

# THE NEW LIMITS ON ANTITRUST

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## ABSTRACT

*Rising prices, disturbing levels of market concentration, and the power of the Tech Giants make an aggressive approach to antitrust enforcement imperative. But four doctrines—the new limits on antitrust—stand in the way. This Article takes Easterbrook’s famous 1984 article, “The Limits of Antitrust,” and flips it on its head. Instead of calling, as Easterbrook did, for more constraints on antitrust enforcement, this Article urges courts to eliminate or sharply curtail the new obstacles it identifies. Although superficially appealing, these new limits are perverse and undermine antitrust’s ability to achieve its important goals of protecting consumers and workers from anticompetitive conduct.*

*The output limit prevents plaintiffs from showing that the defendant harmed consumers by raising prices unless the plaintiff also proves that the defendant’s output fell. Such proof is normally impossible, however, because many factors determine a firm’s output. As a result, the output limit routinely deprives plaintiffs of the most obvious and damning evidence of harm.*

*The profit margin limit holds that a court should never infer monopoly power from persistent, extraordinary profit margins, even though such margins strongly suggest monopoly power. To be sure, accounting profits and economic profits are not the same, but economists have become adept at converting accounting profits into economic profits. Moreover, the larger they are and the longer they last, the more likely that accounting profits reflect monopoly power.*

*The aftermarket limit stipulates that a firm can restrain trade in an aftermarket if customers know of the restraint and have other choices in the primary market. That means that a smartphone maker can restrict the distribution of apps, enabling it to charge high commissions in its app store, if customers are aware of the restriction and could have bought another smartphone. But numerous studies show that ordinary consumers exhibit bounded rationality, present bias, search fatigue, and other characteristics that cause them to spend little time discovering prices in the aftermarket. As a result, even if consumers are aware that distribution is restricted, they are unaware of the high commission*

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charges and do not choose another smartphone. Moreover, if competition in the smartphone market is limited, a competing app store will also charge high commissions.

The two-sided platform limit holds that the relevant market in a two-sided platform case must include both sides of the platform. A two-sided platform sells services to two sets of customers, like merchants and credit cardholders, but the customers on one side are not substitutes for the customers on the other side. In consequence, a two-sided market fails the fundamental test of market definition. The limit also holds that two-sided platforms compete only with other two-sided platforms, a proposition that makes no economic sense because a one-sided platform can prevent a two-sided platform from exercising market power.

This is the first article to identify this set of unwarranted constraints on antitrust enforcement and the first to explain in detail why they should be abolished or cut back.

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## INTRODUCTION

Now is the time for a muscular approach to antitrust law. Rising prices, disturbing levels of market concentration, and the power of the Tech Giants make it imperative for antitrust enforcement to be aggressive.<sup>1</sup> But antitrust cannot respond to market problems when antitrust doctrine stands in the way. Public and private plaintiffs cannot protect consumers and workers from anticompetitive conduct if antitrust doctrine prevents them from challenging it.

In a famous 1984 article, *The Limits of Antitrust*, Frank Easterbrook proposed that courts impose limits on antitrust liability to curb its excesses.<sup>2</sup> Easterbrook tried to justify this anti-enforcement bias by claiming that false positives are more dangerous than false negatives—that a mistaken finding of liability is more harmful than a mistaken finding of innocence. He asserted:

If the court errs by condemning a beneficial practice, the benefits may be lost for good. Any other firm that uses the condemned practice faces sanctions in the name of stare decisis, no matter the benefits. If the court errs by permitting a deleterious practice, though, the welfare loss decreases over time. Monopoly is self-destructive. Monopoly prices eventually attract entry.<sup>3</sup>

This willingness to tolerate false negatives in order to avoid false positives continues to pervade antitrust enforcement. Both the Supreme Court’s heightened requirements for predatory pricing cases and its virtual elimination of refusal to deal cases are grounded in the fear of false positives.<sup>4</sup> Summing up the law, the Tenth Circuit recently declared that “limiting the risk of false condemnation is a central tenet of modern antitrust jurisprudence.”<sup>5</sup>

1. See, e.g., AMY KLOBUCHAR, ANTITRUST: TAKING ON MONOPOLY POWER FROM THE GILDED AGE TO THE DIGITAL AGE (2021) (calling for more vigorous antitrust enforcement, laying out the reasons, and citing numerous officials and scholars in support).

2. Frank H. Easterbrook, *The Limits of Antitrust*, 63 TEX. L. REV. 1 (1984). For his specific limits, see *id.* at 17-39.

3. *Id.* at 2.

4. See *Brooke Grp. Ltd. v. Brown & Williamson Tobacco Corp.*, 509 U.S. 209, 226 (1993); *Verizon Comm’ns Inc. v. Law Offs. of Curtis v. Trinko, LLP*, 540 U.S. 398, 414-15 (2004). Likewise, in *Spectrum Sports, Inc. v. McQuillan*, the Court rejected the Ninth Circuit’s expansion of the attempt to monopolize offense because it would chill too much pro-competitive behavior. 506 U.S. 447, 458-60 (1993).

5. *In re EpiPen (Epinephrine Injection, USP) Mktg., Sales Pracs. & Antitrust Litig.*, 44 F.4th 959, 993 (10th Cir. 2022).

But this overwhelming concern with false positives is mistaken. After reviewing the evidence, Jonathan Baker found that antitrust conservatives “systematically overstate the incidence and significance of false positives [and] understate the incidence and significance of false negatives.”<sup>6</sup> Herbert Hovenkamp and Fiona Scott Morton concluded that it is “naïve” to minimize the harm from false negatives on the ground that markets tend naturally toward more competition.<sup>7</sup> Instead, “[e]conomic theory and evidence developed over the last forty years strongly support the reversed premise”—that “markets tend more naturally to situations of market power.”<sup>8</sup>

Easterbrook proposed his limits in order to make antitrust enforcement more rational, fair, and predictable, but his constraints were perverse and led to a substantial and enduring cutback. This Article flips Easterbrook’s approach on its head and urges courts to remove the current unwarranted constraints on antitrust enforcement in order to reinvigorate it. Two of the most serious deficiencies in antitrust doctrine are already well known. Plaintiffs cannot successfully attack predatory pricing unless they establish both below-cost pricing and a dangerous probability of recoupment.<sup>9</sup> Neither requirement is necessary, and the recoupment requirement is particularly likely to defeat legitimate actions.<sup>10</sup> Likewise, the Supreme Court has made it almost impossible to challenge a dominant firm’s refusal to deal with a rival,<sup>11</sup> even though this blanket immunity is unjustified.<sup>12</sup>

This Article focuses on four constraints that have received less scrutiny. Reflected in precedent, they regularly block legitimate cases because they are superficially appealing. In each instance, there is a

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6. Jonathan B. Baker, *Taking the Error Out of “Error Cost” Analysis: What’s Wrong with Antitrust’s Right*, 80 ANTITRUST L.J. 1, 2 (2015); see also Andrew I. Gavil & Steven C. Salop, *Probability, Presumptions and Evidentiary Burdens in Antitrust Analysis: Revitalizing the Rule of Reason for Exclusionary Conduct*, 168 U. PA. L. REV. 2107, 2111-13, 2125-30 (2020) (emphasizing the Chicago School’s excessive concern with false positives).

7. Herbert Hovenkamp & Fiona Scott Morton, *Framing the Chicago School of Antitrust Analysis*, 168 U. PA. L. REV. 1843, 1870-71 (2020).

8. *Id.* at 1870.

9. See *Brooke Grp.*, 509 U.S. at 222-25.

10. See, e.g., C. Scott Hemphill & Philip J. Weiser, *Beyond Brooke Group: Bringing Reality to the Law of Predatory Pricing*, 127 YALE L.J. 2048, 2048-49 (2018); Christopher R. Leslie, *Predatory Pricing and Recoupment*, 113 COLUM. L. REV. 1695, 1698-99 (2013); John B. Kirkwood, *Controlling Above-Cost Predation: An Alternative to Weyerhaeuser and Brooke Group*, 53 ANTITRUST BULL. 369, 371 (2008); Patrick Bolton, Joseph F. Brodley & Michael H. Riordan, *Predatory Pricing: Strategic Theory and Legal Policy*, 88 GEO. L.J. 2239, 2255-56 (2000).

11. See *Verizon Commc’ns Inc. v. Law Offs. of Curtis V. Trinko, LLP*, 540 U.S. 398, 410-11 (2004).

12. See, e.g., Erik Hovenkamp, *The Antitrust Duty to Deal in the Age of Big Tech*, 131 YALE L.J. 1483, 1492-93, 1525 (2022); Steven C. Salop, *Refusals to Deal and Price Squeezes by an Unregulated, Vertically Integrated Monopolist*, 76 ANTITRUST L.J. 709, 713-14 (2010); Andrew I. Gavil, *Exclusionary Distribution Strategies by Dominant Firms: Striking a Better Balance*, 72 ANTITRUST L.J. 3, 47 (2004).

plausible ground for invoking them to kill a meritorious case. Yet the results they produce are commonly harmful. These doctrines—the new limits on antitrust—should be jettisoned or sharply curtailed.

The first limit, the *output limit*, was endorsed by Easterbrook and continues to undermine enforcement.<sup>13</sup> It holds that plaintiffs cannot introduce direct evidence of market power or anticompetitive effects unless they prove that the defendant's output fell. This means that the plaintiff cannot show that consumers were harmed simply because the defendant raised prices. In fact, this evidence is inadmissible unless the plaintiff *also* proves that the defendant's output dropped. In a growing market, however, where output is rising because of multiple reasons, it is usually impossible to prove that the defendant's conduct made output rise less rapidly than it otherwise would. As a result, the output limit normally precludes the plaintiff from relying on the most obvious and damning evidence of consumer harm. To be sure, there are potentially innocent explanations for a price increase. A firm might raise prices because demand has grown, and in that case output would also increase. But as this Article shows, plaintiffs can rebut every one of those explanations without proving that output fell.

The second limit, the *profit margin limit*, holds that a court should never infer monopoly power from a large and sustained profit margin. This limit is especially puzzling because a large and sustained profit margin strongly suggests monopoly power. As explained below, monopoly power is the ability to price substantially above the competitive level, and the competitive level is ordinarily measured by cost. Thus, if a firm prices substantially above its costs for many years—if it commands a large and sustained profit margin—it is very likely to possess monopoly power. To be sure, the inference is airtight only if costs are measured properly, but economists have become adept at converting accounting costs to economic costs.<sup>14</sup> Moreover, the larger the firm's accounting margin, and the longer it lasts, the more likely it reflects true monopoly power.

