.20 (4th Cir. 2002) (finding 30% insufficient for inferring plausible market power).

90. See 3B AREEDA & HOVENKAMP, *supra* note 81, ¶ 801a. The term “monopoly” in the antitrust sense does not necessarily mean a firm with 100% market share. Rather it often refers to what economists call a dominant firm. See *id.* ¶ 801. The distinction is perhaps partly a result of antitrust law’s purpose to prevent dominant firms from becoming perfect economic

B. BARRIERS TO ENTRY

As discussed in Part III, user and developer lock-ins, strong network effects, and economies of scale and scope in the form of broad ecosystems—factors courts have recognized in antitrust cases—create significant barriers to entry that protect Apple.⁹¹ Strong lock-in features, in particular, further strengthen Apple's power over both consumers and developers by increasing switching costs. The Supreme Court held in *Eastman Kodak* “[i]f the cost of switching is high, [buyers] who already have purchased the equipment, and are thus ‘locked in,’ will tolerate some level of [supracompetitive prices],” which is a sign of seller's market power.⁹²

As Section III.C has mentioned, iPhone users face switching costs of at least \$250⁹³ and rarely switch to a different platform—the iPhone's retention rate is consistently in the high 80% in the United States, and more recently it has been above 90%.⁹⁴ The \$250 estimate only factors in “application purchasing cost, accessory purchasing cost, and uncertainty from the possibility of additional post-transition payment increase.”⁹⁵ Apple's strong product ecosystem likely poses even higher costs due to the incompatibility of the other Apple-specific smart devices that people own. Even if iPhone apps see a 5% price increase—a threshold antitrust enforcement agencies often use to infer monopolist status if the move does not reduce profits⁹⁶—which would

monopolies. The law's focus regarding market power is thus often on a firm's ability to exclude competitors and become a perfect monopoly.

91. See *United States v. Microsoft Corp.*, 253 F.3d 34, 55 (D.C. Cir. 2001) (finding an “applications barrier to entry” from “chicken-and-egg” effects of consumer preference for operating systems with many applications and developer preference to write software for a substantial customer base—essentially network effects—which “protects a dominant operating system irrespective of quality”); *Image Tech. Servs. v. Eastman Kodak Co.*, 125 F.3d 1195, 1208 (9th Cir. 1997) (finding entry barriers in part due to economies of scale); *Kodak*, 504 U.S. at 476 (finding lock-ins to contribute significantly to market power).

92. 504 U.S. at 476–77.

93. See text accompanying note 69.

94. See Joe Rossignol, *CIRP Says iOS Loyalty ‘Hit the Highest Levels We’ve Ever Measured’ Last Quarter*, MACRUMORS (Jan. 28, 2019), <https://www.macrumors.com/2019/01/28/cirp-iphone-android-loyalty-4q18/>; Gordon Gottsegen, *Almost All iPhone Users Will Buy Another iPhone*, *Says Survey*, CNET (May 18, 2017), <https://www.cnet.com/news/apple-iphone-92-percent-retention-morgan-stanley-survey>. Similar reasons give Android strong lock-ins as well. Both platforms thus likely have power beyond their market share numbers, making them arguably two quite distinct markets.

95. Park & Koo, *supra* note 69, at 313–14.

96. See *Horizontal Merger Guidelines*, DEP'T OF JUST. §§ 4.1.1–2 (Aug. 19, 2010), <https://www.justice.gov/atr/horizontal-merger-guidelines-08192010>.

amount to \$5 per user given the average app spending of \$100,⁹⁷ users would likely tolerate the price hike as their switching costs would be over 50 times higher. Even with a 30% price increase, switching costs would still be more than eight times higher, allowing Apple to maintain supracompetitive profits to a significant extent.

These barriers thus prevent competition from easily accessing Apple's users, making the company's power over its user base and in turn the developers who covet these users much stronger than the 71% market share implies.

C. DIRECT EVIDENCE

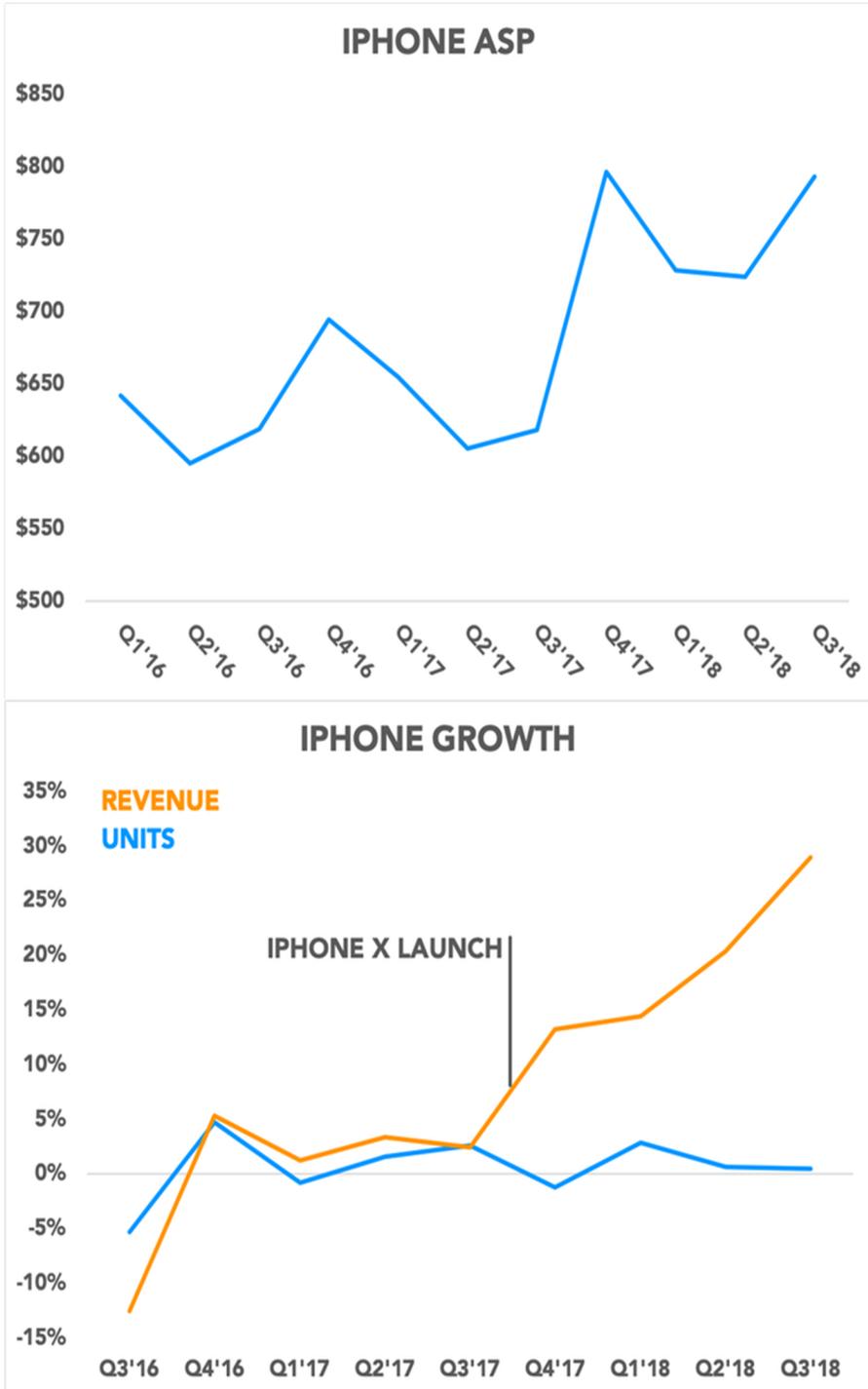
Direct evidence of the actual exercise of control over prices or the actual exclusion of competition from the relevant market can more strongly indicate monopoly power.⁹⁸ Despite raising iPhone's prices by around 33% over the past few years, Apple continues to see its sales volume remain steady and revenue grow, as Figure 1 shows.⁹⁹

97. See Randy Nelson, *U.S. iPhone Users Spent an Average of \$100 on Apps in 2019, Up 27% from 2018*, SENSOR TOWER (Mar. 25, 2020), <https://sensortower.com/blog/revenue-per-iphone-2019>.

98. See *Eastman Kodak v. Image Tech. Servs.*, 504 U.S. 451, 477–78 (1992) (“It is clearly reasonable to infer that Kodak has market power to raise prices and drive out competition . . . [from] direct evidence that Kodak did so.”); *FTC v. Ind. Fed’n of Dentists*, 476 U.S. 447, 460–61 (1986) (using direct proof to show market power).

99. See Niu, *supra* note 68.

Figure 1: iPhone Average Selling Price and Sales



This pricing power is against the backdrop of the iPhone's narrowing advantage over Android phones. For example, CNET has given Samsung's Galaxy S20 (its latest flagship phone as of this writing) a score of 8.7 compared to a similarly priced iPhone model's 8.8.¹⁰⁰ Yet after Samsung raised its premium phones' prices, its smartphone profits dropped by 42% due to "weak sales momentum . . . and stagnant demand for [its] premium products."¹⁰¹ The contrast demonstrates Apple's unique market power stemming from its platform lock-ins that in many ways make iOS a distinct market over which Apple has monopoly control.¹⁰²

Further, Apple has indeed exercised its power to exclude rivals, as Section VI.A discusses, and sustained supracompetitive prices. The continued existence of an inefficient 30% in-app purchase fee, as Part V details, is direct evidence of Apple's power. The Seventh Circuit has held "[market power] means power over price The best way to show power over price is to establish directly that the price of the tied package is higher than the price of components sold in competitive markets."¹⁰³ Google's Android allows certain developers to distribute their paid in-app digital goods (e.g., ebooks and downloaded songs) without using its in-app purchase services,¹⁰⁴ effectively eliminating any associated fees. Tinder, for example, recently decided to not use Google's payment system as to avoid any fee, whereas it still has to use Apple's in-app purchase system and pay the Apple tax on iOS.¹⁰⁵ Epic Games, the maker of Fortnite (one of the most popular video games in history), has similarly exited Google's Play Store and now uses its own payment system to avoid fees; but it had to tolerate Apple's in-app purchase system for two years

100. See Scott Stein, *Apple iPhone XS Max Review*, CNET (Dec. 17, 2018), <https://www.cnet.com/reviews/apple-iphone-xs-max-review>; Jessica Dolcourt, *Galaxy S20 5G Review: Top-Shelf Specs, But Plenty of Room for Refinement*, CNET (Mar. 13, 2020), <http://www.cnet.com/reviews/samsung-galaxy-s20-5g-review>.

101. See Catherine Shu, *Samsung Posts 55.6% Drop in Second-Quarter Profit as It Copes with Weak Demand and a Trade Dispute*, TECHCRUNCH (July 31, 2019), <https://techcrunch.com/2019/07/30/samsung-posts-55-6-drop-in-second-quarter-profit-as-it-cope-with-weak-demand-and-a-trade-dispute>.

102. See *Kodak*, 504 U.S. at 473–78 (finding distinct market from strong lock-ins and high switching costs).

103. *Will v. Comprehensive Accounting Corp.*, 776 F.2d 665, 671–72 (7th Cir. 1985) (citations omitted).

104. See GOOGLE PLAY, *Monetization and Ads*, PLAY CONSOLE HELP, <https://play.google.com/about/monetization-ads> (last visited Jan. 4, 2021) (listing a variety of monetization strategies, including paid distribution, in-app products, subscriptions, and ad-based models).

105. See Olivia Carville, *Tinder Bypasses Google Play Joining Revolt Against App Store Fee*, BLOOMBERG (July 19, 2019), <https://www.bloomberg.com/news/articles/2019-07-19/tinder-bypasses-google-play-joining-revolt-against-app-store-fee>.

because it is forbidden to use alternative payment mechanisms on iPhone.¹⁰⁶ This disparity clearly indicates that Apple has some unique power that others in the market simply do not have.¹⁰⁷

The story of Nintendo in the video game console market provides a telling parallel. With a similar market structure where Nintendo serves both as the gaming platform operator and games distributor for third-party developers, Nintendo charged developers essentially \$44 per game sold around late 80s when it had dominance in the gaming console market and tied game cartridge manufacturing to distribution.¹⁰⁸ Nintendo eventually had to cut its royalty rate to \$7 per game due to both FTC scrutiny that undid the tie and successive competition from Sega, Sony, and Microsoft.¹⁰⁹ In contrast with Apple's basically constant rate of around 30%, this precipitous decline shows that only with market power can a platform maintain a supracompetitive, inefficient price for a tied service.

Combined with indirect evidence of Apple's market power such as dominant market share and barriers to entry, direct evidence such as its unique

106. See Nick Statt, *Fortnite for Android Will Ditch Google Play Store for Epic's Website*, THE VERGE (Aug. 3, 2018), <https://www.theverge.com/2018/8/3/17645982/epic-games-fortnite-android-version-bypass-google-play-store>. Epic's Fortnite was also removed from the iOS App Store in August 2020 after Epic sued Apple. Fortnite's daily active users on iOS have declined by over 60% since then, supporting Apple's economic power over Epic. See Sean Hollister, *Read Epic's New, Full Argument Why a Court Should Force Apple to Reinstate Fortnite*, THE VERGE (Sept. 5, 2020), <https://www.theverge.com/2020/9/5/21423889/fortnite-epic-apple-preliminary-injunction-filing-ios-mac>.

107. Although Apple has offered a reduced 15% fee for subscription apps starting their second year after maintaining a uniform 30% tax for eight years, this is only a very partial exception, and it may more properly be interpreted as an attempt to price discriminate, appease sophisticated developers, and deter them from opposing and changing the rule. In fact, Apple's overall take rate has only changed from 30% to 26.4% as a result of the 15% exception according to an estimate. See *Dedicated to the Best Store Experience for Everyone*, APPLE, <https://www.apple.com/ios/app-store/principles-practices> (last visited Jan. 4, 2021); Roger Fingas, *Apple Announces It Will Offer App Store Subscriptions to All Apps, Take Smaller 15% Cut*, APPLEINSIDER (June 08, 2016), <https://appleinsider.com/articles/16/06/08/apple-announces-it-will-offer-app-store-subscriptions-take-smaller-15-cut>; *Apple Discloses Key App Store Financial Data Point, Hulu Revises Pricing, Aetna and Apple Announce Watch Partnership*, ABOVE AVALON (Jan. 29, 2019), <https://www.aboveavalon.com/dailypremiumupdate/2019/1/29/apple-discloses-key-app-store-financial-data-point-hulu-revises-pricing-aetna-and-apple-announce-watch-partnership>.

108. See Andrei Hagiu, *Microsoft Xbox: Changing the Game?* 6-13 (Harv. Bus. Sch., Case No. 9-707-501, 2007) (on file with author).

109. See *id.*; Andrew Quemere, *The People Versus Mario: The FTC's Forgotten Investigation into Nintendo in the '90s*, MUCKROCK (Feb. 2, 2017), <https://www.muckrock.com/news/archives/2017/feb/02/people-versus-mario-ftcs-investigation-nintendo>; DAVID S. EVANS, ANDREI HAGIU & RICHARD SCHMALENSE, *INVISIBLE ENGINES: HOW SOFTWARE PLATFORMS DRIVE INNOVATION AND TRANSFORM INDUSTRIES* 126 (2008).

pricing power, actual exclusion, and sustained supracompetitive prices tend to strongly support Apple's dominance. When consumers and developers find it hard to switch away even in the face of price hikes and quality degradation, Apple's dominance over this sticky user base thus makes the platform a de facto monopoly.

V. TYING: FORCING THE APPLE TAX

Apple has abused its dominance by tying the distribution of digital goods to its proprietary in-app purchase (IAP) payment system to impose a 30% tax and extract supracompetitive profits, leading to higher app prices and reduced innovation through illegal tying. At the core of the tying doctrine is a forced, inefficient, and often unwanted combination of transactions achieved through imposition of market power.¹¹⁰ This Part will show the IAP tie is illegal and hurts consumers and developers alike to the extent of billions of dollars.

Apple's App Store is the sole channel through which iPhone users can download iOS apps.¹¹¹ Third-party (i.e., non-Apple) app developers have to submit the apps they have created to Apple for its review and approval.¹¹² Third-party apps cannot reach iPhone consumers without following Apple's rules and guidelines, including those governing app monetization.¹¹³

Beyond the basic functionality provided by downloading an app, developers may sell bonus features or digital goods within the app,¹¹⁴ such as "subscriptions, in-game currencies, game levels, access to premium content, or unlocking a full version."¹¹⁵ This is an important way for developers to monetize their creations, generating tens of billions of dollars a year in revenue.¹¹⁶ However, for in-app digital goods to be distributed to purchasing users, developers must configure their apps so that all purchases of the digital

110. See *Jefferson Par. Hosp. Dist. No. 2 v. Hyde*, 466 U.S. 2, 12 (1984).

111. See *App Store Review Guidelines* § 3.2.2, APPLE DEVELOPER, <https://developer.apple.com/app-store/review/guidelines> (last visited Jan. 4, 2021) [hereinafter *App Store Review Guidelines*] (forbidding apps "similar to the App Store"). The App Store is the sole channel unless users employ technical hacks known as "jailbreaking," which has always been a small niche and has increasingly fallen out of use these days. See Lorenzo Franceschi-Bicchierai & Brian Merchant, *The Life, Death, and Legacy of iPhone Jailbreaking*, VICE (June 29, 2017), <https://www.vice.com/en/article/8xa4ka/iphone-jailbreak-life-death-legacy>.

112. See *App Store Review Guidelines*, *supra* note 111.

113. See *id.* § 3.

114. See *In-App Purchase*, APPLE DEVELOPER, <https://developer.apple.com/in-app-purchase> (last visited Jan. 4, 2021).

115. *App Store Review Guidelines*, *supra* note 111, § 3.1.

116. See J. Clement, *Worldwide Gross App Revenue of The Apple App Store from 2017 to 2019*, STATISTA (Jan. 2020), <https://www.statista.com/statistics/296226/annual-apple-app-store-revenue>.

goods go through Apple's IAP system, which processes the transactions.¹¹⁷ With very limited exceptions, Apple takes a 30% cut from all such third-party IAP transactions for using its payment system.¹¹⁸ For example, for every ten dollars consumers pay for a Pandora streaming music subscription, three dollars go to Apple. This 30% fee operates essentially like a tax, allowing Apple to profit from developer revenues often only tenuously related to Apple's efforts.

The App Store's rules forbid developers from offering alternative payment mechanisms or even providing information about them: "Apps may not use their own mechanisms to unlock content or functionality, such as license keys, augmented reality markers, QR codes, etc. Apps and their metadata may not include buttons, external links, or other calls to action that direct customers to purchasing mechanisms other than in-app purchase."¹¹⁹ Apps violating these rules will be rejected or removed from the App Store. The rules thus forcefully combine the IAP system with the distribution of paid digital goods and serve to enable and protect Apple's tax revenue.

A. ESTABLISHING THE IAP TIE

Section 1 of the Sherman Act prohibits tying in restraint of trade.¹²⁰ In addition to market power discussed in Part IV, courts generally require four factors in finding illegal tying: (1) two separate products or services are involved; (2) the sale of one product or service is conditioned on the purchase of another; (3) anticompetitive effect in the market for the tied product affects not an insubstantial amount of interstate commerce; and (4) procompetitive efficiencies of the tie do not outweigh its anticompetitive effect.¹²¹ The sections below analyze how the IAP tie meets the first three elements of the judicial test for illegal tying and restrains competition (while Section V.A analyzes how the IAP tie meets the fourth element).

117. *See id.*

118. *See App Store Review Guidelines, supra* note 111, § 3; SPOTIFY, *Five Fast Facts, TIME TO PLAY FAIR*, <https://timetoplayfair.com/facts> (last visited Jan. 4, 2021). Apple announced that it would reduce its tax rate to 15% for developers earning less than \$1 million per year starting January 1, 2021, but this move will affect only 5% of Apple's App Store revenue and thus does not make a significant difference to Apple's policy overall. *See Nicas, supra* note 14.

119. *App Store Review Guidelines, supra* note 111, § 3.1.1.

120. Other prohibitions on tying arrangements include Clayton Act § 3, 15 U.S.C. § 1, 14, and the Federal Trade Commission Act § 5, 15 U.S.C.A. § 45; *see also* HOVENKAMP, *supra* note 35, at 534, 537 (discussing the statutory scheme prohibiting tying in restraint of trade).

121. *See* 10 AREEDA & HOVENKAMP, *supra* note 81, ¶¶ 1702, 1760 (4th ed. 2019); *see also* United States v. Microsoft Corp., 253 F.3d 34, 84–97 (D.C. Cir. 2001) (en banc) (holding that rule of reason and in particular consideration of efficiencies may be needed in the case of tying software products).

1. *Separability*

For two services to be separate, “there must be sufficient [buyer] demand so that it is efficient for a firm to provide [one service] separately from [another].”¹²² Courts have found sufficient separate demand when the two offerings have previously been sold separately and when other industry suppliers sell them separately.¹²³

Apple had itself offered distribution of in-app subscriptions independent of IAP services until 2011.¹²⁴ In fact, many subscription app developers protested the bundling when the rule was introduced.¹²⁵ Moreover, Android allows certain apps to distribute digital goods (e.g., ebooks and downloaded songs) without using its IAP services.¹²⁶ Separate demand thus does exist for IAP and distribution.

2. *Forceful Conditioning*

Courts require proof of coercion to establish forceful conditioning,¹²⁷ for which often “a formal agreement is . . . sufficient.”¹²⁸ Apple requires the use of IAP by fiat through the App Store rules, forbidding all alternative payment mechanisms.¹²⁹ As developers cannot distribute apps without following these rules, coercion is clearly established.

122. *Eastman Kodak v. Image Tech. Servs.*, 504 U.S. 451, 462 (1992).

123. *See id.*; *Associated Press v. Taft-Ingalls Corp.*, 340 F.2d 753, 759–64 (6th Cir. 1965).

124. *See Why You Should Fight Apple’s Subscription Extortion*, TREEHOUSE (Feb. 15, 2011), <https://blog.teamtreehouse.com/why-you-should-fight-apples-subscription-extortion>; Press Release, Apple, Apple Launches Subscriptions on the App Store (Feb. 15, 2011), <https://web.archive.org/web/20110307215013/https://www.apple.com/pr/library/2011/02/15appstore.html> (announcing the policy); John Gruber, *Dirty Percent*, DARING FIREBALL (Mar. 1, 2011), https://daringfireball.net/2011/03/dirty_percent.

125. *See, e.g.*, TREEHOUSE, *supra* note 124 (“I’d . . . NOT [pay] 30% of all my revenue going forward [for some IAP services].”).

126. *See* GOOGLE PLAY, *Monetization and Ads*, DEVELOPER POL’Y CTR., <https://play.google.com/about/monetization-ads> (last visited Jan. 4, 2021); *see also* Olivia Carville, *Tinder Bypasses Google Play Joining Revolt Against App Store Fee*, BLOOMBERG (July 19, 2019), <https://www.bloomberg.com/news/articles/2019-07-19/tinder-bypasses-google-play-joining-revolt-against-app-store-fee> (“[To avoid Android’s IAP services] Match . . . changed the payment method in-app . . . Others have instead forced subscribers back to their own websites to enter payment information.”).

127. *See* *Paladin Assocs. v. Mont. Power Co.*, 328 F.3d 1145, 1159 (9th Cir. 2003).

128. *Ungar v. Dunkin’ Donuts of Am., Inc.*, 531 F.2d 1211, 1224 (3d Cir. 1976).

129. *See* text accompanying note 119.

B. CONSUMER HARM: TAXING THE APP ECONOMY

Recent cases increasingly require an inquiry into anticompetitive effects in the tied product market, even for per se tying claims.¹³⁰ Specifically, courts consider an alleged anticompetitive arrangement's impact on price, quality, quantity, and innovations.¹³¹

Here, the consumer-side harm is two-fold. First, despite already paying high prices for the iPhone, users must pay higher prices for apps as developers pass on the overcharge; their experience then suffers from reduced quality and innovations in the iPhone experience. For example, the following table shows that nearly all major music streaming apps are 30% more expensive on iOS than Android; the exception is Apple Music as Apple does not pay the 30% fee itself.¹³²

Table 1: iOS Subscription Prices for Major Music Streaming Apps

	Spotify*	Pandora	Tidal	YouTube Music	Apple Music
iOS	\$12.99	\$12.99	\$12.99	\$12.99	\$9.99
Android	\$9.99	\$9.99	\$9.99	\$9.99	N/A
*Before Spotify stopped in-app iOS subscriptions in 2016					

When developers don't charge 30% higher, perhaps because their customers are more price sensitive, developers are left with less to invest in improving quality. This loss can amount to tens of billions of dollars that Apple

130. *See, e.g.,* *Princo Corp. v. Int'l Trade Comm'n*, 616 F.3d 1318, 1338 (Fed. Cir. 2010); *E & L Consulting v. Doman Indus.*, 472 F.3d 23, 32 (2d Cir. 2006); HOVENKAMP, *supra* note 35, at 535. Illegal tying also requires that a "not insubstantial amount of commerce" in the tied product must be affected, which is a de minimus test easy to meet for the IAP processing market worth billions of dollars. *See, e.g.,* *Tic-X-Press v. Omni Promotions Co.*, 815 F.2d 1407, 1419 (11th Cir. 1987) (finding \$10,091 not insubstantial).

131. *See, e.g.,* *Ohio v. Am. Express Co.*, 138 S. Ct. 2274, 2282, 2288–90 (2018) (considering innovation, price, output, and quality effects).

132. The table is as of April 30, 2019—except Spotify, which used to charge 30% more on iOS too but decided to pull out of the IAP system altogether in 2016 and stopped offering subscription on iOS. *See A Timeline: How We Got Here*, SPOTIFY, <https://www.timetoplayfair.com/timeline> (last visited Jan. 4, 2021) [hereinafter *Spotify Timeline*].

has taken from developers.¹³³ Furthermore, the burden of the IAP fee has forced some app publishers to exit the IAP system altogether—Netflix, Spotify, Kindle, and YouTube TV are prominent examples.¹³⁴ Due to Apple's restrictions, these apps cannot even communicate to customers about alternative channels (e.g., developers' websites).¹³⁵ As a result, iPhone users can become frustrated by their inability to acquire digital content available on other platforms.