The third limit, the *aftermarket limit*, broadly prohibits plaintiffs from showing market power and anticompetitive effects in an aftermarket. An aftermarket is a follow-up market to a primary market. Thus, if the primary market is smartphones, the principal aftermarket is apps for those phones. The aftermarket limit holds that if customers are aware of the defendant's conduct in the aftermarket, they cannot be hurt when there is competition in the primary market. If customers do not like the defendant's aftermarket conduct, they can switch to another primary market supplier. While this logic may be correct when customers are sophisticated businesses, it is not correct when customers are ordinary consumers. Unlike the sophisticated actors in

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13. See Easterbrook, *supra* note 2, at 31.

14. See *infra* notes 142-43 and accompanying text.

economic models, ordinary consumers exhibit characteristics like bounded rationality, present bias, and search fatigue, which cause them to overlook critical terms in the aftermarket. As a result, even when consumers know that the defendant has restricted choices in the aftermarket, they are unlikely to switch to another primary market supplier because they are unaware that the defendant is charging monopoly prices.<sup>15</sup>

The final new limit is the *two-sided platform limit*. A two-sided platform serves two sets of customers, like merchants and credit cardholders, and in *Ohio v. American Express Co. (Amex)*,<sup>16</sup> the Court held that the relevant market must include both sets of customers. The Court also ruled that two-sided platforms compete only with other two-sided platforms. Both propositions are economically unsound and have already produced three mistaken lower court decisions.

The most egregious application of these limits was in *Epic Games, Inc. v. Apple Inc.*,<sup>17</sup> where the district court invoked all four of them to block Epic's well-founded Sherman Act claims. But whether they are applied individually or in combination, courts should avoid them except in the most narrow circumstances.

This Article is the first to identify this set of important but unjustified constraints on antitrust enforcement. It is also the first to show that a price increase is not unobjectionable simply because it follows an increase in demand. In addition, it is the first article to marshal an extensive array of behavioral economics studies to explain why individual consumers are unlikely to be aware of a defendant's prices in the aftermarket.<sup>18</sup>

## I. THE OUTPUT LIMIT

Section I.A recounts the origins of the output limit in the Chicago School attack on antitrust enforcement. Section I.B shows that while most cases apply the output limit, a few reject it. Section I.C identifies

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15. To be sure, consumers may not be hurt—even when they pay monopoly prices in the aftermarket—if sellers lower their prices in the primary market to capture more high-profit aftermarket business. Indeed, if competition in the primary market is intense enough, primary market prices may fall so much that they fully compensate consumers for high aftermarket prices. See Carl Shapiro, *Aftermarkets and Consumer Welfare: Making Sense of Kodak*, 63 ANTITRUST L.J. 483, 485 (1995). But whether consumers are fully protected—whether the market achieves this benign result—is an empirical question. In the smartphone aftermarket, there is considerable evidence that consumers have not been fully protected. See *infra* Section III.B.

16. 585 U.S. 529 (2018).

17. 559 F. Supp. 3d 898 (N.D. Cal. 2021), *aff'd in part, rev'd in part*, 67 F.4th 946 (9th Cir. 2023).

18. My article focuses on substantive constraints on antitrust enforcement. Jonathan Sallet recently noted that courts also use procedural devices to derail antitrust cases. They adopt doctrines that ban or skew fact-finding, decide cases while ignoring facts, use dicta to formulate doctrine, and tolerate confusion and complexity. See Jonathan Sallet, *Antitrust Reform: A Litigation Perspective*, 38 ANTITRUST 14, 15-17 (2022).

the reasons given for the output limit and shows that each is incorrect or overbroad. Section I.D points out that some types of conduct reduce output by their nature, making it unnecessary for the plaintiff to independently demonstrate that output fell. Section I.E stresses that in many cases it is impossible to determine the effect of the defendant's conduct on output, rendering the output limit especially perverse. Section I.F reviews the Supreme Court's most recent application of the output limit in *Amex*.

### A. Origins

The output limit emerged from price theory. Easterbrook claimed that antitrust cases ought to be filtered by their impact on output because price theory indicates that if “arrangements are anticompetitive, the output and market share of those using them must fall.”<sup>19</sup> This logic led Robert Bork to assert that the *sole* task of antitrust law was to identify practices that reduce output.<sup>20</sup> Shortly thereafter, the Supreme Court embraced the approach. In articulating the test for per se illegality, the Court equated effect on competition with effect on output and held that per se condemnation was only appropriate if the practice “always or almost always tend[s] to . . . decrease output.”<sup>21</sup>

Forty years later, the output limit still restricts antitrust enforcement. In *Amex*,<sup>22</sup> the Supreme Court rejected the plaintiffs' most striking evidence of market power and anticompetitive effect—*Amex*'s repeated fee increases—because the plaintiffs had not shown that output had fallen.<sup>23</sup> Likewise, in *Epic Games, Inc. v. Apple Inc.*,<sup>24</sup> the district court refused to accept Epic's direct evidence of monopoly power—Apple's extraordinary and long-lasting profit margins—because Epic had not demonstrated “a necessary restriction in the output of the relevant product.”<sup>25</sup>

This widespread concern with output does have a plausible basis. If a firm raises its price not because it has increased the quality of its product but because it has acquired market power, output is likely to fall. Indeed, the negative correlation between price and output is so

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19. Easterbrook, *supra* note 2, at 31.

20. ROBERT H. BORK, *THE ANTITRUST PARADOX: A POLICY AT WAR WITH ITSELF* 122 (1978) (“The task of antitrust is to identify and prohibit those forms of behavior whose net effect is output restricting and hence detrimental.”).

21. *See* *Broad. Music, Inc. v. Columbia Broad. Sys., Inc.*, 441 U.S. 1, 19-20 (1979) (stating that per se illegality is not warranted unless “the practice facially appears to be one that would always or almost always tend to restrict competition and decrease output”).

22. *Ohio v. Am. Express Co. (Amex)*, 585 U.S. 529 (2018).

23. *Id.* at 547-49. In fact, as the Court emphasized, industry output had increased dramatically. *Id.* But as explained below, that growth occurred *after* *Amex*'s price increases; it did not cause them. *See infra* Section I.F.

24. 559 F. Supp. 3d 898 (N.D. Cal. 2021).

25. *Id.* at 1030.

common that it is called the Law of Demand.<sup>26</sup> But that does not mean that reduced output should be a required element of the plaintiff's proof.

### B. Precedent

Precedent is nearly uniform. If a plaintiff points to the defendant's price increases as direct evidence of the defendant's market power or the anticompetitive effects of its conduct, virtually all decisions hold that this evidence cannot be accepted unless the plaintiff also shows that the defendant's output fell. The exceptions are rare: only three appellate decisions in recent years, two in the Ninth Circuit and one in the Second Circuit.<sup>27</sup>

These decisions address two distinct but interrelated issues. Some cases consider whether price increases constitute direct evidence of the defendant's *market power* or *monopoly power*. Other decisions consider whether price increases constitute direct evidence of *anticompetitive effects*. But the differences between the two sets of cases are minor because a defendant's conduct cannot produce anticompetitive effects unless the defendant has market power or monopoly power.

Five different circuits have stated that supracompetitive prices do not constitute direct evidence of monopoly power without proof of reduced output. The leading case is *Broadcom Corp. v. Qualcomm Inc.*,<sup>28</sup> where the Third Circuit stated that "monopoly power may be proven through direct evidence of supracompetitive prices *and* restricted output."<sup>29</sup> Four other circuits have repeated this language.<sup>30</sup> As a result, one district court stated flatly: "To prove monopoly power directly, supracompetitive pricing must be accompanied by restricted output."<sup>31</sup>

Likewise, many courts have ruled that anticompetitive effects cannot be established through direct evidence unless the plaintiff also demonstrates reduced output. Three decisions, for example, refused to find that the defendant's conduct raised prices to supracompetitive

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26. Easterbrook, *supra* note 2, at 31.

27. *Epic Games, Inc. v. Apple Inc.*, 67 F.4th 946 (9th Cir. 2023); *O'Bannon v. NCAA*, 802 F.3d 1049 (9th Cir. 2015); *US Airways, Inc. v. Sabre Holdings Corp.*, 938 F.3d 43 (2d Cir. 2019).

28. 501 F.3d 297 (3d Cir. 2007).

29. *Id.* at 307 (emphasis added).

30. See *Geneva Pharms. Tech. Corp. v. Barr Lab's Inc.*, 386 F.3d 485, 500 (2d Cir. 2004); *Broadcom Corp. v. Qualcomm Inc.*, 501 F.3d 297, 307 (3d Cir. 2007); *Harrison Aire, Inc. v. Aerostar Int'l, Inc.*, 423 F.3d 374, 380-81 (3d Cir. 2005); *Blue Cross & Blue Shield United of Wis. v. Marshfield Clinic*, 65 F.3d 1406, 1412 (7th Cir. 1995); *Rebel Oil Co. v. Atl. Richfield Co.*, 51 F.3d 1421, 1434 (9th Cir. 1995).

31. *Safeway Inc. v. Abbott Lab's*, 761 F. Supp. 2d 874, 887 (N.D. Cal. 2011) (citing *Rebel Oil*, 51 F.3d at 1438).

levels without proof of lower output.<sup>32</sup> Judge Easterbrook declared: “Unless the firms have the power to raise price by curtailing output, their agreement is unlikely to harm consumers . . . .”<sup>33</sup> Most recently, the Tenth Circuit concluded that a plaintiff had failed to establish anticompetitive effects because the market was expanding and the plaintiff could not show that the defendant’s conduct had a high probability of depressing output.<sup>34</sup>

These decisions, coupled with earlier cases and commentary, have led some scholars to declare that a plaintiff cannot prevail *at all* without showing that the defendant’s conduct restricted output. In their view, restricted output is not only a precondition to the use of direct evidence but an essential element of every plaintiff’s case.<sup>35</sup> To my knowledge, however, the decisions do not go this far. They require restricted output only when the plaintiff attempts to establish market power, monopoly power, or anticompetitive effects through direct evidence.

Very few decisions hold that the output limit is not controlling. The Ninth Circuit has done so twice and the Second Circuit once. In *O’Bannon v. NCAA*,<sup>36</sup> the Ninth Circuit refused to exclude the plaintiffs’ direct evidence of anticompetitive effects even though the plaintiffs had not established “reduce[d] output in the college education market.”<sup>37</sup> The court declared that a “reduction in output is not the *only* measure of anticompetitive effect.”<sup>38</sup> In *Epic Games, Inc. v. Apple Inc.*,<sup>39</sup> the Ninth Circuit again rejected the output limit, saying that it had dispatched that argument in *O’Bannon*.<sup>40</sup> In *US Airways, Inc. v. Sabre Holdings Corp.*,<sup>41</sup> the Second Circuit agreed, noting that *Amex* had

32. See *Aya Healthcare Servs., Inc. v. AMN Healthcare, Inc.*, 9 F.4th 1102, 1112 (9th Cir. 2021); *Netafim Irrigation, Inc. v. Jain Irrigation, Inc.*, No. 1:21-cv-00540-AWI-EPG, 2022 WL 2791201, at \*7-8 (E.D. Cal. Jul. 15, 2022); *Humana Inc. v. Mallinckrodt ARD LLC*, No. 2:19-CV-06926-DSF-MRW, 2020 WL 3041309, at \*6 (C.D. Cal. Mar. 9, 2020).