Second, the IAP-enforced 30% tax has lessened competition in key downstream app markets. For example, Apple exempts Apple Music from the 30% fee while maintaining the tax for its rivals including Spotify. Given these apps' thin margin—Spotify's gross profit margin for its subscription-based services was at 27% in 2018,¹³⁶ for instance—the 30% tax makes it economically unfeasible for Spotify et al. to maintain the \$9.99 price tag on iOS as they do on Android: if Spotify did so, it would be losing money on

133. See Press Release, Apple, Apple Rings in New Era of Services Following Landmark Year (Jan. 8, 2020), <https://www.apple.com/newsroom/2020/01/apple-rings-in-new-era-of-services-following-landmark-year>. Developers have made \$155 billion between 2008 and 2019 through the App Store. Based on a 30% charge by Apple (which means developers retain 70% of all revenue), Apple's App Store revenue would be $155/0.7*0.3 = \$66.4$ billion during this period.

134. See Juli Clover, *YouTube TV Ending Support for App Store Subscriptions in March*, MACRUMORS (Feb. 13, 2020), <https://www.macrumors.com/2020/02/13/youtube-tv-app-store-subscriptions-ending>; Stuart Dredge, *Netflix Joins Spotify in Bypassing Apple in-App Subscriptions*, MUSIC ALLY (Aug. 22, 2018), <https://www.musically.com/2018/08/22/netflix-joins-spotify-in-bypassing-apple-in-app-subscriptions>.

135. See *Spotify Timeline*, *supra* note 132.

136. See Spotify Tech. S.A., Annual Report (Form 20-F) at 50 (Feb. 12, 2019), https://s22.q4cdn.com/540910603/files/doc_financials/annual/SPOT_20F_Master-Master_Exhibits_HTML.pdf. Spotify's gross profit margin for subscription services is likely to be almost the same for its iOS, Android, and PC versions, as its component parts tend not to vary by platform. Spotify's gross profit margin is based solely on (i) the revenue of its streaming services, which include subscription-based premium services and ad-supported free services and (ii) the cost of providing these services, including royalty and distribution costs related to content streaming, but not including, for example, R&D, marketing, and administrative expenses. See *id.* at 48–50, F-10. The margins for premium and ad-supported services are respectively 27% and 18% in 2018, both below 30%. See *id.* at 50. Spotify's royalty costs, the biggest component of its cost of revenue that makes up Spotify's gross profit margin, are calculated based on either a percentage of revenue, a per user amount, or an amount per play. See *id.* at 45. None of these three considerations is likely to change because of the platform (iOS, Android, or PC) on which a song is played/streamed. Spotify does not disclose methodologies for calculating distribution costs for content streaming, the remaining cost component of Spotify's gross profit margin, likely because this component is not significant enough (or else Spotify would be required to disclose its methodologies under securities law's prohibition against material omission). Other than these cost considerations, margin calculations do not discriminate between different sources of revenue.

every subscription it sells. Given Apple Music's already quite dominant position, having surpassed Spotify in paid iOS listeners in the United States,¹³⁷ competitors will understandably tend to shy away in the face of these additional anticompetitive restrictions. Consumers are thus seeing less competition and innovation in the streaming music space. Spotify's recent pivot away from music toward podcasts is a testament to the reduced head-to-head competition for streaming music.¹³⁸

As Apple enters more service markets,¹³⁹ the threat of this 30% tax will grow more prominent, as digital content services often have thin gross margins around or lower than 30%.¹⁴⁰ Subscription apps such as Spotify are critical to consumer experience. About 94% of the top 250 U.S. apps on iOS monetize through in-app subscriptions.¹⁴¹ The star apps are crucial contributors to user consumption—the top 1% of apps generate 93% of all revenue and 80% of new installs.¹⁴² Damaging subscription apps may thus have a significant negative impact on consumer welfare, a key objective of antitrust law.

137. See Anne Steele & Tripp Mickle, *Apple Music Overtakes Spotify in Paid U.S. Subscribers*, WALL ST. J. (Apr. 5, 2019), <https://www.wsj.com/articles/apple-music-overtakes-spotify-in-u-s-subscribers-11554475924>.

138. See Ben Thompson, *Spotify's Podcast Aggregation Play*, STRATECHERY (Feb. 7, 2019), <https://stratechery.com/2019/spotify-s-podcast-aggregation-play> (citing needing “a way to differentiate its service from Apple Music” as a reason for Spotify's podcast strategy). One might argue Spotify's pivot towards podcasts may be procompetitive in the podcast market, given Apple is the biggest player in podcasts as well. However, the streaming music market is much larger—at \$14 billion, it was 20 times larger than the \$700 million podcast market in 2019. See *Music Streaming*, STATISTA, <https://www.statista.com/outlook/209/100/music-streaming/worldwide> (last visited Jan. 4, 2021); A. Guttman, *Podcast Advertising Revenue in the United States from 2015 to 2019*, STATISTA (Sep. 21, 2020), <https://www.statista.com/statistics/760791/us-podcast-advertising-revenue>. A significant anticompetitive impact on streaming music is thus likely to have a much greater effect on consumer welfare than theoretical procompetitive benefits from the nascent podcast market. The net consumer impact is most likely negative to a significant extent as a result.

139. See *supra* text accompanying notes 17–20.

140. For example, between 2010 and 2019, Netflix's gross profit margin was lower than 30% for three years, between 31.3% and 32.3% for another three years, and between 36.3% and 38.3% for the remaining four years. See *Gross Profit Margin for Netflix, Inc.*, FINBOX, https://finbox.com/NASDAQGS:NFLX/explorer/gp_margin (last visited Jan. 4, 2021). Gross margin represents the percentage of total revenue a company has less costs directly related to production and distribution—in Netflix's case, the profit directly related to selling each unit of streaming content without regard to backend corporate costs.

141. Lexi Sydow, *Subscriptions: The Revenue Model Powering Mobile Apps*, APP ANNIE (Feb. 13, 2020), <https://www.appannie.com/en/insights/market-data/subscriptions-powering-mobile-apps>.

142. Katie Williams, *The Top 1% of App Publishers Generate 80% of All New Installs*, SENSOR TOWER (Nov. 21, 2019), <https://sensortower.com/blog/top-one-percent-downloads>.

While Apple may claim its conduct has procompetitive justifications, these claimed efficiencies are either pretextual or not causally necessary for the IAP tie as Section VII.A will show.

Apple has thus abused its power over the iPhone digital goods market in forcing the IAP tie, distorting competition and creating considerable harm to consumers worth tens of billions of dollars without nearly commensurate efficiencies to compensate. It has therefore violated antitrust law for illegal tying.

VI. MONOPOLIZATION: FORTIFYING THE WALLED GARDEN

Apple distributes proprietary apps on the App Store which compete with many third-party developers' apps. Acting both as an umpire and a player, Apple has blocked or impaired rivals and given itself preferential treatment. In doing so, it has illegally maintained, expanded, and prolonged its monopoly in violation of the Sherman Act § 2.

The Sherman Act § 2 prohibits monopolization.¹⁴³ To show monopolization, in addition to establishing monopoly power as discussed in Part III, courts have required a showing of willful acquisition, enhancement, or maintenance of that monopoly power through exclusionary conduct.¹⁴⁴ Courts have not developed a clear general standard of what such exclusionary conduct entails, except that it should be “distinguished from growth or development as a consequence of a superior product, business acumen, or historic accident”¹⁴⁵—that is, anything that is not competition on the merits—and that such conduct “harm[s] the competitive process and thereby harm[s] consumers.”¹⁴⁶ However, certain specific types of conduct have been recognized in case law as exclusionary to varying degrees, including monopoly leveraging and refusal to deal.¹⁴⁷ Yet as discussed in Part II, courts' interpretations of the leveraging and refusal to deal doctrines have become too rigid to accommodate platforms' abuse of dominance, which would fit under

143. See 15 U.S.C. § 2.

144. See *Verizon Commc'ns v. Law Offs. of Curtis V. Trinko, LLP*, 540 U.S. 398, 407 (2004).

145. *United States v. Grinnell Corp.*, 384 U.S. 563, 570–71 (1966).

146. *United States v. Microsoft Corp.*, 253 F.3d 34, 84–97 (D.C. Cir. 2001) (en banc).

147. See *Berkey Photo, Inc. v. Eastman Kodak Co.*, 603 F.2d 263, 275–76 (2d Cir. 1979), *practically overruled*, *Trinko*, 540 U.S. at 415 n.4; *Aspen Skiing Co. v. Aspen Highlands Skiing Corp.*, 472 U.S. 585, 603–05 (1985).

the general monopolization standard but may go unrecognized under these two categories of specific exclusionary conduct.¹⁴⁸

This Part will show that Apple's exclusionary, self-preferencing conduct often makes rival apps worse without making its own apps better. By leveraging its dominance into downstream app markets and refusing to provide reasonable access to rivals, Apple not only reduces competition between apps on the iOS platform but also lessens competition between platforms and illegally strengthens Apple's dominance over the mobile platform market, causing irreversible and significant harm to consumers. To address this crisis, courts must reconsider their hostility towards monopoly leveraging and refusal to deal claims.

A. BLOCKING COMPETITORS, RESTRICTING RIVALS, AND SELF-PREFERENCING

This Section outlines Apple's various exclusionary, self-preferencing practices.

1. *Block Competitors*

Apple has rejected every third-party payment app that utilizes iPhone's near-field communication (NFC) chip (which allows convenient offline contactless payment), including the Samsung Pay Mini app.¹⁴⁹ This effectively blocks competitors from entering iOS in a \$100 billion proximity mobile payment market where the company's own Apple Pay service already dominates.¹⁵⁰

Apple has also refused to approve gaming apps that compete with its Apple Arcade game subscription service. It rejected Steam's video game streaming app citing "business conflicts."¹⁵¹ Apple's App Store rules also severely limit rivals' cloud gaming services, making them effectively impractical

148. See text accompanying notes 34–48.

149. See *Dutch ACM Report*, *supra* note 12, at 79, 83.

150. Apple Pay has 47.3% of U.S. proximity mobile payment users whereas Google Pay and Samsung Pay, the next two biggest players, respectively make up 19% and 16.8%. See Amy He, *Apple Pay Dominance Drives Mobile Payment Transaction Volume*, EMARKETER (Oct. 28, 2019), <https://www.emarketer.com/content/apple-pay-dominance-drives-mobile-payment-transaction-volume>.

151. See Nick Statt, *Apple Rejects Valve's Steam Link Game Streaming App over 'Business Conflicts'*, THE VERGE (May 24, 2018), <https://www.theverge.com/2018/5/24/17392470/apple-rejects-valve-steam-link-app-store-ios-game-streaming> (suggesting that Apple rejected Steam's app because the app "allows an iOS user to access another app store, namely Steam, within Apple's tightly controlled ecosystem").

on iOS¹⁵² and hampering innovation in a market otherwise expected to grow into a multi-billion-dollar opportunity by 2024.¹⁵³

Moreover, Apple once removed 11 of the 17 most downloaded apps that helped parents limit the time their children spent on Apple devices, which compete with Apple's own parental control app.¹⁵⁴ Apple claimed these apps could violate user privacy and security.¹⁵⁵ A month later, however, Apple abruptly reversed its policy, specifically permitting technologies previously cited as grounds for removal as long as the apps followed certain guidelines.¹⁵⁶ Small businesses who developed these apps lost millions of dollars following Apple's purge, with some completely shutting down.¹⁵⁷ In addition to having less useful features according to parents, Apple's screen time control tools

152. Before September 2020, only games owned or exclusively licensed by the developer would be allowed, that is, no gaming platform non-exclusively hosting third-party games such as Google's Stadia was allowed. See Mark Gurman, *Apple's App Store Rules Limit Rival Gaming Services While Arcade Runs Free*, BLOOMBERG (Mar. 25, 2020), <https://www.bloomberg.com/news/articles/2020-03-25/google-stadia-nvidia-geforce-microsoft-xcloud-not-on-apple-ios>. Apple tweaked the policies in September 2020 to nominally allow such services, but it still requires every third-party game offered to seek approval through Apple's cumbersome app review process. This new policy effectively makes it impractical to host a cloud-based gaming subscription service on iOS, as these services inherently tend to include a variety of third-party games to be useful at all. See Leswing, *supra* note 19; see also Salvador Rodriguez, *Facebook Launches Cloud Games But Says Apple Won't Allow It on iOS*, CNBC (Oct. 26, 2020), <https://www.cnbc.com/2020/10/26/facebook-launches-cloud-games-on-desktop-and-android-but-not-on-ios.html> (stating that Facebook announced the decision to not launch Facebook cloud gaming on Apple devices citing Apple's "arbitrary" policies).

153. See *Global Cloud Gaming Market is Projected to Grow at 59.0% CAGR During 2019–2024, Reaching a Value of USD 3,107 Million by 2024—ResearchAndMarkets.com*, BUS. WIRE (Jan. 24, 2020), <https://www.businesswire.com/news/home/20200124005414/en/Global-Cloud-Gaming-Market-Projected-Grow-59.0>.

154. See Jack Nicas, *Apple Cracks Down on Apps that Fight iPhone Addiction*, N.Y. TIMES (Apr. 27, 2019), <https://www.nytimes.com/2019/04/27/technology/apple-screen-time-trackers.html>.