33. *Polk Bros. v. Forest City Enters.*, 776 F.2d 185, 191 (7th Cir. 1985).

34. See *In re EpiPen (Epinephrine Injection, USP) Mktg., Sales Prac. & Antitrust Litig.*, 44 F.4th 959, 986 (10th Cir. 2022). Other cases have also rejected the plaintiff’s direct evidence of harm because the market was expanding. See, e.g., *Netafim Irrigation*, 2022 WL 2791201, at \*8-10.

35. See John M. Newman, *The Output-Welfare Fallacy: A Modern Antitrust Paradox*, 107 IOWA L. REV. 563, 565 (2022) (“Plaintiffs cannot carry their initial burden of proof unless they can demonstrate that the challenged conduct has reduced output.”); E. THOMAS SULLIVAN, HERBERT HOVENKAMP, HOWARD A. SHELANSKI & CHRISTOPHER R. LESLIE., *ANTITRUST LAW, POLICY, AND PROCEDURE: CASES, MATERIALS, PROBLEMS 2* (7th ed. 2014) (“Absent a finding of output limitation, the conduct is deemed efficient and beyond the condemnation of the antitrust laws.”).

36. 802 F.3d 1049 (9th Cir. 2015).

37. *Id.* at 1070.

38. *Id.* (quoting PHILLIP E. AREEDA & HERBERT HOVENKAMP, *ANTITRUST LAW: AN ANALYSIS OF ANTITRUST PRINCIPLES AND THEIR APPLICATION* ¶ 1503b1 (4th ed. 2013)).

39. 67 F.4th 946 (9th Cir. 2023).

40. *Id.* at 984.

41. 938 F.3d 43 (2d Cir. 2019).

stated the rule of law in the disjunctive: direct evidence of anticompetitive effects can include “reduced output, increased prices, *or* decreased quality in the relevant market.”<sup>42</sup> As a result, adverse effects “can be shown through either a supracompetitive price, reduced output, or other harm.”<sup>43</sup>

These decisions aside, the case law almost uniformly endorses the output limit. But the reasons offered for this result are invariably inadequate.

### C. *Reasons for the Output Limit*

#### 1. *Law of Demand*

As noted above, the output limit springs from a basic proposition of price theory: the exercise of market power ordinarily reduces output. That proposition is “a simple application of the Law of Demand. If a firm raises the effective price of a product of given quality, it will sell less.”<sup>44</sup> The Supreme Court agreed in *Brooke Group*: “Supracompetitive pricing entails a restriction in output.”<sup>45</sup>

Areeda and Hovenkamp reinforced this focus on output by defining market power as “the ability to raise price profitably *by restricting output*.”<sup>46</sup> This definition has been repeatedly quoted by the Supreme Court.<sup>47</sup> Further, it appears not only in the handbook cited by the Court but also in the full, multi-volume Areeda-Hovenkamp treatise.<sup>48</sup> Given the Law of Demand, the Areeda-Hovenkamp definition, and the Supreme Court endorsements, it is hardly surprising that many courts insist on proof of reduced output.

But this position is unwarranted, as Areeda and Hovenkamp recognize. Despite their definition, they do not *require* a plaintiff to demonstrate lower output in order to establish market power. The

42. *Id.* (emphasis added) (quoting *Ohio v. Am. Express Co. (Amex)*, 585 U.S. 529, 542 (2018)). *Amex* relied on similar language in *Brooke Group*. See *Brooke Grp. Ltd. v. Brown & Williamson Tobacco Corp.*, 509 U.S. 209, 237 (1993) (stating that the Court would “not infer competitive injury from price and output data absent some evidence that tends to prove that output was restricted *or* prices were above a competitive level”) (emphasis added).

43. *Chase Mfg., Inc. v. Johns Manville Corp.*, No. 19-cv-00872-MEH, 2022 WL 522345, at \*10 (D. Colo. Feb. 22, 2022) (emphasis omitted) (citing *US Airways, Inc. v. Sabre Holdings Corp.*, 938 F.3d 43, 63 (2d Cir. 2019)).

44. Easterbrook, *supra* note 2, at 31.

45. *Brooke Grp.*, 509 U.S. at 233; see also *Ill. Bell Tel. Co. v. FCC*, 740 F.2d 465, 472 (7th Cir. 1984) (Posner, J.) (“[P]rice and output are inversely correlated.”).

46. PHILLIP E. AREEDA & HERBERT HOVENKAMP, *FUNDAMENTALS OF ANTITRUST LAW* § 5.01 (4th ed. 2016) (emphasis added).

47. See *Amex*, 585 U.S. at 549; *Eastman Kodak Co. v. Image Tech. Servs., Inc.*, 504 U.S. 451, 464 (1992); *Bus. Elecs. Corp. v. Sharp Elecs. Corp.*, 485 U.S. 717, 723 (1988).

48. See PHILLIP E. AREEDA & HERBERT HOVENKAMP, *ANTITRUST LAW: AN ANALYSIS OF ANTITRUST PRINCIPLES AND THEIR APPLICATION* ¶ 501, LexisNexis (database updated Sept. 2024).

treatise discusses many different ways of proving market power and monopoly power in a chapter that is over 400 pages long, but nowhere is there a reduced output requirement.<sup>49</sup> Likewise, when the treatise addresses anticompetitive effects, it does not say that a plaintiff must show an output restriction. To the contrary, the treatise states that a “reduction in output may not be the only measure of anticompetitive effect.”<sup>50</sup>

In short, market power and anticompetitive impact can be established without proof of restricted output. Market power and monopoly power, for instance, can be demonstrated by large and durable profit margins.<sup>51</sup> In addition, as the following sections show, both market power and anticompetitive effects can be demonstrated by price increases that lack an innocent explanation.

## 2. Improved Product

The most arresting evidence of anticompetitive effect is a sharp price increase. When a dominant firm drives out a rival and then raises price dramatically, the antitrust authorities take note. But the Supreme Court has refused to accept price increases as evidence of anticompetitive effect without proof that output declined.<sup>52</sup> The most frequent explanation is that rising prices might be caused by an increase in demand. While that could be an innocent explanation, the next section explains that it is not when the firm could satisfy the increase in demand without raising prices.

A second explanation is that the price increase reflects an improvement in the quality of the defendant’s product. That, too, could be a legitimate explanation. If a firm upgrades its product, the firm is likely to charge more, and if its customers value the improvement more than the higher price, they are likely to buy more, increasing the firm’s output.<sup>53</sup> But a plaintiff need not show that output fell in order to rebut this possibility; the plaintiff can prove that the defendant increased its price without significantly enhancing its product.

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49. See *id.* ch. 5 (“Market Power and Market Definition”). Tellingly, the treatise states that “the degree of a monopolist’s market power is commonly defined by the excess of its profit-maximizing price above its marginal cost.” *Id.* ¶ 502. The treatise never declares that monopoly power is measured by the difference between the monopolist’s output and the competitive output.

50. *Id.* ¶ 1503b1. As mentioned below, Hovenkamp has stated that reduced output is generally the best measure of anticompetitive effect. See *infra* note 80 and accompanying text. But he does not insist that a plaintiff show reduced output.

51. See *infra* Part II.

52. See *infra* note 54 and accompanying text.

53. See Easterbrook, *supra* note 2, at 31.

### 3. *Increased Demand*

The Supreme Court has repeatedly rejected price increases as evidence of anticompetitive effects because price increases may reflect rising demand for the defendant's product. In both *Brooke Group* and *Amex*, the Court stated that when "output is expanding at the same time prices are increasing, rising prices are equally consistent with growing product demand."<sup>54</sup> To rule out this possibility, a plaintiff must prove that output fell. In *Safeway*, the district court precluded the plaintiffs from inferring that output fell from the price increases:

Plaintiffs nevertheless continue to argue that evidence of restricted output is not required because raising prices necessarily depresses sales. This is incorrect. Take for example a market in which demand outstrips supply. In such a hypothetical market, a firm could raise prices—up to a certain point—without necessarily causing a commensurate reduction in sales.<sup>55</sup>

In short, price increases do not constitute evidence of market power or anticompetitive effects unless the plaintiff affirmatively shows that output declined. This requirement, however, is incorrect. Price increases would represent the exercise of market power and would harm consumers, even when demand is growing, if the firm could meet the higher demand without increasing prices. If the firm could expand output without incurring higher costs, it had no need to raise prices.

In these circumstances, the price increases would constitute the exercise of market power. The most common definition of market power is the ability to raise price profitably above the competitive level, and the competitive level is usually defined in terms of cost.<sup>56</sup> As a result, when a firm raises its price above its costs—when it increases its profit margin—it is exerting market power.

This point is so important and so infrequently recognized that it is worth explaining in more detail. The place to start is the cost measures of the competitive level: marginal cost and average total cost (including the cost of capital). The most frequently used measure is marginal cost.<sup>57</sup> The Areeda-Hovenkamp treatise states that "the degree of a monopolist's market power is commonly defined by the excess of its profit-maximizing price above its marginal cost."<sup>58</sup> The leading economics

54. See *Ohio v. Am. Express Co. (Amex)*, 585 U.S. 529, 549 (2018) (quoting *Brooke Grp. Ltd. v. Brown & Williamson Tobacco Corp.*, 509 U.S. 209, 237 (1993)).

55. *Safeway Inc. v. Abbott Lab'sys*, 761 F. Supp. 2d 874, 887 n.3 (N.D. Cal. 2011).

56. See generally John B. Kirkwood, *Market Power and Antitrust Enforcement*, 98 B.U. L. REV. 1169 (2018) (exploring market power and monopoly power in depth).