155. See Eric Slivka, *Phil Schiller Lays Out Apple's Case for Cracking Down on Screen Time Monitoring Apps*, MACRUMORS (Apr. 27, 2019), <https://www.macrumors.com/2019/04/27/schiller-screen-time-crackdown-mdm> (explaining that Apple removed these apps because some parental management apps used Mobile Device Management technology that "enable[d] a developer to have access to and control over consumers' data and devices").

156. See *Updates to the App Store Review Guidelines*, APPLE DEVELOPER (June 3, 2019), <https://developer.apple.com/news/?id=06032019j>.

157. See Nicas, *supra* note 154; Jack Nicas, *Apple Backs Off Crackdown on Parental-Control Apps*, N.Y. TIMES (June 3, 2019), <https://www.nytimes.com/2019/06/03/technology/apple-parental-control-apps.html> (accounting that two affected small businesses lost \$3 million and more than \$1 million respectively from Apple's move, with one of them having depended on its iPhone app for 80% of the business's revenue).

require the whole family to own iPhones, whereas many affected competing apps allow parents with iPhones to control their children's Android devices.¹⁵⁸

2. *Restrict Rivals*

Apple has restricted promotions of Apple Music competitors. It rejected multiple Spotify app updates for including promotional language such as “get 3 months now for €0.99” or “Get in, Get Premium” while Apple Music sends the same kind of promotions.¹⁵⁹ This deprives consumers of valuable information about lower prices. Similar restrictions are non-existent for Apple. If a user subscribes to Apple's iOS services (such as Apple Music) and then cancels, Apple sends invasive push notifications asking her to re-subscribe.¹⁶⁰ Apple's ads are allowed by default, whereas other developers could not send such promotional notifications at all for almost all of the past twelve years.¹⁶¹ Apple's tactics suppress competition in the multi-billion-dollar iOS streaming music market (where it already holds 70% of paid users) and beyond.¹⁶²

In addition, Apple has for years prohibited third-party music from being used with Siri,¹⁶³ prevented third-party messaging apps from becoming Siri defaults,¹⁶⁴ and allegedly copied third-party apps and suppressed their search results once Apple created its own version.¹⁶⁵

158. *See id.*

159. *Spotify Timeline*, *supra* note 132.

160. *See The Paywalled Garden: iOS Is Adware*, STEVE STREZA (Feb. 17, 2020), <https://stevestreza.com/2020/02/17/ios-adware>.

161. *See id.* Third-party developers have only very recently been allowed to send promotional notifications and only with explicit user permission. *See* Mike Peterson, *Apple Updates App Store Guidelines, Sets iOS 13 SDK Requirement*, APPLE INSIDER (Mar. 4, 2020), <https://appleinsider.com/articles/20/03/04/apple-updates-app-store-guidelines-sets-ios-13-sdk-requirement>.

162. *See* BILLBOARD, *Revenue from Music Streaming in the United States from 2010 to 2019*, STATISTA (Feb. 2020), <https://www.statista.com/statistics/437717/music-streaming-revenue-usa>; Steele & Mickle, *supra* note 137.

163. Apple announced that it would be changing the rule in late 2019 for messaging apps. *See* Mark Gurman, *Apple to Loosen Reins on Outside Messaging, Phone Apps Via Siri*, BLOOMBERG (Oct. 2, 2019), <https://www.bloomberg.com/news/articles/2019-10-02/apple-to-loosen-reins-on-outside-messaging-phone-apps-via-siri>.

164. Apple modified the rule for Spotify after Spotify's antitrust complaint against Apple in March 2019. *See* Tom Warren, *Spotify Is Finally Getting Siri Support with iOS 13*, THE VERGE (Sept. 27, 2019), <https://www.theverge.com/2019/9/27/20886783/spotify-siri-integration-support-ios-13-beta-launch-airpods>; Ek, *supra* note 1.

165. *Cf.* Jon Porter, *Developer Suing Apple for Stealing Idea, Calls on Others to Join the Fight*, THE VERGE (Feb. 5, 2020), <https://www.theverge.com/2020/2/5/21124116/apple-developers-sherlocked-blix-bluelmail-anonymous-email-feature>; Nicas, *supra* note 154.

3. *Self-Preferencing*

Moreover, Apple has a pattern of self-preferencing conduct. Apple's App Store search rankings and editorial recommendations display its proprietary apps much more prominently than similar apps.¹⁶⁶ For example, Apple Arcade, the company's subscription gaming service, gets an entire tab on the App Store, which cannot be turned off.¹⁶⁷

Finally, Apple imposes the 30% tax on third-party apps through the IAP tie but not on Apple's own apps. This eats into the frequently thin profit margins of rival apps and make them less competitive, as discussed in Section V.B.¹⁶⁸

B. RAISE RIVALS' COSTS: EXCLUSIONARY AND COLLUSIVE EFFECTS

In addition to the clear exclusionary effects of Apple blocking competitors in areas such as payment services, its pattern of self-preferencing conduct can raise rivals' costs. Such conduct stifles price competition and weakens competitors for reasons unrelated to their apps' intrinsic quality.

The discriminatory 30% tax and other restrictions mentioned above (which only apply to Apple's competitors but not itself) essentially give Apple a cost advantage of at least 30%.¹⁶⁹ Consequently, even an equally efficient competitor could not compete with Apple on price due to the extra cost burden and would need to be at least 30% more efficient to survive.¹⁷⁰

166. See Jack Nicas & Keith Collins, *How Apple's Apps Topped Rivals in the App Store It Controls*, N.Y. TIMES (Sept. 9, 2019), <https://www.nytimes.com/interactive/2019/09/09/technology/apple-app-store-competition.html> ("Apple's apps have ranked first recently for at least 700 search terms in the store."); see also Mark Gurman, *Apple's Default iPhone Apps Give It Growing Edge Over App Store Rivals*, BLOOMBERG (Oct. 2, 2019), <https://www.bloomberg.com/news/articles/2019-10-02/iphone-ios-users-can-t-change-default-apps-safari-mail-music>; Tripp Mickle, *Apple Dominates App Store Search Results, Thwarting Competitors*, WALL ST. J. (July 23, 2019), <https://www.wsj.com/articles/apple-dominates-app-store-search-results-thwarting-competitors-11563897221>.

167. See Streza, *supra* note 160.

168. See text accompanying note 140.

169. *C.f.* LePage's Inc. v. 3M, 324 F.3d 141, 155 (3d Cir. 2003) ("The anticompetitive feature of package discounting is the strong incentive it gives buyers to take increasing amounts or even all of a product in order to take advantage of a discount aggregated across multiple products. . . . [In this case] even an equally efficient rival may find it impossible to compensate for lost discounts on products that it does not produce.").

170. The discussion below assumes a rival app stays in the IAP system, which is the case for 99.9% of iOS apps. For the rare exceptions such as Spotify, being outside of the IAP system presents a similar cost disadvantage from the additional promotional difficulties or experience degradation as discussed in Section VI.A. The effect on competition thus operates similarly.

The extra cost burden can either exclude rivals who are more efficient by up to 29.9% or produce an implicit collusion where rivals know that price competition would not work and thus raise the price along with Apple. Either way, consumers would suffer from stunted price competition. Such reduced competition also allows Apple to expand its dominance into downstream markets and enhances its monopoly by raising entry barriers. Even if competitors are over 30% more efficient than Apple, they would have less resources to invest in pursuing innovations. This effectively reduces their efficiency advantage by 30% and offsets the additional price cut or quality improvement consumers would otherwise receive.

As Section V.B detailed,¹⁷¹ such conduct has in fact reduced competition from important players such as Spotify and worsened user experience. Even if Apple's proprietary apps are of inferior quality to start with, the unfair advantages they receive would exclude or weaken rivals. These unfair advantages would allow Apple's apps to gain more users, more data, and more complementary players on other sides of the market (e.g., musicians in the case of Apple Music). In such a case, Apple's apps would become more dominant through network effects and scale economies, while users lose out on a potentially higher quality app market as Section III.D discussed.¹⁷²

As Apple enters more service markets,¹⁷³ Apple's exclusionary, self-preferencing conduct would threaten competition more prominently. The harm to competition and consumers means that Apple's conduct fits squarely under the general monopolization standard¹⁷⁴—especially as Apple's proclaimed efficiency justifications prove empty, as demonstrated in Part VII. Perhaps more ominously, Apple's self-preferencing can prolong and extend its monopoly over the smartphone platform market.

C. PROLONG THE PLATFORM MONOPOLY

Through its exclusionary, self-preferencing conduct, Apple further lessens the already feeble competition between iOS and Android and prolongs its own smartphone platform monopoly by weakening cross-platform apps such as Spotify, Facebook, and WeChat.

Cross-platform apps can significantly neutralize the iOS platform's differentiation and undermine Apple's dominance. WeChat provides a case in

171. See text accompanying note 138.

172. Cf. HOVENKAMP, *supra* note 35, at 395–96 (discussing a similar network market involving Windows-compatible server technology where “in a path-dependent world, even a rival's clearly superior or more cost-effective server produced by a rival cannot claim a market unless it achieves compatibility with the rest of the network”).

173. See text accompanying notes 16–20.

174. See text accompanying note 146.

point. Despite early successes, Apple has struggled in China with the rise of WeChat.¹⁷⁵ WeChat is a popular social media app with 1.1 billion monthly active users¹⁷⁶—essentially every smartphone user in China has WeChat. In addition to offering messaging services, it provides all kinds of essential digital services including mobile payment and commerce, news, ride-hailing, and food delivery.¹⁷⁷ WeChat also hosts third-party “mini-programs” that are basically mini-apps which offer services through WeChat’s light interface.¹⁷⁸ WeChat users open mini-programs four times a day on average and spent \$113 billion inside mini-programs in 2019.¹⁷⁹ The growing popularity of mini-apps makes stand-alone apps less important, eroding an important source of iPhone’s differentiation over Android—its stronger lineup of apps. The number of iOS apps downloaded in China in 2019 has fallen 12% from its peak in 2017, compared with a 22% increase in the United States over the same period.¹⁸⁰

WeChat is available on both Android and iOS. Due to WeChat’s essential role in Chinese consumers’ digital lives and the popularity of its mini-programs, the smartphone experience in China is quite similar across smartphone platforms. As a result, Chinese buyers care much less about the underlying operating system when making their smartphone purchase decisions than their Western counterparts—iPhone’s retention rate in China, defined as the percentage of users who do not switch platforms, has dropped to around 50–60% in recent years, almost half of that in the United States at 91%.¹⁸¹

175. Apple’s market share in China has stayed around 10%, compared to 50% or so in the United States. See Samantha Wong, *Smartphone Vendor Market Share in China 2014–2020*, STATISTA (Feb. 2020), <https://www.statista.com/statistics/430749/china-smartphone-shipments-vendor-market-share>; O’Dea, *supra* note 87. Its China revenue has also consistently dropped to around 25.5% lower than a 2015 peak. See Felix Richter, *The Size of Apple’s China Business*, STATISTA (Feb. 18, 2020), <https://www.statista.com/chart/13246/apple-china-revenue>; see also Thompson, *supra* note 70 (showing that Apple had its best numbers in 2015).

176. See Lai Lin Thomala, *Number of Active WeChat Messenger Accounts Q2 2011–Q2 2020*, STATISTA (Nov. 2019), <https://www.statista.com/statistics/255778/number-of-active-wechat-messenger-accounts>.

177. See Connie Chan, *When One App Rules Them All: The Case of WeChat and Mobile in China*, ANDREESSEN HOROWITZ (Aug. 6, 2015), <https://a16z.com/2015/08/06/wechat-china-mobile-first>.

178. See Wayne Ma & Juro Osawa, *How Tencent’s WeChat Poses Creeping Threat to Apple*, THE INFO. (Apr. 14, 2020), <https://www.theinformation.com/articles/how-tencents-wechat-poses-creeping-threat-to-apple>.

179. *Id.*

180. See *id.* App Store revenue growth in China slowed to 11% in 2019 from triple-digit growth rates in 2015 and 2016. *Id.*

181. See Josh Horwitz, *The Next iPhone Will Mark a Major Test for Apple in China*, QUARTZ (Sept. 11, 2017), <https://qz.com/1073634/the-next-iphone-will-mark-a-major-test-for-apple>.

Given the significance of cross-platform apps, Apple's move to weaken cross-platform apps and favor Apple-unique apps such as Apple Music is particularly problematic. First, Apple's self-preferencing conduct reduces competition between iOS and Android by undermining multihoming apps. For instance, when iOS users are unfamiliar with Spotify's premium services but are fed with push notifications about Apple Music's features, they would know less about Spotify's similar if not superior services available on both iOS and Android. Accordingly, iOS users would have less incentive to switch to Android.