57. See *id.* at 1174, 1181; see also *infra* note 131.

58. AREEDA & HOVENKAMP, *supra* note 48, ¶ 502.

textbook on industrial organization agrees: “Monopoly or market power is the ability to price profitably above marginal cost.”<sup>59</sup>

These statements imply that a price above marginal cost is a supracompetitive price. Although that proposition is frequently asserted, it is an oversimplification. In industries with high fixed costs and low marginal costs (discussed below), a price above marginal cost is needed to cover fixed costs. In the long run, firms cannot survive and grow unless they earn enough revenue to cover their fixed costs as well as their marginal costs.<sup>60</sup> As a result, some courts and scholars endorse an alternative measure of the competitive level: average total cost (including the cost of equity capital).<sup>61</sup> Judge Posner favored this measure, writing that market power is “the power to charge a price above cost (including in ‘cost’ a profit equal to the cost of equity capital).”<sup>62</sup>

Accordingly, the most comprehensive and defensible measure of market power is the ability to profitably price above *both* marginal cost and average total cost (including the cost of equity capital).<sup>63</sup> This means that if a firm responds to a surge in demand by raising price, but its marginal and total costs do not increase, it is exercising market power. Its higher price exceeds the short-run (marginal cost) and the long-run (average total cost, including the cost of equity capital) measures of the competitive level. It can increase output without increasing either dimension of its costs. In short, the proper question to ask is not whether the defendant’s price increases were caused by a surge in demand, but whether those price increases were justified by higher costs.

In many industries, firms can increase output without incurring higher marginal or full economic costs.<sup>64</sup> In most manufacturing industries, marginal costs are constant over a wide range of output because the manufacturing process is repetitive: each unit requires the same steps and the same costs as the prior unit.<sup>65</sup> Moreover, in a large number of these industries, marginal costs are not only constant but low. For example, in the production and distribution of electronic books,

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59. DENNIS W. CARLTON & JEFFREY M. PERLOFF, MODERN INDUSTRIAL ORGANIZATION 119 (4th ed. 2005).

60. See Kirkwood, *supra* note 56, at 1175.

61. See *id.* at 1188-94.

62. *In re Brand Name Prescription Drugs Antitrust Litig.*, 186 F.3d 781, 783 (7th Cir. 1999).

63. Likewise, the best measure of *monopoly* power is the ability to price *substantially* above both marginal cost and average total cost (including the cost of equity capital).

64. To simplify the terminology, I have substituted full economic cost for average total cost (including the cost of equity capital).

65. See Kirkwood, *supra* note 56, at 1184.

marginal costs are negligible.<sup>66</sup> In the manufacture of many brand name prescription drugs, variable costs are just “pennies a pill.”<sup>67</sup> The marginal cost of an additional copy of a software program is essentially zero.<sup>68</sup> All three industries are well-known examples of cases in which the fixed costs of product development are high, but the marginal costs of production are minimal.<sup>69</sup>

William Baumol and Daniel Swanson observe that the same cost structure is characteristic of new economy industries: “From software to semiconductors, digital entertainment to biotechnology, and in innovative fields more generally, the standard cost pattern entails sunk outlays that are large and must be incurred over and over again, but the marginal cost—the cost of serving an additional customer—is virtually negligible.”<sup>70</sup> In all these industries, producers can ordinarily increase output without confronting higher marginal costs.

Courts imagine that an increase in demand must lead to a price increase because that is what happens in the textbook, perfectly competitive model. But there is a critical difference between the textbook model and the real-world industries just described. In the real-world industries, firms can expand output without incurring higher marginal costs. In the perfectly competitive model, the firms face rising marginal costs.<sup>71</sup> The reason they increase price when demand grows is that they cannot expand output without incurring higher costs.<sup>72</sup> Further, when they increase price, they do not exercise market power;

66. Richard Epstein, *Not Proven: The DOJ Suit Against Apple for eBook Pricing*, RICOCHET (Apr. 12, 2012), <https://ricochet.com/194269/not-proven-the-doj-suit-against-apple-for-ebook-pricing/> [<https://perma.cc/2A6L-FSAZ>] (observing that “the marginal price for the production of an additional eBook is close to zero”).

67. Richard G. Frank & Joseph P. Newhouse, *Should Drug Prices Be Negotiated Under Part D of Medicare? And If So, How?*, 27 HEALTH AFFS. 33, 34 (2008).

68. Michal S. Gal & Daniel L. Rubinfeld, *The Hidden Costs of Free Goods: Implications for Antitrust Enforcement*, 80 ANTITRUST L.J. 521, 526 (2016) (“[T]he marginal cost of supply of digital products and services is often extremely low.”).

69. See John B. Kirkwood, *Collusion to Control a Powerful Customer: Amazon, E-Books, and Antitrust Policy*, 69 U. MIA. L. REV. 1, 35 (2014) (discussing e-books); John B. Kirkwood, *Buyer Power and Healthcare Prices*, 91 WASH. L. REV. 253, 264 (2016) (discussing prescription drugs); Richard A. Posner, *Antitrust in the New Economy*, 68 ANTITRUST L.J. 925, 926-27 (2001) (“Intellectual property is characterized by heavy fixed costs relative to marginal costs . . . dramatically so in the case of software, where it is only a slight overstatement to speak of marginal cost as zero.”).

70. William J. Baumol & Daniel G. Swanson, *The New Economy and Ubiquitous Competitive Price Discrimination: Identifying Defensible Criteria of Market Power*, 70 ANTITRUST L.J. 661, 661 (2003).

71. In the familiar textbook model, the supply curve of each perfectly competitive firm slopes upward and, in consequence, the industry supply curve is upward sloping. These supply curves rise with increasing output because the firms’ marginal costs are increasing. See CARLTON & PERLOFF, *supra* note 59, at 61-62.

72. See *id.*

they continue to price at marginal cost; their margin does not grow.<sup>73</sup> In short, in a perfectly competitive industry, a surge in demand leads to a price increase but not a price above marginal cost. In contrast, in most real-world industries, a surge in demand leads to both a price increase and a price above marginal cost.

In most real-world industries, moreover, a short-term increase in output is unlikely to cause an increase in fixed costs. That is because a firm would not have to incur additional fixed costs to produce more output unless the increase is so large or lasts so long that the firm cannot satisfy it with its existing capacity. Thus, unless the defendant shows that it needed to expand capacity to meet a surge in demand, the court should assume that the defendant was able to expand output without incurring higher fixed costs.

In sum, in most industries, firms can ordinarily increase output in the short term without increasing their marginal costs or their fixed costs. As a result, when a firm raises its price in response to a surge in demand, it is usually exercising market power. Accordingly, *Amex*, *Brooke Group*, and *Safeway* oversimplified the issue. Price increases are not benign just because they reflect growing product demand. Instead, price increases constitute direct evidence of market power when demand is growing *and* the producers were able to meet that demand without higher costs.

#### 4. *Net Effect on Competition*

When the defendant's conduct has caused both anticompetitive effects and procompetitive effects, its net impact on competition must be determined. Output is a possible test, since one might expect that conduct that is harmful on balance would cause customers to buy less and conduct that is beneficial on balance would cause customers to buy more.<sup>74</sup> But there is no one-to-one correspondence between output and consumer welfare. As Newman has explained:

A variety of strategies—including some that are quite well-recognized by antitrust law—can have the effect of increasing output while simultaneously reducing welfare. These include creating or maintaining information asymmetries, deception and misleading [advertising], predatory pricing, coercive practices like tying, intrabrand vertical restraints, externalizing costs, and exploiting cognitive limits.<sup>75</sup>

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73. More precisely, their short-run margin—the gap between their price and their marginal cost—does not increase. It remains at zero because perfectly competitive firms always price at marginal cost and never exercise market power. *See id.* at 57-59.

74. *See* Easterbrook, *supra* note 2, at 31.

75. Newman, *supra* note 35, at 582 (emphasis omitted).

When the defendant employs one of these strategies, the plaintiff cannot show reduced output because the defendant's conduct *increased* output. But that does not mean the conduct was procompetitive.<sup>76</sup>

Bid rigging harms customers but in the short run it may have no effect on output. When the winning bid is inflated through collusion, the customer may pay a higher price but purchase exactly the same amount. In many cases, to be sure, anticompetitive conduct tends to diminish output, but the plaintiff need not *prove* that output fell. There are almost always other ways of showing that conduct had an anticompetitive effect, as merger cases illustrate. The ordinary merger challenge involves a prospective merger, a merger that has not yet occurred. By definition, its effect on output cannot be measured. Yet courts routinely assess whether the transaction is likely to reduce competition.<sup>77</sup>

Some commentators favor an output test. Judge Ginsburg and Koren Wong-Ervin contend that “changes in market wide output, rather than in price” should be the test in two-sided platform markets.<sup>78</sup> They argue that price is a noisier signal than output because prices may go up on one side of a platform and simultaneously decrease on the other side, but “output levels on both sides are either identical or at least highly correlated.”<sup>79</sup> Herbert Hovenkamp maintains that “[t]he best criterion for assessing harm is likely or reasonably anticipated

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76. Output and welfare are also inconsistent when the defendant's conduct benefits *marginal* consumers, who increase their purchases, and harms *inframarginal* consumers, who maintain their purchases, and the losses to the latter exceed the gains to the former. *Id.* at 590. This is a classic problem with resale price maintenance (RPM): it can increase output at the same time as it depresses welfare. Suppose that a manufacturer adopts RPM to stimulate the provision of additional retail services, and some consumers like the change so much that they increase their purchases. But other consumers would have preferred the status quo. While they value the product enough to maintain their purchases at the higher price, they would have preferred fewer services and a lower price. In plausible circumstances, the losses to these inframarginal consumers exceed the gains to the marginal consumers, so that although output rises, consumer welfare falls. In a case like this, inferring welfare from the effect on output is a “defective approach.” Steven C. Salop, Daniel Francis, Lauren Sillman & Michaela Spero, *Rebuilding Platform Antitrust: Moving on from Ohio v. American Express*, 84 ANTITRUST L.J. 883, 907 n.172 (2022). For a full discussion of the RPM problem, see John B. Kirkwood, *Rethinking Antitrust Policy Toward RPM*, 55 ANTITRUST BULL. 423 (2010).

77. See, e.g., *United States v. AT&T Inc.*, 310 F. Supp. 3d 161, 189-90, 192 (D.D.C. 2018) (evaluating the competitive effects of AT&T's proposed acquisition of Time Warner), *aff'd*, 916 F.3d 1029 (D.C. Cir. 2019).

78. Douglas H. Ginsburg & Koren W. Wong-Ervin, *AmEx: Beyond Transaction Platforms and Section 1*, COMPETITION POL'Y INT'L, May 2020, at 5.

79. *Id.* (quoting Abbott B. Lipsky et al., *The Federal Trade Commission's Hearings on Competition and Consumer Protection in the 21st Century, Platforms, Comment of the Global Antitrust Institute* 10 (Geo. Mason Univ. of L. & Econ. Rsch. Paper Series, Paper No. 18-39, 2018), [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=3267489](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3267489) [<https://perma.cc/4AQU-BNHL>]). Output may be noisy at the same time, though, because demand may also be changing.

market output effects.”<sup>80</sup> But even if output is sometimes a superior measure, the output limit holds that reduced output is the *only* acceptable test of harm. As the facts of *Amex* demonstrate, however, it is quite possible to show both market power and consumer harm without addressing output.<sup>81</sup>

#### D. Conduct that Reduces Output by Its Nature

When the defendant curtails the quality of its product by diminishing its size, substituting inferior materials, or downgrading its performance, the defendant reduces the value it provides customers. Unless there is some countervailing change in conduct, customer welfare has fallen and quality-adjusted output has dropped. Likewise, when the defendant’s conduct suppresses innovation, reducing the number of new products offered to consumers, choice has been reduced and output has fallen. The acquisition of a nascent competitor, only to kill its most promising research project, is a direct reduction of potential market output.<sup>82</sup> In all these instances, the nature of the challenged conduct demonstrates an adverse effect on actual or potential output. There is no reason to require the plaintiff to prove, in addition, that the total quantity sold in the relevant market fell.

#### E. Impossible to Determine

Easterbrook recognized that an output test may be difficult to apply, but he was not troubled because “[t]here are statistical tools for doing this, if the data are available.”<sup>83</sup> Yet the data and the statistical tools are often not available. In many cases, there will not be enough information to distinguish the effects of the defendant’s conduct from other influences on industry output. As *Epic Games* illustrates, this is especially likely in platform or new economy industries in which the defendant adopts a restrictive practice at the same time as it introduces a new product. This simultaneity problem makes it impossible to determine how much of market growth is due to the defendant’s restraint and how much is due to the appeal of its new product.

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80. Herbert Hovenkamp, *Antitrust Harm and Causation*, 99 WASH. U. L. REV. 787, 788 (2021).

81. See *United States v. Am. Express Co.*, 88 F. Supp. 3d 143, 151, 195-96, 215 (E.D.N.Y. 2015) (finding that Amex’s fee increases showed that it had market power because it could increase fees without losing significant merchant business; that the fee increases not only harmed merchants but also injured consumers, including those who paid with other cards or cash; and that Amex passed on only part of its higher revenues to cardholders in greater rewards), *rev’d and remanded*, 838 F.3d 179 (2d Cir. 2016), *aff’d sub nom.* *Ohio v. Am. Express Co.*, 585 U.S. 529 (2018); see also *infra* Section IV.A.

82. See Colleen Cunningham, Florian Ederer & Song Ma, *Killer Acquisitions*, 129 J. POL. ECON. 649, 650 (2021).

83. Easterbrook, *supra* note 2, at 31.

In *Epic Games*, Apple adopted restraints on App Store distribution and payment processing at the same time as it opened the App Store.<sup>84</sup> As a result, the dramatic rise in App Store usage—particularly for online gaming—could not be attributed to Apple’s restraints. It was just as likely, if not more likely, that App Store transactions soared because of the popularity of iPhone apps and online gaming. The district court stated:

Apple argues that the amount of iOS game output has increased over time. On this, the Court agrees. The evidence shows that iOS game transactions exploded by 1,200% since 2008, with double that growth in developer game revenue. However, that does not mean that Apple’s conduct is procompetitive. As Dr. Evans explained, “high-technology industries [often] grow extraordinarily rapidly” even where “a dominant firm emerges very quickly,” so “tremendous growth” in these markets is “commonplace.” Using growth as a competitiveness metric would “be essentially a free pass for high-tech companies.”<sup>85</sup>

The court noted that “what is needed is a comparison of output in a ‘but-for’ world without the challenged restrictions.”<sup>86</sup> But given the simultaneity problem, it was not possible for the parties to estimate Apple’s but-for volume. It “may have been even higher without Apple’s restrictions.”<sup>87</sup>

In many ways, the district court’s opinion is a study in contrasts, finding facts that favored Epic and then reaching legal conclusions that favored Apple. That was the case with respect to monopoly power. The court found that Apple had commanded an extraordinary profit margin for nearly a decade,<sup>88</sup> yet ruled Epic had not demonstrated monopoly power because it had not shown the “necessary restriction in the output of the relevant product.”<sup>89</sup> But the simultaneity problem applied here as well. Apple’s high commission rate on App Store transactions had been imposed from the very beginning of the App Store.<sup>90</sup> It was no more possible to determine whether this allegedly monopolistic fee reduced output than it was to determine the impact of Apple’s restraints on output.

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84. *Epic Games, Inc. v. Apple, Inc.*, 559 F. Supp. 3d 898, 922-23 (N.D. Cal. 2021).

85. *Id.* at 998 (alteration in original) (footnote omitted).

86. *Id.*

87. *Id.*

88. *See id.* at 952-53; *see also infra* Section II.B.3.

89. *Epic Games*, 559 F. Supp. 3d at 1030. The court’s ruling also reflected its overbroad definition of the relevant market. *See infra* Sections III.B & IV.B.3.

90. *Epic Games*, 559 F. Supp. 3d at 923.

### F. *Amex*

The Supreme Court's decision in *Amex* has quickly become one of the most criticized opinions in antitrust law.<sup>91</sup> Scholars have "called the decision 'wrong,' 'alarming,' 'deeply flawed,' 'tortured,' 'a mistake,' 'nonsense,' 'inappropriate,' 'regressive,' a 'house of cards,' and [incoherent]." <sup>92</sup> The Court's analysis of numerous issues, including market definition, market power, anticompetitive effects, and justifications, was mistaken.<sup>93</sup> Among other errors, the Court embraced the output limit, rejecting the plaintiffs' direct evidence of market power and anticompetitive effects—*Amex*'s repeated fee increases—because the plaintiffs had not shown reduced output.<sup>94</sup>

Starting in 2005 and continuing until 2010, *Amex* continually increased its merchant fees.<sup>95</sup> This initiative involved over twenty separate price hikes,<sup>96</sup> and *Amex* accomplished them without losing any of its large merchant customers.<sup>97</sup> The plaintiffs argued that *Amex*'s ability to increase merchant fees with such impunity showed that it had market power.<sup>98</sup> The plaintiffs also claimed that the price hikes constituted actual anticompetitive effects, since they forced merchants and consumers to pay higher prices.<sup>99</sup>

The Supreme Court refused to accept the fee increases as direct evidence of market power or anticompetitive effects because industry output "grew dramatically from 2008 to 2013, increasing 30%."<sup>100</sup> The Court repeated *Brooke Group*'s admonition that when "output is expanding at the same time prices are increasing, rising prices are equally consistent with growing product demand."<sup>101</sup> But output was not expanding at the same time prices were rising. *Amex* began raising

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91. See, e.g., Salop et al., *supra* note 76, at 883 (stating that *Amex* "may be the worst antitrust decision in many decades").

92. See Brief of the American Antitrust Institute as Amicus Curiae in Support of Plaintiff, Counter-Defendant-Appellant at 21-22, *Epic Games, Inc. v. Apple, Inc.*, 67 F.4th 946 (9th Cir. 2023) (Nos. 21-16506 & 21-16695).

93. See John B. Kirkwood, *Antitrust and Two-Sided Platforms: The Failure of American Express*, 41 CARDOZO L. REV. 1805 (2020) (exposing the flaws in the Court's reasoning).

94. See *Ohio v. Am. Express Co. (Amex)*, 585 U.S. 529, 547-50 (2018). As noted, the Court stated initially that a plaintiff could establish anticompetitive effects through "reduced output, increased prices or decreased quality." *Id.* at 542 (emphasis added). Later, however, the Court reversed itself and held that increased prices could not establish anticompetitive impact unless they were accompanied by proof of reduced output. See *infra* notes 101-02.

95. See *United States v. Am. Express Co.*, 88 F. Supp. 3d 143, 195 (E.D.N.Y. 2015), *rev'd and remanded*, 838 F.3d 179 (2d Cir. 2016), *aff'd sub nom.* *Ohio v. Am. Express Co.*, 585 U.S. 529 (2018).

96. *Id.* at 196.

97. *Id.* at 195.

98. *Id.* at 195-97.

99. *Id.* at 215-17.

100. *Ohio v. Am. Express Co. (Amex)*, 585 U.S. 529, 549 (2018).

101. *Id.* (quoting *Brooke Grp. Ltd. v. Brown & Williamson Tobacco Corp.*, 509 U.S. 209, 237 (1993)).

fees *before* the output expansion started and stopped raising fees *before* the output expansion ended.<sup>102</sup> The output expansion did not cause the fee increases.

Amex raised fees because Visa and MasterCard had previously increased their fees and Amex had not kept up.<sup>103</sup> As a result, Amex had unexploited pricing power: its cardholders were still more valuable as a group than Visa's and MasterCard's, but Amex was no longer charging merchants for this added value.<sup>104</sup> Consequently, it could recapture this value without losing significant numbers of merchants. Indeed, Amex called its program of repeated fee increases, "Value Recapture."<sup>105</sup>

For the same reason, the output expansion does not indicate that the challenged restraints—Amex's anti-steering provisions—were pro-competitive. These provisions had existed since the 1950s and Amex had last tightened them in the late 1980s and early 1990s,<sup>106</sup> more than fifteen years *prior* to the output expansion.<sup>107</sup> In contrast, the output expansion occurred at the same time as a major industrywide increase in cardholder rewards.<sup>108</sup>

The plaintiffs did not show that Amex's anti-steering provisions had caused a decline in output. But it was likely too difficult to obtain the data necessary to disentangle the impact of Amex's provisions from other factors affecting industry output. Without such data, it is impossible to attribute changes in industry output to Amex's conduct. As a result, as Justice Breyer stated, "The fact that credit-card use in general has grown over the last decade . . . says nothing about whether such use would have grown more or less without the nondiscrimination provisions."<sup>109</sup> This point was so obviously correct that the majority offered no response. Instead, it allowed the adverse consequences of Amex's restraint to continue.<sup>110</sup>

102. Amex raised fees from 2005 to 2010. The output expansion took place from 2008 to 2013. See Kirkwood, *supra* note 93, at 1836 n.151.

103. See *Am. Express Co.*, 88 F. Supp. 3d at 195-96.

104. See Kirkwood, *supra* note 93, at 1831.

105. See *id.*

106. See *Am. Express Co.*, 88 F. Supp. 3d at 161.

107. See *supra* note 102.

108. See *United States v. Am. Express Co.*, 838 F.3d 179, 206 (2d Cir. 2016) ("Increased investment in cardholder rewards has accompanied a dramatic increase in transaction volume . . ."), *aff'd sub nom.* *Ohio v. Am. Express Co.*, 585 U.S. 529 (2018). In addition, output expanded because the demand for credit increased and the cost of electronic funds transfers fell. Steve Salop pointed this out to me.