Subscription apps such as Spotify are very important to smartphone owners. About 94% of the top 250 U.S. apps on iOS monetize through in-app subscriptions.¹⁸² The star apps are a critical contributor to user consumption—the top 1% of apps generate 93% of all revenue and 80% of new installs.¹⁸³

Star apps are the few ones that still multihome. For instance, only 8.8% of all iOS apps also exist on Android, while a much higher 47% of apps on the top 100 listings do so.¹⁸⁴ Their multihoming fosters robust smartphone platform competition as consumers would find it easier to switch to alternative platforms with many of the same apps.¹⁸⁵

However, with Apple's increasing exclusionary, self-preferencing conduct, multihoming apps will have a more difficult time competing on iOS even if they are more efficient. Users who already use Apple's apps would face higher costs when switching to alternative providers. This artificial distance created by Apple's self-preferencing conduct thus further locks users within Apple's

in-china (showing 50% retention rate in China); Matt Turner, *UBS Surveyed 8,000 Smartphone Users Around the World, and the Results Should Worry Apple*, BUS. INSIDER (May 28, 2019), <https://markets.businessinsider.com/news/stocks/apple-stock-price-survey-results-should-be-worry-ubs-2019-5-1028236598> (finding the iPhone China retention rate at around 50% and 60% in 2016 and 2019); Rossignol, *supra* note 94 (showing the U.S. retention rate).

182. See Sydow, *supra* note 141.

183. See Williams, *supra* note 142.

184. See Sami Hyrynsalmi, Arho Suominen & Matti Mantymaki, *The Influence of Developer Multi-Homing on Competition Between Software Ecosystems*, 111 J. SYS. & SOFTWARE 119, 123, 123 tbl.2 (2016) (examining app multihoming on App Store's free, paid, and grossing top 100 listings).

185. See Mingchun Sun & Edison Tse, *The Resource-Based View of Competitive Advantage in Two-Sided Markets*, 46 J. MGMT. STUD. 45, 57–61 (2009) (finding reduced competition in single-homing network markets); Jay Pil Choi, *Tying in Two-Sided Markets with Multi-Homing*, 58 J. INDUS. ECON. 607, 625 (2010) (“[T]ying is unambiguously welfare-reducing if multi-homing is *not* allowed.”); *United States v. Microsoft Corp.*, 253 F.3d 34, 53 (D.C. Cir. 2001) (en banc) (finding that if software on Windows is “written for multiple operating systems, its impact could be even greater” as “[t]he more developers could rely upon APIs exposed by such [software], the less expensive porting to different operating systems would be”).

ecosystem and weakens cross-platform competition without necessarily making the consumer experience better.

Second, Apple's conduct slows the rise of new generations of platforms that exist on top of iOS and Android. Facebook's Instant Games platform, which offers mobile games within Facebook, has introduced in-app purchase features for both Android and its web version, but conspicuously not on iOS.¹⁸⁶ Apple's 30% tax is likely a significant factor because when both Facebook and Apple take a cut from game developers' revenue, it becomes harder for developers to profit. Similarly, WeChat's mobile gaming platform generated hundreds of millions of dollars from in-app purchases on Android but has not launched in-app purchase systems on iOS for the explicit reason of the 30% tax.¹⁸⁷ The monetization potential of WeChat's mini-programs is likewise limited. Tencent's guidelines for mini-program developers warn them not to offer digital goods on iOS, but they can provide the goods on Android.¹⁸⁸ This limitation has been a focal point in ongoing negotiations between WeChat and Apple.¹⁸⁹

What these new software platforms and multihoming apps can do is commoditize the iOS platform by creating a new layer of experience independent of the underlying smartphone OS. If users want a WeChat mini-program, a Facebook game instead of a particular iOS app, or multihoming apps such as Spotify, they can find them on both iOS and Android. In many ways, this challenge is similar to Netscape's threat to Windows, where a rising internet browser could commoditize Microsoft's PC operating system monopoly by providing desirable web applications regardless of the underlying OS.¹⁹⁰ To the extent that they limit the rise of future platforms existing on top of iOS, Apple's actions are not unlike what Microsoft did around the turn of the century to prolong its PC operating system monopoly, which the D.C.

186. See Sarah Perez, *In-App Purchases Are Coming to Facebook's Instant Games on Android and the Web*, TECHCRUNCH (May 1, 2018), <https://www.techcrunch.com/2018/05/01/in-app-purchases-are-coming-to-facebooks-instant-games-on-android-and-the-web>.

187. Mengfan Chen, *Special Report | Mini-Programs Facing Battle, Official Accounts Under Pressure—WeChat's Rise and Crises*, CAIXIN WEEKLY (Feb. 25, 2019), <http://weekly.caixin.com/2019-02-23/101382875.html?p0#page2>.

188. See Ma & Osawa, *supra* note 178.

189. See Chen, *supra* note 187.

190. See *Microsoft*, 253 F.3d at 53, 60 (finding that Netscape is the "middleware" that exposes its own APIs (interfaces for third-party developers) and "could take over some or all of Windows's valuable platform functions" which can erode Microsoft's Windows monopoly, as "[a]pplications written to a particular browser's APIs . . . would run on any computer with that browser, regardless of the underlying operating system" and consumers would as a result "no longer feel compelled to select Windows").

Circuit found to constitute illegal monopolization.¹⁹¹ Apple's conduct thus deserves similar antitrust scrutiny and courts should recognize its harm to competition both in the smartphone platform market and the downstream app markets. These harms make Apple's conduct fit under the general monopolization standard,¹⁹² particularly as Apple's proclaimed efficiency justifications ring hollow as Part VII discusses.

VII. HOLLOW EFFICIENCIES AND LESS RESTRICTIVE ALTERNATIVES

Apple may claim its IAP tie and conduct restricting it rivals has procompetitive efficiency justifications, a defense both tying and monopolization cases have considered.¹⁹³ As this Part will show, however, these claimed justifications are either pretextual or not causally necessary and are thus not a sufficient defense.

In considering efficiency justifications, courts often conduct a balancing test that weighs the harm and benefits of the conduct at issue.¹⁹⁴ Given the complexity of balancing two often highly uncertain and complicated effects, however, courts often further employ the Less Restrictive Alternative (LRA)

191. *See id.* at 64, 71–72, 76–78 (finding that a series of Microsoft's restrictive agreements with suppliers and partners to limit Netscape, as well as its actions to undermine non-Microsoft Java virtual machines (another middleware), “represent uses of Microsoft's market power to protect its monopoly” over computer operating systems which “violate § 2 of the Sherman Act”); *see also* Robin Cooper Feldman, *Defensive Leveraging in Antitrust*, 87 GEO. L.J. 2079 (1999) (“Microsoft is leveraging into browsers for one key reason: to prevent browsers from eroding Microsoft's formidable monopoly in the operating systems market.”). Microsoft relied on external partners to limit the distribution of rival browsers and Java virtual machines. *See Microsoft*, 253 F.3d at 60. But Apple can undermine multihoming apps and future platforms on its own thanks to its tight grip on iOS app distribution.

192. *See* text accompanying note 146.

193. *See, e.g.,* *Int'l Salt Co. v. United States*, 332 U.S. 392, 397–98 (1947); *Metrix Warehouse v. Daimler-Benz A.G.*, 828 F.2d 1033, 1035 (4th Cir. 1987); *Breaux Bros. Farms v. Teche Sugar Co.*, 21 F.3d 83, 89 (5th Cir. 1994); *Viamedia, Inc. v. Comcast Corp.*, 951 F.3d 429, 461 (7th Cir. 2020) (supporting a “balancing” test in monopolistic refusal to deal cases).

194. *See, e.g.,* *Eastman Kodak v. Image Tech. Servs.*, 504 U.S. 451, 486 (1992) (leaving as question on remand whether procompetitive effects “outweighed” anticompetitive effects); *Cal. Dental Ass'n v. FTC*, 526 U.S. 756, 771, 774 (1999) (refusing to ignore that gains to competition will outweigh costs from the elimination of across-the board advertising).

test to simplify the calculus.¹⁹⁵ The test asks whether an alternative exists that serves the beneficial goal equally well but with a less anticompetitive effect.¹⁹⁶

A. IAP TIE

Apple proponents have claimed that efficiencies including security, ease of use, app discovery or promotion, app quality control, and general developer support justify Apple's use of the IAP tie.¹⁹⁷ The argument is that if Apple controls the in-app transaction process, it will ensure payment safety and provide a smooth experience; the proceeds from its 30% tax can then be used for promoting third-party apps in the App Store and to support app quality control, development, and distribution. However, applying the balancing and LRA tests shows that these proclamations ring rather hollow.

Some easy balancing for certain key apps exposes the weakness of these claims. To begin with, Apple's promotions are not worth the 30% tax for many big brands like Spotify and Netflix—they are big enough to attract customers themselves without Apple's help. If anything, Apple also benefits from these popular apps in driving demand for the iPhone.¹⁹⁸ In fact, some big app makers have stated they actively do not want Apple's services or other first-party services, if given the choice. For example, Epic Games, the creator of Fortnite, pulled out of the Google Play store and explicitly said it would have done the

195. See C. Scott Hemphill, *Less Restrictive Alternatives in Antitrust Law*, 116 COLUM. L. REV. 927, 937–38, 941, 947–55 (2016) (discussing the difficulty of balancing and how courts often sidestep that question by using the LRA test); *Jefferson Par. Hosp. Dist. No. 2 v. Hyde*, 466 U.S. 2, 25 n.42 (1984) (rejecting “goodwill” defenses in light of less restrictive alternative of using contractual quality specifications); *Fortner Enters., Inc. v. U.S. Steel Corp.*, 394 U.S. 495, 503 (1969) (discussing cases where “tying arrangements generally served no legitimate business purpose that cannot be achieved in some less restrictive way”); *Daimler-Benz A.G.*, 828 F.2d at 1040 (“An asserted business justification cannot salvage a tying arrangement that is otherwise per se unlawful without proof that means less restrictive than the tie-in were not feasible to achieve the desired protection.”).

196. See Hemphill, *supra* note 195, at 937.

197. See *Online Platforms and Market Power, Part 2: Innovation and Entrepreneurship*, Hearing Before H. Judiciary Comm., Subcomm. on Antitrust, Commercial, and Admin. Law (July 16, 2018) (Statement of Kyle Andeer, Apple) (discussing the benefits of the Apple ecosystem, including improved security, ease of use, and integration); Press Release, Apple, Addressing Spotify's Claims (Mar. 14, 2019), <https://www.apple.com/newsroom/2019/03/addressing-spotifys-claims> (discussing the benefits provided by Apple, such as critical software tools and secure payment systems, to Spotify).

198. Apple itself ran a popular ad campaign with the slogan “There’s an app for that.” See Brian X. Chen, *Apple Registers Trademark for “There’s an App for That,”* WIRED (Oct. 11, 2010), <https://www.wired.com/2010/10/app-for-that>.

same for the iOS version of the battle royale game but for Apple's restrictions on installation of apps from third-party sources.¹⁹⁹

These supposed efficiency justifications crumble further in the face of three LRAs. First, Apple would actually profit more from offering lower fees to the big apps, and that it has not done so suggests ill intent implying likely anticompetitive effect. Netflix, for example, generated \$853 million in 2018 revenue on iOS before it pulled out of IAP, which means Apple's 30% take from Netflix alone was around \$256 million in that one year.²⁰⁰ For Apple to offer a more acceptable 10% rate and get 10% of \$853 million would be much better than getting 30% of nothing when these apps pull out.²⁰¹ But Apple has chosen to forgo these enormous profits, which suggests it is expecting even more gains from restraining these apps.

Second, the claimed quality control, security, developer support, and promotional efficiencies are not causally related to the IAP tie and the 30% tax, and they likely would have been provided regardless. To protect iPhone's deliberately cultivated status as a premium brand, Apple would hardly allow its apps' quality control or security to slip. Indeed, Apple's own Mac computer does not tie its app-purchase system to digital goods distribution, but it is still secure and has decent quality control by Apple's own account.²⁰² Similarly, Apple offered quality control, developer support, and app promotions to subscription apps before it imposed the 30% tax and IAP on them in 2011.²⁰³ Furthermore, broad-based developer support is a sine qua non for all successful modern software platforms, and such support is routinely offered without an expensive 30% tax.²⁰⁴ In fact, Apple already charges a \$99 annual

199. See Liz Lanier, *'Fortnite' Avoiding Google Play Store's 30% Cut on Android Version*, VARIETY (Aug. 4, 2018), <https://www.variety.com/2018/gaming/news/fortnite-avoiding-google-play-stores-30-cut-on-android-version-1202895335>. Epic was eventually removed from the iOS App Store in August 2020 after refusing to pay Apple's 30% tax. See Hollister, *supra* note 106.

200. Sarah Perez, *Netflix Stops Paying the 'Apple Tax' on Its \$853M in Annual iOS Revenue*, TECHCRUNCH (Dec. 31, 2018), <https://www.techcrunch.com/2018/12/31/netflix-stops-paying-the-apple-tax-on-its-853m-in-annual-ios-revenue>.

201. An argument can be made that perhaps Apple should pay these big apps rather than the reverse, as Apple can get more revenue from the increased demand for the iPhone generated by these popular apps.

202. See *Security. Built Right In.*, APPLE, <https://www.apple.com/macOS/security> (last visited Jan. 4, 2021) (touting Mac apps' security).