109. *Ohio v. Am. Express Co. (Amex)*, 585 U.S. 529, 573 (2018) (Breyer, J., dissenting).

110. See Newman, *supra* note 35, at 614-15 ("[I]t is difficult to think of a more harmful restraint than one that has endured for decades in a highly concentrated market, that extracts wealth from the least well-off members of society and redistributes it to the already-affluent, and that increases the cost of nearly every good and service sold in the United States.").

## II. THE PROFIT MARGIN LIMIT

A firm that prices substantially above its costs—both its marginal cost and its full economic cost—possesses monopoly power. It has the ability to “profitably raise prices substantially above the competitive level,” the definition of monopoly power set forth in *Microsoft*,<sup>111</sup> and commonly used today.<sup>112</sup> It also has the ability to “control prices,” the classic definition of monopoly power articulated in *United States v. E.I. du Pont de Nemours & Co.*<sup>113</sup>

But neither *Microsoft* nor *du Pont* determined monopoly power by comparing the defendant’s prices to its costs. Neither court concluded that the defendant must have monopoly power because its profit margin—the difference between its average price and its average total costs (including the cost of capital)—was exceptionally high for many years. Instead, both courts followed the traditional method of defining a relevant market and measuring the defendant’s market share.<sup>114</sup> This approach is not only traditional; it is invariable. Precedent mandates market definition,<sup>115</sup> and courts *always* determine whether monopoly power—or a dangerous probability of monopoly power—exists by defining a relevant market.<sup>116</sup> Some decisions say that monopoly power may be established through direct economic evidence.<sup>117</sup> Yet direct economic evidence is never central to the decision. Instead, courts rarely rely on it, either because they think it is not clear enough,<sup>118</sup> or because the parties do not offer it.<sup>119</sup> The decisive evidence is market share, which depends on market definition.

111. *United States v. Microsoft Corp.*, 253 F.3d 34, 51 (D.C. Cir. 2001).

112. *See* Kirkwood, *supra* note 56, at 1172 n.12, 1173 n.14.

113. *See* 351 U.S. 377, 391 (1956) (“Monopoly power is the power to control prices or exclude competition.”).

114. *See* AREEDA & HOVENKAMP, *supra* note 48, ¶ 502 (“Instead of trying to measure the degree by which a profit-maximizing monopoly price exceeds the competitive price, courts traditionally attempt to infer market power from the defendant(s)’ market share.”).

115. *See, e.g.*, *Walker Process Equip., Inc. v. Food Mach. & Chem. Corp.*, 382 U.S. 172, 177 (1965) (“Without a definition of th[e] [relevant] market there is no way to measure [defendant’s] ability to lessen or destroy competition.”); *McWane, Inc. v. FTC*, 783 F.3d 814, 828 (11th Cir. 2015) (“Defining the market is a necessary step in any analysis of market power . . .” (quoting *U.S. Anchor Mfg., Inc. v. Rule Indus., Inc.*, 7 F.3d 986, 994 (11th Cir. 1993))).

116. To the best of my knowledge, there are no exceptions.

117. *See, e.g.*, *Broadcom Corp. v. Qualcomm Inc.*, 501 F.3d 297, 307 (3d Cir. 2007) (stating that “monopoly power may be proven through direct evidence of supracompetitive prices” or may be inferred from “the structure and composition of the relevant market”); *Harrison Aire, Inc. v. Aerostar Int’l, Inc.*, 423 F.3d 374, 381 (3d Cir. 2005) (same). Likewise, the Supreme Court has recognized the evidentiary value of high profits. *See* *FTC v. Actavis, Inc.*, 570 U.S. 136, 157 (2013) (“[H]igher-than-competitive profits [are] a strong indication of market power.”). But the Court has never dispensed with market definition.

118. *See* Gregory J. Werden, *Why (Ever) Define Markets? An Answer to Professor Kaplow*, 78 ANTITRUST L.J. 729, 733 n.17 (2013) (“[T]he courts typically find insufficient any direct evidence of market power.”).

119. *See* *United States v. Microsoft Corp.*, 253 F.3d 34, 51 (D.C. Cir. 2001) (stating that “such direct proof is only rarely available”).

This approach places too much weight on market definition and too little weight on a firm's actual pricing power, demonstrated by its ability—or inability—to earn sustained supracompetitive margins. Market definition is fraught with difficulties. Done correctly, it is no less technical than measuring power through direct economic evidence.<sup>120</sup> It requires attention to multiple factors, it is “rarely sufficient to establish the degree of market power that a firm possesses,”<sup>121</sup> and “its binary result works poorly in differentiated markets.”<sup>122</sup> Moreover, even if market definition shows that the defendant can price significantly above marginal cost, that conclusion does not mean that the defendant earns supracompetitive profits. It may need to price above marginal cost to finance the research and development (R&D) and marketing that make its product attractive.<sup>123</sup> Further, in the areas addressed in Parts III and IV (aftermarkets and two-sided platforms), courts have adopted approaches to market definition that often conceal rather than expose market power.<sup>124</sup>

In contrast, a persistent, abnormally high profit margin can be a practical and reliable indicator of pricing power. Section II.A explains why this is so and Section II.B reinforces the point with examples in which courts, agencies, and scholars have cited extraordinary profitability as evidence of market power or monopoly power.

Placing greater emphasis on profitability would not mean dispensing with market definition. Courts can infer the relevant market from the profit margin evidence. For example, if the evidence shows that DuPont earned an exceptional rate of return on cellophane for decades,<sup>125</sup> the relevant market should be defined as cellophane, not all flexible wrapping materials. This inferential approach achieves one of the main benefits of market definition—focusing the case on the

120. See AREEDA & HOVENKAMP, *supra* note 48, ¶ 515 (“[O]ne should not be misled into thinking that the exercise of market definition is inherently less technical than assessing power directly . . . [through] economic methods. If market definition is performed correctly, it is also quite technical.”).

121. *Id.*

122. *Id.* (“Once a market is defined, a particular firm’s output must be counted as either inside or outside of the relevant market, with no gradations in between. This can lead to serious errors.”).

123. See *supra* Section I.C.3.

124. On the other hand, market definition may reveal the existence of monopoly power when the defendant’s profit margin is not high. Learned Hand found that Alcoa had monopoly power because its share of the relevant market was 90 percent even though its overall profit margin was about average. See *United States v. Aluminum Co. of America (Alcoa)*, 148 F.2d 416, 424-25, 429 (2d Cir. 1945). As *Alcoa* suggests, profit margin is a one-sided test. It does not identify firms that could price substantially above the competitive level but do not exercise their power.

125. See *infra* Section II.B.1.

competitive process at issue<sup>126</sup>—without all the extra steps of the traditional approach.

### A. *Meaningful Measure of Market Power*

If properly measured, a firm's profit margin—the difference between its price and its cost—would accurately measure its market power. After all, market power is simply the ability to profitably raise price above the competitive level.<sup>127</sup> Thus, so long as the cost measure in the firm's margin equals or exceeds the competitive level—the level at which a competitive firm would price—the firm's margin would capture its ability to exert market power.<sup>128</sup>

As Part I noted, the most frequently stated measure of the competitive level is marginal cost. The treatise declares: “[T]he degree of a monopolist's market power is commonly defined by the excess of its profit-maximizing price above its marginal cost.”<sup>129</sup> In their classic article on market power, William Landes and Richard Posner concur: “[I]f a firm's price is above its marginal cost, the implication is that the firm does not face perfect competition, i.e., that it has at least some market power.”<sup>130</sup> Other scholars agree.<sup>131</sup>

If marginal cost is the competitive level, a firm's contribution margin is very likely to reflect its market power. A firm's contribution margin is the difference between its price and its variable costs.<sup>132</sup> This margin is likely to capture a firm's ability to price above marginal cost because in many industries, marginal cost is low and constant over the relevant range of production.<sup>133</sup> When that is so, average variable cost and marginal cost are equal or very similar. Accordingly, if marginal cost is the competitive benchmark, as many scholars indicate it is, a

126. See Werden, *supra* note 118, at 730 (asserting that “the relevant market can bring clarity and power to the narrative” of an antitrust case because it “identifies the competitive process at issue”).

127. See Kirkwood, *supra* note 56, at 1172.

128. Likewise, if the firm's margin was large enough, it would show that the firm had the ability to price *substantially* above the competitive level and thus exercise monopoly power.

129. AREEDA & HOVENKAMP, *supra* note 48, ¶ 502.

130. William M. Landes & Richard A. Posner, *Market Power in Antitrust Cases*, 94 HARV. L. REV. 937, 939 (1981) (emphasis omitted).

131. See, e.g., Jonathan B. Baker, *Competitive Price Discrimination: The Exercise of Market Power Without Anticompetitive Effects*, 70 ANTITRUST L.J. 643, 645 (2003) (referring to “marginal cost pricing” as “the usual competitive benchmark”); Mark A. Lemley & Mark P. McKenna, *Is Pepsi Really a Substitute for Coke? Market Definition in Antitrust and IP*, 100 GEO. L.J. 2055, 2094-95 (2012) (stating that the “competitive level” for measuring market power is “generally defined as marginal cost”).

132. See *Contribution Margin: Definition, Overview, and How to Calculate*, INVESTOPEDIA, [www.investopedia.com/terms/c/contributionmargin.asp](http://www.investopedia.com/terms/c/contributionmargin.asp) [https://perma.cc/9YZD-RZLZ] (Apr. 12, 2024) (“The contribution margin is computed as the selling price per unit, minus the variable cost per unit.”).

133. See *supra* Section I.C.3.

firm's contribution margin is likely to provide direct evidence of its ability to exert market power or monopoly power.

In most industries, however, marginal cost is not an appropriate measure of the competitive level. In those industries, described in Part I, fixed costs are high but marginal costs are “virtually negligible.”<sup>134</sup> Where marginal costs are minimal, a firm that prices at marginal cost cannot cover its fixed costs like plant and equipment and R&D. Because firms must cover their fixed costs in order to survive over the longer term, marginal cost is not the competitive level in those industries if that means the level at which a competitive industry would price. There would be no industry—and no competition—if the firms were forced to price at marginal cost.<sup>135</sup>

In short, marginal cost should not be the sole measure of the competitive level. Instead, to determine whether a firm is exercising market power or monopoly power, a court should also address whether the firm is pricing above average total cost (including the cost of equity capital). Judge Posner agreed, defining the competitive level as “cost, including the cost of capital,” and monopoly power as the ability to charge a price above total cost.<sup>136</sup> Likewise, Areeda and Hovenkamp state that a price above average total cost (including the cost of capital) is evidence of market power: “A price above total cost yields an ‘economic profit’ that would not be steadily earned in a competitive market.”<sup>137</sup>

Accordingly, if a firm is pricing above *both* marginal cost and average total cost (including its cost of capital), it is exercising market power.<sup>138</sup> Since, as noted above, firms typically price above marginal cost, the critical issue is whether the firm is pricing above average total cost (including the cost of capital). If a firm is pricing above average total cost (including the cost of capital), it is earning “economic” or supracompetitive profits, which strongly suggests market power.<sup>139</sup>

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134. See Baumol & Swanson, *supra* note 70, at 661.

135. See *id.* at 668 (“Such a price clearly is a recipe for insolvency.”).

136. See *Sheridan v. Marathon Petroleum Co.*, 530 F.3d 590, 594 (7th Cir. 2008) (Posner, J.) (“Monopoly power we know is a seller’s ability to charge a price above the competitive level (roughly speaking, above cost, including the cost of capital) . . . .” (emphasis omitted)); accord *In re Brand Name Prescription Drugs Antitrust Litig.*, 186 F.3d 781, 783 (7th Cir. 1999) (Posner, J.) (defining “market power” as “the power to charge a price above cost (including in ‘cost’ a profit equal to the cost of equity capital)”).

137. AREEDA & HOVENKAMP, *supra* note 48, ¶ 504b.

138. Similarly, if a firm is pricing *substantially* above its marginal cost and its average total cost (including its cost of capital), it is exerting monopoly power.

139. See *FTC v. Actavis, Inc.*, 570 U.S. 136, 157 (2013) (“[H]igher-than-competitive profits [are] a strong indication of market power.”); *Epic Games, Inc. v. Apple Inc.*, 559 F. Supp. 3d 898, 993 (N.D. Cal. 2021) (noting that experts for both parties agree that “persistently high economic profit is suggestive of market power”), *aff’d in part, rev’d in part*, 67 F.4th 946 (9th Cir. 2023); AREEDA & HOVENKAMP, *supra* note 48, ¶ 516a (“[S]ubstantial market power usually brings higher returns than needed to attract capital to the business . . . .”).

To be sure, accounting profits are not the same as economic profits.<sup>140</sup> But accounting profits are likely to be a reasonable proxy for economic profits when accounting profits have been exceptionally high for many years.<sup>141</sup> In that case, the firm's economic profits are likely to be substantial. The prime problem with short-term accounting profits as a measure of economic profits is that they may not reflect the costs and risks of a firm's prior investments in R&D. But when a firm has been earning an extraordinarily high total margin, year after year, for many years, its revenues have more than covered all its R&D expenses and its risks have not undermined its profitability. On the contrary, despite whatever risks it faced, it has consistently earned exceptional profits. Accordingly, courts should be willing to infer monopoly power from a persistent and extraordinary total profit margin—a margin that reflects all of a firm's costs, including R&D.

Today, moreover, it is increasingly unnecessary to infer monopoly power from persistently high accounting profits because economists have become adept at converting accounting data into economic profits.<sup>142</sup> In recent years, Carl Shapiro, Dennis Carlton, and OXERA have used “accounting data to measure economic profits in antitrust analyses.”<sup>143</sup>

### B. Examples

Several authorities have recognized the significance of persistent extraordinary profit margins. While no case has inferred market power or monopoly power solely from margin data, a number of courts, government agencies, and leading scholars have cited a history of exceptional margins to bolster their conclusion that a large firm was charging excessive prices.

#### 1. DuPont (Cellophane)

The most striking example involved DuPont. Its profit margin on cellophane was so high for so long that Areeda and Hovenkamp conclude that DuPont must have exercised market power:

[D]ata both in and out of the record showed extraordinarily high profits for DuPont on cellophane sales from the 1920s on, and as late as 1950 DuPont earned profits of 20 percent after taxes. Profits of such

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140. For the differences between accounting profits and economic profits, and the adjustments required to convert accounting profits to economic profits, see AREEDA & HOVENKAMP, *supra* note 48, ¶ 504b; Kirkwood, *supra* note 56, at 1190; Michael Cragg, Patrick Holder, David Hutchings & Bin Zhou, *The Proper Measure of Profits for Assessing Market Power*, 37 ANTITRUST 48, 48 (2023).

141. See AREEDA & HOVENKAMP, *supra* note 48, ¶ 516b (inferring market power and economic profits from persistently high accounting profits).

142. See generally Cragg et al., *supra* note 140 (explaining the adjustments needed in accounting data to reflect an economic approach to issues like depreciation and risk).

143. *Id.* at 50.

magnitude and such durability strongly suggest market power. It seems quite implausible that the cost of capital over this long period would have exceeded, say, 10 to 12 percent. During the same period, DuPont invested in rayon production at returns averaging 7 to 8 percent.<sup>144</sup>

## 2. *Google and Facebook*

The UK Competition and Markets Authority (CMA) concluded that Google and Facebook exercised substantial market power because their accounting returns far exceeded their cost of capital for many years. The CMA estimated that Google's return on capital (40%) was more than four times its cost of capital (9%).<sup>145</sup> The gap between Facebook's return on capital and its cost of capital was even greater: 50% versus 9%.<sup>146</sup> As a result, the agency found that "the profitability of both Google and Facebook has been well above any reasonable estimate of what we would expect in a competitive market for many years."<sup>147</sup>

## 3. *Apple (App Store)*

In *Epic Games*, the district court concluded that "under any normative measure, . . . Apple's operating margins tied to the App Store are extraordinarily high."<sup>148</sup> The court found that Apple earned operating margins of over 75% in fiscal years 2018 and 2019,<sup>149</sup> and as early as fiscal year 2013, its margin exceeded 72%.<sup>150</sup> In short, for almost a decade, Apple's profit margin exceeded 70% and there was no evidence it had begun to decline. These striking margins caused the court to conclude that the App Store is "incredibly profitable" and "there appears to be no market forces to . . . motivate a change."<sup>151</sup> Indeed, Apple's margins "strongly show market power."<sup>152</sup>

The court's findings rested on a thorough analysis of Apple's records by Epic expert Ned Barnes. In line with my recommendation in the previous section, Barnes calculated Apple's total margin, not its contribution margins. That is, he took Apple's revenues and subtracted its fixed as well as its variable costs, including "selling, general and administrative expenses, and research and development ("R&D")

144. AREEDA & HOVENKAMP, *supra* note 48, ¶ 516f1 (footnote omitted).

145. COMPETITION & MKTS. AUTH., ONLINE PLATFORMS AND DIGITAL ADVERTISING: MARKET STUDY INTERIM REPORT ¶ 59 (2019).

146. *Id.*

147. *Id.* (emphasis omitted).

148. *Epic Games, Inc. v. Apple Inc.*, 559 F. Supp. 3d 898, 953 (N.D. Cal. 2021), *aff'd in part, rev'd in part*, 67 F.4th 946 (9th Cir. 2023).

149. *Id.* at 952.

150. *Id.*

151. *Id.* at 997-98.

152. *Id.* at 993.

expenses.”<sup>153</sup> When Apple calculated its total margin—what Apple called its “fully burdened” operating margin—it came to a comparable conclusion.<sup>154</sup>

These figures strongly suggest monopoly power. They mean that for every ten dollars in revenue Apple received, less than three dollars were needed to cover the costs of setting up, operating, and improving the App Store. The remaining seven dollars were pure profit. These numbers also mean that Apple’s revenues were more than *three times* its total costs, powerful evidence that it was pricing substantially above the long-run competitive level. Yet the district court ruled that Apple did not exert monopoly power. To reach this surprising result, the court had to invoke the three other limits in this article.

First, the court ruled that Epic had failed to show reduced output. Despite Apple’s “extraordinarily high” profit margins,<sup>155</sup> the court stated that restricted output is a “necessary . . . corollary” to monopoly power.<sup>156</sup> As discussed above, the Ninth Circuit rejected this reasoning. It held that the output limit did not apply because reduced output is not the *only* way of demonstrating a reduction in competition. In fact, Epic had shown noncompetitive pricing by proving that Apple’s margin had “exceeded 75% for years.”<sup>157</sup> The Ninth Circuit did not explain, however, why Apple’s “immense profitability”<sup>158</sup> demonstrated market power but not monopoly power.

The district court also found that Apple’s market share was too low for monopoly power. According to the court, Apple’s share ranged from “52% to 57% over the course of the three years in evidence,”<sup>159</sup> which was “near the precipice of . . . monopoly power,”<sup>160</sup> but not over it.<sup>161</sup> This finding depended on the district court’s definition of the relevant market, which, as discussed below, was based on both the aftermarket limit—the idea that consumers would simply buy a non-Apple

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153. *Id.* at 952. Barnes addressed the issue of joint or “shared” costs by allocating a portion of Apple’s shared costs to the App Store. *Id.* The court found that Barnes’ allocation was reasonable because it was consistent with Apple’s own approach. *See id.* (“Although there are multiple ways to account for shared costs in a business unit, the consistency between Mr. Barnes’ analysis and Apple’s own internal documents suggest that Mr. Barnes’ analysis is a reasonable assessment of the App Store’s operating margin.”).

154. *Id.* (“Apple has calculated a fully burdened operating margin for the App Store as part of their normal business operations. Apple’s financial planning and analysis team are tracking revenues, fixed and variable operating costs, and allocation of IT, Research & Development, and corporate overheads to an App Store P&L statement. The team’s calculation was largely consistent with that of Mr. Barnes.”).

155. *Id.* at 953.

156. *Id.* at 1030.

157. *See Epic Games, Inc. v. Apple, Inc.*, 67 F.4th 946, 984 (9th Cir. 2023).

158. *Id.* at 980.

159. *Epic Games*, 559 F. Supp. 3d at 1030.

160. *Id.* at 1032.

161. *Id.* (“[T]he Court cannot conclude that Apple’s market power reaches the status of monopoly power in the mobile gaming market.”).

smartphone if they were indeed being harmed by Apple's supracompetitive App Store pricing—and the two-sided platform limit—the idea that competition is unharmed unless both sides of the App Store platform, iPhone users *and* app developers, are simultaneously harmed.<sup>162</sup> Both limits concealed Apple's monopoly power.