203. See text accompanying note 124.

204. See MICROSOFT DEVELOPER, <https://developer.microsoft.com/en-us> (offering support tools); Microsoft Store Team, *A New Microsoft Store Revenue Share Is Coming*, WINDOWS BLOGS (May 7, 2018), <https://blogs.windows.com/windowsdeveloper/2018/05/07/a-new-microsoft-store-revenue-share-is-coming> (charging a mere 5%).

developer fee for support tools needed to develop, test, and distribute apps.²⁰⁵ Finally, promotions are also independently provided through Apple's Search Ads program. This program advertises apps for a fee when users conduct searches and is expected to generate \$2 billion in 2020.²⁰⁶ It is thus disingenuous to say that without the 30% fee Apple would not be able to provide these efficiencies.

Third, if Apple's IAP provides clear security and ease of use benefits, users and developers will adopt it as a matter of choice. As the Fourth Circuit has held, if security is the concern, the tying firm "could have required its dealers [or developers in Apple's case] to inform their customers" of the alternative payment mechanism developers offer and their associated security risks (as Apple already does with Mac apps from third-party sources).²⁰⁷ Citing the Supreme Court, the court observed that "any intrinsic superiority of the 'tied' product would convince freely choosing buyers to select it over others, anyway. Perceived consumer expectation, without more, will rarely justify an unlawful tie-in."²⁰⁸ This unchosen LRA based on information and buyer choice, rather than a forced tie, offers much of the same benefit claimed and is much less restrictive. No efficiency justification here can therefore outweigh the significant harm the IAP tie creates.

B. IMPAIRING RIVALS

Many of Apple's other practices impairing rivals and favoring its proprietary apps may have potential efficiencies related to quality control, privacy, and integration, but they can again be achieved through less restrictive alternatives. Apple may claim, for example, that restricting third-party apps' notification-based promotions, access to user data, NFC, and certain other iPhone features may improve user experience and security.²⁰⁹ As noted above, quality control is not a justification if a less restrictive means exists to ensure quality, such as specifying standards.²¹⁰ Apple can thus simply require third-party apps to meet certain quality standards for promotions or data and NFC access instead of banning these apps outright. This alternative is often viable

205. See *Membership Details*, APPLE DEVELOPER PROGRAM, <https://developer.apple.com/programs/whats-included> (last visited Jan. 4, 2021).

206. See Lauren Feiner, *Apple's App Store Ads Could Be a \$2 Billion Business by 2020*, *Bernstein Analyst Predicts*, CNBC (Oct. 22, 2018), <https://www.cnbc.com/2018/10/22/apple-app-store-ads-to-be-2-billion-business-by-2020.html>.

207. *Metrix Warehouse v. Daimler-Benz A.G.*, 828 F.2d 1033, 1041 (4th Cir. 1987).

208. *Id.* (internal quotation marks omitted) (citing *Times-Picayune Publishing Co. v. United States*, 345 U.S. 594, 605 (1953)).

209. See, e.g., Slivka, *supra* note 155.

210. See text accompanying notes 207–208.

as evidenced by the parental control app incident.²¹¹ Similarly, if prominent promotions for Apple's apps help launch desirable products, similar openings should be available to third-party developers (e.g., by auction) who will pay for such services to the extent their apps are valued by users and thus profitable.

Apple can also offer users information and choice that will allow them to decide for themselves whether they desire certain claimed benefits. For example, Apple could allow users to turn off Apple's promotions for its proprietary apps as well as those from third-party apps instead of forcing Apple's ads while prohibiting third-party promotions; or Apple could also ask users for permission before sending Apple ads when Apple already requires other apps to do so.

Discriminatory access to certain private APIs presents a trickier issue. Opening iPhone's NFC and Siri features to third-party apps may require Apple to create and maintain certain protocol outside access, which may involve non-trivial technical costs. This burden may justify a slightly delayed rollout for third-party support. However, the benefits from competition that incentivize developers to offer better deals and more choices to consumers as a result of opening access may significantly outweigh the non-negligible but not prohibitive cost of creating public APIs for key features such as Siri and NFC. As access to voice control is quite important for music apps and NFC is essential for modern proximity payment apps, the competitive harm from not opening access likely dominates over the technical costs.

Either Apple's restrictions on third parties are not causally necessary to the claimed benefits or substantially less restrictive alternatives exist. As a result, Apple's claimed efficiencies provide no sufficient defense for the significant harm of its exclusionary conduct. Apple has therefore abused its dominance to force the IAP tie and expand its monopoly in the smartphone platform market. The fortress of its walled garden keeps out not only competition but also innovations that could transform the future of technology, to the detriment of the entire digital economy and hundreds of millions of consumers. Accordingly, Apple's conduct violates antitrust law for illegal tying and monopolization.

Current judicial doctrines on monopoly leveraging and refusal to deal, however, may impede enforcement against platforms' abuse of dominance. Antitrust law thus needs new tools to contain the rise of consumer platform abuses in the twenty-first century.

211. See text accompanying notes 154–158.

VIII. ANTITRUST FOR THE 21ST CENTURY

As Parts IV-VII have shown, Apple has leveraged its dominance to expand its mobile platform monopoly, harming competition and consumers. Its conduct should therefore be condemned under antitrust law's general monopolization standard. Yet courts often follow precedents on specific exclusionary conduct with a restrictive reading of what constitutes monopolization. Monopoly leveraging and refusal to deal doctrines, for example, put a high burden of proof on plaintiffs to show exclusionary outcomes as discussed in Part II.²¹² This judicial reluctance to recognize exclusionary conduct may even spill over to tying claims that resemble refusal to deal, letting otherwise illegal tying pass under judicial watch. This Part exposes the misplaced assumptions behind these doctrines and calls for a doctrinal reform.

A. RECONSIDER LEVERAGING

When platform operators such as Apple leverage their power to restrict downstream markets on a platform through exclusion and discriminatory treatment of rivals, significant competitive distortions and consumer welfare losses can result as shown in Parts V and VI. Relying on the "one monopoly profit" theory as discussed in Part II, however, the current leveraging doctrine requires dangerous probability of monopolization in downstream markets to prove illegality, despite significant harm from expanded monopoly even short of achieving monopoly power in these secondary markets.²¹³

Apple's example pokes a conspicuous hole in the Chicago School's theory of benign leveraging embraced by courts today.²¹⁴ The "one monopoly profit" theory courts rely on rests on special assumptions that do not hold true for platform markets. It ignores transaction costs and assumes static market competitiveness²¹⁵ and rational actors. As Parts III-VII have documented, significant information costs from limited consumer and small business resources and capabilities mean that buyers in platform markets systematically do not take secondary market prices into full account;²¹⁶ strong lock-ins across product ecosystems prevent platform users and partners to switch away even when they become aware of supracompetitive prices;²¹⁷ and the temptation of

212. See *supra* text accompanying notes 36–48.

213. See *supra* text accompanying notes 36–42.

214. See *supra* text accompanying notes 34–42.

215. See Einer Elhauge, *Tying, Bundled Discounts, and the Death of the Single Monopoly Profit Theory*, 123 HARV. L. REV. 397, 413–19 (2009).

216. See *supra* Sections III.A–B, IV.B–C.

217. See *supra* Sections III.C, IV.B–C.

successive monopolies and network effects in both upstream and downstream markets incentivize dominant firms to employ even inefficient leveraging to preserve and expand their profitable dominance.²¹⁸ As a result, iPhone users have to pay supracompetitive prices for both the iPhone and many key apps as well as tolerate experience and innovation losses without the practical ability to switch away to more efficient choices when Apple leverages its power downstream.²¹⁹ Although Apple could indeed monopolize certain markets with its totalizing control such as in contactless proximity payment and parental control markets, the competitive harm of its conduct does not depend on its monopoly status downstream but rather upstream—as shown by damages in many other markets (e.g., streaming music) even without such complete exclusion.²²⁰

Courts should thus recognize leveraging's exclusionary effect when there are significant information and switching costs and strong network effects. Accordingly, they should reestablish monopoly leveraging as an independent category of exclusionary conduct that can violate Section 2 of the Sherman Act without necessarily requiring a dangerous probability of monopolization of the second market, as they did before the Chicago School era.²²¹ Courts should also jettison the associated burdensome and unnecessary market definition requirement for downstream markets affected by leveraging.²²² Courts should allow plaintiffs to focus on proving actual harm as long as such harm is substantial enough (e.g., worth over a monetary threshold such as \$10 million). Such reform will better address the often very significant harm from platform monopolists that escapes the ambit of current Section 2 doctrines.

In administering the new leveraging doctrine, an LRA-based approach may help limit overly expansive enforcement that could discourage efficient leveraging. While monopoly leveraging can have significant harms as Part VI demonstrates, it is possible to have certain efficient vertical integration. For example, Apple may better coordinate internally about what software features to adopt for a new phone, which might benefit both Apple's apps and third-party apps. If the new features make Apple's apps work better without making third-party apps function worse, such leveraging should be preserved. The LRA-based approach preserves bona fide efficiencies when no equally

218. See *supra* Sections III.D, IV.A, VI.A; Feldman, *supra* note 191; Whinston, *supra* note 76; Brian, *supra* note 76; Carlton & Waldman, *supra* note 76.

219. See *supra* Sections IV.B-C, V.B, VI.A.

220. See *supra* Sections VI.A-B.

221. See *United States v. Griffith*, 334 U.S. 100, 107–09 (1948); *United States v. Paramount Pictures*, 334 U.S. 131, 174 (1948).

222. See *supra* text accompanying notes 37–40.

effective and less restrictive alternatives exist, while screening out pretextual efficiencies and unnecessary restrictions.²²³

B. RATIONALIZE THE REFUSAL TO DEAL DOCTRINE

Similar to the flawed leveraging doctrine, courts should reconsider their narrow interpretation of the refusal to deal doctrine.²²⁴ Apple's exclusion and discriminatory treatment of rival apps entail "unreasonable terms and conditions" that constitute effective refusal to deal.²²⁵ Courts, however, have singularly focused on ending a prior course of dealing as the requirement for illegal refusal to deal.²²⁶ With the changing dynamics of platform markets, judges should be less rigid in recognizing alternative reasons for illegal refusal to deal—in particular, platforms' role as the essential infrastructure of the modern digital economy and the dangers of installed-base opportunism.

First, platforms' role as today's essential digital infrastructure further cautions against judicial hostility to refusal to deal claims. Current literature has extensively documented the infrastructural nature of tech platforms as computer and smartphone operating systems, cultural and political public forums, and e-commerce platforms, finding strong positive spillovers from their open access.²²⁷ Platforms' essential role in combating COVID-19 recently has underscored their social importance.²²⁸ The positive externalities from their openness mean restricting access to key platforms, such as Apple's

223. See *supra* Part VII.

224. See *supra* text accompanying notes 45–48.

225. See *MetroNet Servs. Corp. v. Qwest Corp.*, 383 F.3d 1124, 1132 (9th Cir. 2004) (holding terms that “would not be profitable for the plaintiff [or competitor to the monopolist defendant] to accept” was a “practical refusal to deal”).

226. See *supra* text accompanying notes 45–48.

227. See Geoffrey Parker, Marshall Van Alstyne & Xiaoyue Jiang, *Platform Ecosystems: How Developers Invert the Firm*, 41 MGMT. INFO. SYS. Q. 255 (2017) (showing that open access is more advantageous than closed organization for platform firms such as Apple, Google, and Microsoft, with significant knowledge spillovers); Brett Frischmann & Spencer Weber Waller, *Revitalizing Essential Facilities*, 75 ANTITRUST L.J. 1, 55 (2008) (finding that Microsoft's Windows operating system's “downstream externalities for both software developers and individual computer users are both immense and incalculable”); Frank Pasquale, *Dominant Search Engines: An Essential Cultural & Political Facility*, in *THE NEXT DIGITAL DECADE* 401 (Berin Szoka & Adam Marcus eds., 2011); Jean-Christophe Plantin, Carl Lagoze, Paul N. Edwards & Christian Sandvig, *Infrastructure Studies Meet Platform Studies in the Age of Google and Facebook*, 20 NEW MEDIA & SOC'Y 293 (2016); Zachary Abrahamson, Comment, *Essential Data*, 124 YALE L.J. 867, 879 (2014); Lina M. Khan, *Amazon's Antitrust Paradox*, 126 YALE L.J. 710, 802 (2017).

228. See, e.g., Brian Fung, *The Pandemic Is Playing to Almost Every One of Amazon's Strengths*, CNN (Apr. 9, 2020), <https://www.cnn.com/2020/04/09/tech/amazon-dominance-coronavirus> (“As the coronavirus pandemic has forced people to stay inside, few companies have proven themselves as essential as Amazon.”).

smartphone ecosystem, has negative consequences beyond what is incorporated in their private profitability calculations.

Antitrust law's essential facilities doctrine, now dormant but once active in the era of deregulation, in many ways represents courts' recognition of the social importance of maintaining reasonable access to essential infrastructure.²²⁹ As such infrastructure facilities derive the bulk of their social value from downstream innovations—for example, by the millions of apps on iPhone rather than the metal bar itself and its basic software framework—courts have required them to open access to downstream market players who might compete with the owner of the infrastructural input to facilitate social innovations.²³⁰ Following this history, courts today should also take into account the infrastructural nature of tech platforms and reconsider the risk of their refusal to deal.

Second, Apple's discriminatory treatment of rivals on its platform serves as an example of installed-base opportunism and militates against the rigid refusal to deal doctrine. When the App Store was launched in 2008, subscription-based third-party apps were free to choose their own payment methods, including non-IAP alternatives.²³¹ Developers arrived in droves to create hundreds of millions of apps for the iPhone, a critical factor in iPhone's success.²³² In 2011, however, Apple limited subscription apps' payment choice to Apple's own IAP system which requires a 30% tax.²³³ This move hurt developers' businesses and started a trend where Apple increasingly tries to capture the benefits of the platform for its own profits rather than for the developers who have created the hundreds of millions of apps that attract users.

229. See Frischmann & Waller, *supra* note 227, at 8, 10–17.

230. Courts have applied the essential facilities doctrine to infrastructure such as railroad bridge, power utility, and telephone networks. See *United States v. Terminal R.R. Ass'n of St. Louis*, 224 U.S. 383, 411–13 (1912); *Otter Tail Power Co. v. United States*, 410 U.S. 366, 380–83 (1973); *MCI Comm'ns Corp. v. AT&T Co.*, 708 F.2d 1081, 1132–33 (7th Cir. 1983).

231. See TREEHOUSE, *supra* note 124 (“Apple just dropped a nuclear bomb on all of us Apple will not allow you to encourage your iOS customers to pay for your subscription service outside the App Store fence.”).

232. See Garcia-Swartz & Garcia-Vicente, *supra* note 72, at 883, 889 (finding that “the iPhone did not really take off before the opening of the App Store” and that each extra app by developers is associated with 271–386 additional users). Apple itself also admitted the importance of developers: “[i]f third-party software applications and services cease to be developed and maintained for the Company's products, customers may choose not to buy the Company's products.” Apple Inc., Annual Report (Form 10-K) (Oct. 30, 2020), <https://sec.report/Document/0000320193-19-000119>.

233. See TREEHOUSE, *supra* note 124; Gruber, *supra* note 124.

In the early days of the App Store, Apple also had little presence in the subscription app market. Given the uncertainty of what was a whole new platform, developers reasonably did not fully expect that Apple would later enter this market and compete directly with them in such a sweeping fashion as it does now,²³⁴ often using its power as the App Store gatekeeper to disadvantage rivals and tip the competitive balance in its own favor. Apple's discriminatory treatment of Spotify, a competitor to its Apple Music app in the streaming music market as detailed in Sections V.B and VI.A, is an emblematic example of such a trend. In all these cases, third-party app developers have played a crucial role in the success of the Apple ecosystem but are now expropriated by Apple who imposes its power to claim more than its fair share of the platform proceeds.

Apple's conduct further threatens the platform economy's long-term sustainability. Allowing Apple to abuse the system and expropriate third-party developers can deter the investment of future developers and potential participants in other platforms. Knowing that platforms will exploit them, platform participants are less likely to invest in the platform in the first place. Professor Carl Shapiro has spoken about this phenomenon which he terms "installed-base opportunism":

[I]n a network industry, a firm might obtain a dominant position based in part on certain "open" policies that induce reliance by complementary firms, and then later exploit that position by offering less favorable interconnection terms or by refusing to interconnect with them altogether [F]ear of opportunism can dull the incentives of other parties—downstream firms, suppliers of complements, rival networks, or final customers—to make investments.²³⁵

Apple's relatively early openness and its growing self-preferencing intervention in downstream app markets similarly risk reducing future investments in the platform. As a result, if Apple's conduct is allowed, iPhone users would increasingly experience fewer and less impactful innovations on the platform as developers shy away, a net loss for consumer welfare.

If this kind of self-preferencing is allowed with impunity, platforms in general will see less investment from third parties who fear ex post expropriation. Despite their many flawed practices, tech platforms have also in many ways been engines of innovation, creating millions of jobs and

234. See *supra* text accompanying notes 17–20.

235. CARL SHAPIRO, EXCLUSIONARY CONDUCT: TESTIMONY BEFORE THE ANTITRUST MODERNIZATION COMMISSION, ANTITRUST MODERNIZATION COMMISSION 15–16 (2005), <https://faculty.haas.berkeley.edu/Shapiro/amcexclusion.pdf>.

providing significant consumer benefits. However, without the active and often passionate participation of third-party app developers, merchants, news publishers, and other players, these platforms would not have been able to achieve all these welfare improvements. As potential platform participants grow wary, future platforms will find it harder to grow their ecosystems and drive innovation. The net result will be a loss of productivity growth and consumer welfare on an economy-wide level and particularly in innovative markets where platforms tend to provide unique value.

Ultimately, monopolists' prior dealing should serve only as a heuristic—a useful evidentiary device, but not the sole determinant of illegal refusal to deal. If a party abruptly ends a voluntary and thus likely profitable contract, it often suggests some ill intent behind the move to hurt competitors. However, many other refusal scenarios can have exclusionary effects,²³⁶ as this Part has shown. Narrowly focusing on but one cause of anticompetitive harm in refusal to deal cases, as courts do now, will only cause them to overlook damaging exclusionary conduct that will likely be increasingly common by tech platforms in multilayered network markets that provide strong incentives for refusal to deal everywhere. Worse, such judicial reluctance to recognize anticompetitive refusal to deal may even spill over to tying claims that resemble refusal to deal.²³⁷ As the remedy for illegal tying is to untie a forced combination of transactions, it often means requiring the antitrust defendant to be more open and deal with third parties—non-Apple payment systems on iOS, for example. Judges hostile to refusal to deal claims may very well let such anticompetitive tying pass,²³⁸ which would otherwise be illegal under current case law on tying. Doing so would leave consumers vulnerable to anticompetitive harm.²³⁹

Courts should thus unanchor the refusal to deal doctrine from the prior dealing requirement, at least for tech platforms, when refusal to deal excludes competitors despite the presence of LRAs, as the Seventh Circuit recently hinted.²⁴⁰ One concern about refusal to deal remedies is that specifying the

236. See generally Adam Candeub, *Trinko and Re-Grounding the Refusal to Deal Doctrine*, 66 U. PITT. L. REV. 821 (2005).

237. See 3B AREEDA & HOVENKAMP, *supra* note 81, ¶ 772 (“Refusals to deal in dominated, path-dependent networks . . . can resemble tying arrangements.”).

238. See *id.* (stating that current law on refusal to deal is “overinclusive” as judges consider refusal to deal “virtually per se lawful”).

239. See *supra* Section V.B.

240. See *Viamedia, Inc. v. Comcast Corp.*, 951 F.3d 429, 463 (7th Cir. 2020) (“We leave open the question whether allegations of short-term losses are necessary [O]ther factors—such as a prior course of conduct, exploitation of power over a cooperative network, refusal to sell at retail price, and discriminatory treatment of rivals—could plausibly support the inference that a refusal to deal is prompted . . . by anticompetitive malice.” (internal citation and quotation marks omitted)).

terms of the required deal may turn judges into regulators, who may not be in the best position to dictate what constitute efficient terms.²⁴¹ Using LRAs as a basic approach for providing refusal to deal remedies, however, can allow plaintiffs to put forth specific alternatives which can achieve similar efficiencies with less restrictive means, as Part VII has demonstrated. This would alleviate the courts' job because they would only need to evaluate specific alternative scenarios already provided and their marginal benefits over the status quo instead of having to compare the aggregate balance of harm and benefits and devise a comprehensive scheme of remedy.²⁴²

C. RECALIBRATE ENFORCEMENT: CLASS CERTIFICATION AND PRIVATE-PUBLIC DIVISION OF LABOR

U.S. antitrust law can be enforced by either private litigants or government agencies such as the FTC and DOJ. This dual-track system often gives different roles to private parties and the enforcement agencies in upholding antitrust law due to their different capabilities and strengths. The consumer platform economy today has brought about important changes to market dynamics and the need to reimagine antitrust law. These shifts require a careful recalibration of antitrust enforcement laws and the division of labor between private and public enforcers to bring the new antitrust regime to reality.

This Section explores (1) the difficulties of private class actions against dominant consumer platforms and the importance of permissive class certification standards, which are critical for ensuring the viability of private antitrust enforcement, and (2) the need for expanding public enforcement as well as new agency priorities (especially investigating possible LRAs, expanding current doctrines, and enforcement on behalf of small players) in the age of consumer platforms.

1. *Private Class Actions*

Class actions play a vital role in the private enforcement of U.S. antitrust law thanks to their role in “aggregating large numbers of small claims, which otherwise would [be] nearly impossible to litigate on an individual basis.”²⁴³ In

241. See *Verizon Commc'ns v. Law Offs. of Curtis V. Trinko, LLP*, 540 U.S. 398, 407 (2004); Herbert Hovenkamp, *The Reckoning of Post-Chicago Antitrust*, in POST-CHICAGO DEVELOPMENTS IN ANTITRUST LAW 11 (2002).

242. Cf. James A. Henderson Jr. & Aaron D. Twerski, *Achieving Consensus on Defective Product Design*, 83 CORNELL L. REV. 867, 884–85 (1998) (discussing similar virtues of tort law's Reasonable Alternative Design doctrine); see also HOVENKAMP, *supra* note 35, at 395, 415 (concluding that antitrust provides a more modest form of regulation for dominant network firms than utility regulations).

243. Spencer Weber Waller & Olivia Popal, *The Fall and Rise of the Antitrust Class Action*, 39 WORLD COMPETITION 29, 29 (2016).

doing so, private enforcement generates deterrence “by multiplying the total resources committed to the detection and prosecution” of antitrust violations.²⁴⁴ The Supreme Court has also recognized that “private enforcement . . . provides a necessary supplement” to public enforcement given the latter’s limited resources.²⁴⁵

In reality, however, class actions in general often do not live up to their promise, principally due to agency problems. Because class attorneys are “unconstrained by the dictates or interests of a specific client,” four important factors misalign their incentives with plaintiffs’ and in turn the goal of private antitrust law: (1) risk aversion as the attorney is more invested in the litigation, has more to lose, and thus is more willing to settle early often for inadequate amounts; (2) collusion between attorney and defendant that produces a lower settlement amount but higher attorney fees; (3) lack of property rights in the litigation so that other attorneys can join and reduce the award to each attorney; and (4) greater search costs compared to non-class litigations, as the class attorney cannot get much information from his clients due to their tenuous attorney-client nexus and would thus need to “play private detective.”²⁴⁶

Class actions against dominant consumer platforms face further difficulties. First, search costs are even greater in these cases. The hundreds of millions of individual consumers and small businesses (e.g., app developers) on a platform usually have even less information about the defendant than traditional antitrust plaintiffs. These plaintiffs mostly consist of the defendant’s competitors or downstream businesses suing their suppliers²⁴⁷ that tend to be more sophisticated firms and deal with the defendant on a closer basis than the fragmented platform participants today which only deal with tiny parts of a giant platform.

Second, the diverse demand and supply dynamics of a broad-based consumer platform pose significant challenges to class certification, in turn chilling plaintiffs’ and attorneys’ incentives to pursue lawsuits. To bring a class action and claim damages as compensation, plaintiffs must first certify as a class by meeting certain requirements. These requirements include predominance under Civil Procedure Rule 23(b)(3), which says “questions of

244. John C. Coffee Jr., *Rescuing the Private Attorney General: Why the Model of the Lawyer as Bounty Hunter Is Not Working*, 42 MD. L. REV. 215, 218 (1983).

245. *J.I. Case Co. v. Borak*, 377 U.S. 426, 432 (1964).

246. Coffee, *supra* note 244, at 229–34.

247. See Paul V. Teplitz, *The Georgetown Project: An Overview of the Data Set and Its Collection*, in PRIVATE ANTITRUST LITIGATION 68 (Lawrence J. White ed., 1988).

law or fact common to class members predominate over any questions affecting only individual members.”²⁴⁸

Predominance for the question of damages can be particularly fraught for consumer-platform plaintiffs. To prove common questions of damages, plaintiffs often must offer a model that can calculate classwide damages susceptible to common evidence.²⁴⁹ However, dominant platforms’ anticompetitive conduct often span the multitude of their products and services, targeting very different groups and causing harms to different degrees. For example, Apple’s exclusionary conduct happens across its IAP tie, its limits on third-party access to NFC and Siri, and its self-preferencing over push-notification advertising, affecting developers and consumers in different markets.²⁵⁰ A complete absence of alternative NFC payment apps and suppressed innovation in the streaming music market due to Apple’s restrictions on rivals’ promotions likely result in divergent consumer losses, which would need different evidence to calculate. Moreover, heterogeneous supply and demand on a broad-based platform means even the same conduct may have divergent impacts on different groups. While Apple’s 30% tax is consistent across apps, developers who have different levels of profit margins may act differently in the alternative world with an LRA of, say, 5% Apple tax for optional IAP usage—some may choose the IAP system for secure transaction processing; some might not if their margins are too low.

As the existence of individual conduct impacts supply and demand factors and precludes the exclusive use of common evidence for a model that estimates damages reliably, the diversity in the degree of anticompetitive harm across groups may thus impede certification of a class that includes all platform participants. But without forming a class, small individual plaintiffs (and their lawyers) have little incentive to bring an expensive lawsuit just to recover a small amount of individual damages, effectively defeating private antitrust enforcement.

A heightened pleading standard in recent case law further complicates class certification. Traditionally, courts have certified classes even if individual questions of damages predominate over common ones, as long as antitrust liability still presents common issues—that is, as long as plaintiffs can use common evidence to prove antitrust violations, they can proceed as a class to prove liability first and then determine damages individually afterwards.²⁵¹

248. See AM. BAR ASSOC., 1 ANTITRUST LAW DEVELOPMENTS 836 (8th ed. 2017).

249. See *Comcast Corp. v. Behrend*, 569 U.S. 27, 34 (2013); Paul A. Johnson, *The Economics of Common Impact in Antitrust Class Certification*, 77 ANTITRUST L.J. 533 (2011).

250. See *supra* Sections III.A, IV.B.

251. See 1 ANTITRUST LAW DEVELOPMENTS, *supra* note 248, at 837.

However, after the Supreme Court in a 5–4 decision instructed courts to “probe behind the pleadings before coming to rest on the certification question” to meet predominance standards,²⁵² some lower courts have been closely examining even *damages* at the certification stage to determine whether they form questions common to the class and have denied certification if they do not.²⁵³ This recent development thus frustrates class actions at an earlier stage and further chills private incentives to police antitrust violations.

Fortunately for antitrust plaintiffs, this recent line of cases has not dominated in all courts, and a circuit split currently exists over whether common questions regarding damages are necessary for class certification.²⁵⁴ There is a strong argument that they should not be necessary, especially for consumer platform plaintiffs.

First, the drafters of the Civil Procedure rules explicitly stated that it is “an appealing situation for a class action . . . despite the need, if liability is found, for separate determination of the damages suffered by individuals within the class,” signaling the intent of the rule.²⁵⁵ Second, “the predominance requirement calls only for predominance, not exclusivity, of common questions” as some courts have noted.²⁵⁶ As long as liability, the main question in an antitrust case, presents common questions rather than individual ones, the class action will be mostly based on common issues. Third, Civil Procedure Rule 23(c)(4) directs that “an action may be brought or maintained as a class action with respect to particular issues.”²⁵⁷ Courts may thus certify a class in which only certain but not all issues in the underlying controversy are to be resolved collectively.²⁵⁸

These class certification rules that allow separate adjudications for liability and damages are particularly important for consumer platform plaintiffs. These plaintiffs already face special difficulties over common issues of damages. If certification is simply banned over individualized questions of damages, consumer platform antitrust class actions would effectively be

252. *Comcast*, 569 U.S. at 33.

253. See Elena Kamenir, *Seeking Antitrust Class Certification: The Role of Individual Damage Calculations in Meeting Class Action Predominance Requirements*, 23 GEO. MASON L. REV. 199, 200 (2015).

254. See *id.* at 214–16.

255. See *id.* at 220; Amendments to Rules of Civil Procedure, Supplemental Rules for Certain Admiralty and Maritime Claims, Rules of Criminal Procedure, 39 F.R.D. 69, 103 (1966).

256. E.g., *Shelter Realty Corp. v. Allied Maintenance Corp.*, 75 F.R.D. 34, 37 (S.D.N.Y. 1977).

257. FED. R. CIV. P. 23.

258. See Kamenir, *supra* note 253, at 262.

foreclosed despite having predominantly common underlying questions of antitrust liability. The supposed alternative—individual actions—is practically impossible for most platform monopoly victims given their numerosity and lack of financial resources to afford a protracted legal fight against lavishly funded tech giants. It is thus critical to separate class certification from questions of damages at least at the initial stage of the lawsuit.

Two other class certification principles that correctly interpret “predominance” as actual predominance as opposed to exclusivity are also important for courts to adopt in consumer-platform class actions. If a question fails to affect every class member, it does not mean that it affects “only individual [class] members.”²⁵⁹ Instead of this dichotomy, there is a continuum between questions common to all class members and those specific to only individual members. Along this continuum are issues common to important subgroups of the class. For example, the anticompetitive effect of Apple’s self-preferencing conduct in the streaming music app market is an issue common to all streaming music users on iOS. Such users constitute an important subgroup of the iPhone user class given their likely significant representation in a consumer platform class action against Apple. Yet the effect of Apple’s conduct in this market is not an issue common to non-music listeners in the class. The same goes for the issue of NFC foreclosure to mobile payment users. As long as the relevant subgroups are important enough for issues common to them to collectively predominate truly individualized issues, class certification should be granted. As such industry subgroups affected by platform abuse of dominance are likely common, this interpretation of the predominance element will be important to preserve incentive for private enforcement against dominant platforms.

Second, class certification should not be denied just because some class members are not injured. Given the enormous number of platform users, there will probably be a small number of them who have not purchased any apps and may not have purchased any even absent anticompetitive behavior. With the enormous scale of today’s consumer platforms, however, even a small percentage of uninjured users may seem large in absolute terms. It is thus important not to deny certification based merely on this small number of users; otherwise it would similarly preclude class actions against platforms in effect.

While both principles may seem sensible if not obvious, some courts unfortunately do not adopt them or do not consistently do so despite many of their peers’ acceptance.²⁶⁰ It is therefore worth reiterating the importance of

259. See J. Douglas Richards & Benjamin D. Brown, *Predominance of Common Questions—Common Mistakes in Applying the Class Action Standard*, 41 RUTGERS L.J. 163, 178–81 (2009).

260. See *id.* at 173–81.

these principles particularly in today's consumer platform economy, where private actions will often be effectively foreclosed by a contrary policy.

Perhaps a more radical proposal for easing class certification is to allow averaging impact to satisfy the commonality requirement for certain parts of damages. For example, to produce a class for the purpose of overall damages determination, cases can aggregate and average diverse damages for app developers who may pay different rates for in-app transaction processing in an alternative scenario without a forced IAP and 30% tax. This can again ease the litigation burden for each small developer who would otherwise need to bring the suit or participate in the damages proceeding independently. As each would need to hire their own expensive lawyers which may eat up much of the litigation award,²⁶¹ a rule prohibiting average impact may again effectively eliminate private actions.

In fact, a Supreme Court class certification case already permitted statistical averaging. In *Tyson Foods v. Bouaphakeo*, plaintiffs averaged workers' production times to demonstrate predominance of common questions.²⁶² While the Court refused to promulgate any general rules apart from the specific facts of the case, it can be a sensible rule when averaging is possible and not far from the actual damages for a class. It would remove a major obstacle to private enforcement of antitrust violations by offering more proportionate incentives for class attorneys, reduce their risk aversion, and better align attorney and plaintiff incentives.

2. *Public Enforcement*

A public-private partnership in antitrust enforcement offers a useful baseline to determine the role of agencies and identify their priorities in enforcing antitrust law in today's consumer platform economy. John Coffee has observed a model of antitrust public enforcement that focuses on detection with its investigative resources, works on cases likely to generate publicity and political visibility, and breaks new legal ground and sets legal precedents, but is less interested in the financial damages recoverable.²⁶³ Private plaintiffs, on the other hand, piggyback on successful agency actions to recover damages with their greater experience in litigation, offering greater and often more proportionate deterrence beyond "the modest [agency] fine

261. On average, 60% of an antitrust award can go to litigation costs. See Ira M. Millstein, *The Georgetown Study of Private Antitrust Litigations: Some Policy Implications*, in PRIVATE ANTITRUST LITIGATION 399, 402 (Lawrence J. White ed., 1988). Distribution of an award amongst developers can be determined after the proceeding through negotiations. So averaging the damages for certification purposes does not necessarily mean equally distributing the award.

262. See 136 S. Ct. 1036, 1049 (2016).

263. See Coffee, *supra* note 244, at 228, 228 n.28.

schedules that are authorized by law”—which top at \$1 million for a corporation whereas private damages or settlement amounts can reach billions of dollars.²⁶⁴ Given this public-private enforcement dynamic, enforcement agencies should be more active overall to provide evidence, explore specific LRAs, expand leveraging and refusal to deal doctrines, and pay particular attention to small players.

First, agencies need to be more active in bringing lawsuits against dominant consumer platforms to provide evidence. Three factors underincentivize consumer platform class attorneys even more than usual to obtain information and to bring enough suits: (1) the significant search costs for private class actions overall, (2) currently stringent class certification standards for damages that pose special difficulties to platforms, and (3) the complexity of platform market power and the dynamic mechanisms of harm. Although agencies are already investigating major tech platforms, they should be more aggressive in bringing actions or otherwise issuing public reports detailing their findings, which can help private enforcement with information from investigations. To aid this expansion, Congress should provide more resources to the DOJ and FTC antitrust divisions by providing bigger budgets, more personnel, and private market-competitive salary as commentators have argued.²⁶⁵

Second, agencies should actively explore possible LRAs to anticompetitive conduct using their greater investigate resources. LRA proposals can be extremely fact-intensive, as Sections III.D and IV.C have demonstrated, making them unsuitable for private class actions which lack information. The current underuse of LRAs may well be a result of under-pleading by plaintiffs. With agencies leading the charge on evidence-finding that demonstrates LRAs, they can be enormously helpful in establishing liability for consumer platforms in what can otherwise be very tough balancing acts.²⁶⁶

Third, agencies should try to expand the boundaries of antitrust law for consumer platforms. In particular, they should expand monopolistic leveraging and refusal to deal doctrines as argued in Section V.A, using their freedom to break new legal ground that more risk averse class action attorneys may not have.

264. *See id.* at 224, 224 n.19; Jennifer Surane, *Visa, Mastercard Face Next Fight After \$6.2 Billion Settlement*, BLOOMBERG (Sept. 18, 2018), <https://www.bloomberg.com/news/articles/2018-09-18/visa-mastercard-reach-6-2-billion-settlement-over-swipe-fees>.

265. *See, e.g.*, William E. Kovacic, Former Chairman, FTC, Panel Discussion at the Antitrust and 21st Century Bigness: Dealing with Tech Platforms in a Globalized World Conference (Feb. 28, 2020).

266. *See supra* Part VII.

Fourth, agencies should pay particular attention to evidence that helps small players. While information is generally hard to come by for class attorneys, big plaintiffs tend to be better off. The more sizable of the class plaintiffs—for example the few big app developers such as Epic Games, Spotify, and Netflix—have greater information and incentive due to their higher stake in the litigation.²⁶⁷ Indeed, Spotify's EU antitrust complaint and Epic's lawsuit have produced significant information about Apple's anticompetitive conduct that plaintiffs can use.²⁶⁸ In their investigations and litigations, the FTC and DOJ should thus spend significant amounts of time on possible LRAs and relevant facts that smaller players such as individual developers and consumers may not have the resources and capabilities to develop on their own. This focus can better make up for the gaps in private class action incentives and improve the efficiency of the division of labor between public and private antitrust enforcement in today's consumer platform economy.

IX. CONCLUSION

Before the age of the smartphone, two gigantic platforms successively dominated the tech world: IBM and Microsoft. IBM was the giant of mainframe computers that commanded the market. As the DOJ was strongly considering an antitrust lawsuit against the company for illegal tying, IBM preemptively unbundled its hardware and software offerings and opened up its software platform to outsiders. That move created the conditions for Microsoft's operating system software to flourish.²⁶⁹ In the late 1990s, similarly motivated by what many believe was the threat of antitrust lawsuit and the desire to appease regulators, Microsoft opened up and made its Office software suite available not only on Windows but also on Apple's computer operating system.²⁷⁰ This helped Apple survive its near-bankruptcy and made it possible for the company to create the iPhone a decade later.

In both cases, the dominant platform, facing imminent antitrust enforcement, opened itself to potential competitors. Both moves led to the creation of the next great platform. Antitrust law was doing its work even before litigation happened—although lawsuits were ultimately brought in both cases, a refreshing reminder that anticompetitive conduct will eventually be

267. See Coffee, *supra* note 244, at 223.

268. See *Spotify Timeline*, *supra* note 132; Hollister, *supra* note 106.

269. See Ben Thompson, *Facebook's FTC Fine, Apple and Microsoft's Mistake, IBM's Unbundling*, STRATECHERY (July 16, 2019), <https://stratechery.com/2019/facebooks-ftc-fine-apple-and-microsofts-mistake-ibms-unbundling>.

270. See *id.*

punished. This is how competition and innovation happen when antitrust law works.

But U.S. antitrust law has not worked in a long time. Antitrust enforcement has fallen to its slowest rate since 1970s.²⁷¹ The Bush administration brought “a grand total of zero anti-monopoly antitrust cases” over eight years, and antitrust enforcement has not recovered ever since.²⁷² Without the threat of antitrust law, tech platforms have been happily collecting their monopoly rents without fear of punishment.

Recent investigations are changing that, and a new toolbox is needed. This Note outlined the various harms tech platforms such as Apple have brought to consumers and competition. It also aimed to transform outdated antitrust assumptions with findings from the modern consumer platform economy. With a renewed understanding of competition dynamics, courts and enforcement agencies would be better equipped to address the challenges of the twenty-first century.

The free market does not always work on its own. With big data, armies of Ph.D. economists, and sharp understandings of consumer vulnerabilities, tech giants know the rules and loopholes of the market inside out. To build a fair marketplace where competition delivers innovation and consumer welfare, antitrust law must set the right boundaries.

271. Kadhim Shubber, *US Antitrust Enforcement Falls to Slowest Rate Since 1970s*, FIN. TIMES (Nov. 28, 2018), <https://www.ft.com/content/27a0a34e-f2a0-11e8-9623-d7f9881e729f>.

272. Tim Wu, *THE CURSE OF BIGNESS: ANTITRUST IN THE NEW GILDED AGE* 108–10 (2018).