#### 4. *U.S. Tobacco, Dentsply, and Microsoft*

In contrast, several recent decisions relied on high price-cost margins to support findings of monopoly power. In *Conwood Co., L.P. v. United States Tobacco Co.*,<sup>163</sup> the Sixth Circuit declared that U.S. Tobacco “has the highest profit margin of any public company in the country.”<sup>164</sup> In *United States v. Dentsply International, Inc.*,<sup>165</sup> the Third Circuit stated that the defendant's “artificial tooth business is characterized as a ‘cash cow’ whose profits are [so large that they are] diverted to other operations of the company.”<sup>166</sup> In *Microsoft*,<sup>167</sup> the D.C. Circuit pointed out that the company failed to rebut the claim that it was earning long-run economic profits.<sup>168</sup>

In all the examples in this section, a court, government agency, or treatise cited a record of persistent, extraordinary profitability to support a finding that a firm was pricing above—or substantially above—the competitive level. As these examples indicate, the profit margin limit has no place in antitrust analysis.

### III. THE AFTERMARKET LIMIT

The third limit holds that a firm cannot exercise market power or harm customers in an *aftermarket* if the firm faces competition in its *primary* market. Many firms offer products in both a primary market and an aftermarket. They sell razors and razor blades, printers and ink cartridges, smart phones and smart phone apps, industrial equipment and repair parts, and other linked products. The aftermarket limit stipulates that when firms operate in both a primary market and an aftermarket, they cannot exploit their customers in the aftermarket if the customers are aware of their aftermarket terms and have other choices in the primary market. In that case, competition in the primary market will discipline competition in the aftermarket.

162. See *infra* Parts III and IV.

163. 290 F.3d 768 (6th Cir. 2002).

164. *Id.* at 774.

165. 399 F.3d 181 (3d Cir. 2005).

166. *Id.* at 185.

167. 253 F.3d 34 (D.C. Cir. 2001).

168. Microsoft claimed that “it never charged the short-term profit-maximizing price for Windows.” *Id.* at 57. But as the D.C. Circuit pointed out, “Microsoft never claims that it did not charge the long-term monopoly price,” the price that would maximize its long-term economic profits. See *id.*

The aftermarket limit does not always apply. Thirty years ago, in *Eastman Kodak Co. v. Image Technical Services, Inc.*,<sup>169</sup> the Supreme Court recognized two major exceptions. The basic facts of the case were simple. The plaintiffs had serviced Kodak copiers but alleged that Kodak had shut them out of this aftermarket by refusing to sell replacement parts.<sup>170</sup> Kodak conceded that it cut off the plaintiffs but asserted that consumers would not be hurt because “competition in the equipment market [would] prevent Kodak from possessing power in the parts market.”<sup>171</sup>

The Supreme Court rejected this argument and held that the aftermarket limit does not apply in two circumstances. First, it does not apply when consumers purchase the primary product *before* the seller imposes restrictions in the aftermarket. In that case, consumers could not have been aware of the seller’s restrictions when they purchased and had no reason to turn to a competing primary product. Moreover, even when they find out about the restrictions after they purchase, they would not switch to another primary product if *switching costs* are too high. In that case, they are *locked into* the seller’s product.<sup>172</sup>

Second, the aftermarket limit does not apply, even if consumers are aware of the aftermarket restrictions before they buy, when they cannot determine the restrictions’ full impact. To make the right choice in the primary market, consumers must be able to estimate the full life-cycle costs of each seller’s products. If they purchase Seller A’s primary product, they must be able to forecast how often they would use its aftermarket products, what they would have to pay when they do, and how its other aftermarket terms would affect them. When aftermarket *information costs* are high, consumers cannot effectively compare Seller A’s products to competing products and Seller A can exert market power in the aftermarket.<sup>173</sup>

Today, however, the two exceptions *Kodak* recognized—lock in and information costs—have little force. Appellate courts rarely find lock in because they rule that customers were aware of the defendant’s aftermarket restraints when they purchased its primary product.<sup>174</sup> Courts seldom find high information costs because they hold that

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169. 504 U.S. 451 (1992).

170. *Id.* at 458.

171. *Id.* at 460.

172. *See id.* at 476 (“If the cost of switching is high, customers who already have purchased the equipment, and are thus ‘locked in,’ will tolerate some level of service price increases before changing equipment brands.”).

173. *See id.* at 473-74 (explaining that high information costs prevent consumers from determining the full life-cycle costs of a seller’s product, preventing competition in the primary market from eliminating market power in the aftermarket).

174. *See, e.g.,* Avaya, Inc., RP v. Telecom Labs, Inc., 838 F.3d 354, 405 (3d Cir. 2016).

customers could easily understand the significance of the aftermarket terms they accepted.<sup>175</sup>

This hostility to the *Kodak* exceptions is correct in some cases. When the plaintiffs are sophisticated businesspersons who knew what they were getting into when they bought the defendant's primary product and had other choices in the primary market, they are in no position to invoke *Kodak*. The *Kodak* exceptions should apply, however, when customers are ordinary consumers who lack the interest, information, and unbiased cognitive strength to determine the full life-cycle costs of the defendant's product. As explained below, these customers can be exploited in the aftermarket.<sup>176</sup>

Section III.A summarizes the relevant economic theory and shows how recent cases have virtually abolished the *Kodak* exceptions. Section III.B presents an important counterexample. It explains why the *Kodak* exceptions apply to the distribution of iPhone apps, where Kodak's commission charges have been extraordinarily high for many years and where the principal purchasers are not sophisticated businesses but ordinary consumers.

#### A. *Economic Theory and Recent Cases*

The aftermarket limit flows from a fundamental observation about vertical relationships. An attempt to exert market power in an upstream market will not work if customers are aware of the attempt and can avoid it by shifting their purchases in the downstream market. Brother cannot double the price of its ink cartridges if customers notice the increase and shift to Hewlett-Packard printers. In this instance, competition in the primary market constrains sellers in the aftermarket.

*Kodak* held that this constraint does not apply to customers who purchase the primary product before the defendant imposes the aftermarket restraint and cannot easily switch to a competing product. Switching costs may be high if the primary product is a durable and complex piece of equipment that is expensive to replace, like an iPhone. This exception, however, is narrow. It does not apply to customers who learn of an aftermarket restraint or price increase before they purchase in the primary market. If Brother raises the price of its ink cartridges and Hewlett-Packard does not, customers buying their first printer can choose Hewlett-Packard and avoid the price increase. First-time purchasers are not locked in. Moreover, a seller will not exploit its existing customers, even if they are locked in, if that would

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175. See, e.g., *DSM Desotech Inc. v 3D Sys. Corp.*, 749 F.3d 1332, 1347 (Fed. Cir. 2014).

176. Further, competition in the primary market may not protect these customers. When the defendant faces few rivals in the primary market, price competition among them is likely to be limited. In consequence, price cutting in the primary market is unlikely to compensate customers for the high prices they must pay in the aftermarket.

drive away too many first-time purchasers. In short, lock in is a valid but circumscribed exception to the notion that primary market competition disciplines aftermarket conduct.

The second exception—information costs—is broader. It occurs when customers find it costly or impossible to calculate the aftermarket impact of a choice in the primary market. A consumer choosing between a Brother and a Hewlett-Packard printer needs to know not only the quality and current prices of their printers but also their current and future prices for ink cartridges. She also needs to predict the number of cartridges she is likely to use in the future, which will depend on how often and how substantially each company upgrades its cartridges. Calculating all these variables may be too much for an ordinary consumer. When it is—when information costs are high—primary market sellers can elevate prices in the aftermarket. Without adequate information, customers cannot effectively compare the aftermarket terms of Hewlett-Packard and Brother, and each seller gains pricing discretion.<sup>177</sup>

Sellers may lose some of this pricing discretion if they attempt to exploit it too aggressively. If Hewlett-Packard raises the prices of its ink cartridges frequently and sharply, it will develop a reputation for taking advantage of its customers, which will hurt its printer sales. To avoid this adverse reputation, Hewlett-Packard is likely to moderate its cartridge price increases. Reputation effects, in short, may limit sellers' market power in the aftermarket, even when information costs are high.

In sum, the aftermarket limit has two principal exceptions—lock in and information costs—and each of these exceptions has qualifications. While there are other possibilities,<sup>178</sup> the courts, following *Kodak*, focus overwhelmingly on these two exceptions. And since *Kodak*, the case law has minimized both exceptions. Courts interpret the lock-in exception strictly, holding that it applies only to customers who purchased the defendant's product before the aftermarket restraint. Moreover, they place little weight on the information costs exception, seeming to believe that any purchaser aware of the defendant's restraint can readily compare all its effects to the alternatives.

The leading case is *Avaya Inc., RP v. Telecom Labs, Inc.*,<sup>179</sup> where the Third Circuit, after a full review of *Kodak* and Third Circuit precedent, firmly rejected the plaintiff's complaint.<sup>180</sup> The plaintiff, Telecom Labs, Inc. (TLI), was not a customer but a competitor in the

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177. See AREEDA & HOVENKAMP, *supra* note 48, ¶ 2008c (“The less information a consumer has about relative price and quality, the easier it is for market participants to charge supracompetitive prices or provide inferior quality.” (emphasis omitted)).

178. For a discussion of these possibilities, see Shapiro, *supra* note 15, at 487-88.

179. 838 F.3d 354 (3d Cir. 2016).

180. *Id.* at 397.

aftermarket, an independent service provider that alleged it had been forced out because Avaya had insisted that purchasers of its PBX equipment could only obtain maintenance from Avaya or one of its partners.<sup>181</sup> The court held first that the primary market was competitive, including not only Avaya but large firms like Cisco, Siemens, and Microsoft.<sup>182</sup> It then ruled that customers who purchased Avaya's PBX equipment after 2008, when Avaya announced its new terms, could not be locked in. They were not surprised by Avaya's restraint and, if they disliked it, could have chosen another PBX supplier.<sup>183</sup> Since, in the court's view, Avaya did not have market power, any control it had over aftermarket maintenance came from its contracts, not its market power.<sup>184</sup> As a result, there could be no antitrust liability: "Avaya cannot be liable under the antitrust laws for enforcing a transparent contract freely agreed to in a competitive market."<sup>185</sup>

The court ignored the information costs exception to the aftermarket limit—the possibility that high information costs might have allowed Avaya to exert market power in the aftermarket. In fact, Avaya *did* have market power in the aftermarket, for its aftermarket profit margin exceeded its primary equipment profit margin.<sup>186</sup> That could not have happened unless it charged supracompetitive prices in the aftermarket.<sup>187</sup> At the same time, there was no evidence that Avaya's overall margin, its margin on equipment and maintenance combined, exceeded the competitive level. Indeed, Avaya asserted that "its major competitors in this market—Cisco, Simens, and Microsoft—follow a similar business model of low-margin equipment and high-margin maintenance, and those firms compete with each other and with Avaya over the 'total cost of ownership' of both equipment and maintenance."<sup>188</sup> This implies, as Shapiro suggested, that all four firms lowered prices in the equipment market to capture a greater share of high-margin aftermarket business, and that competition in the equipment market was so intense that, overall, all four earned only a competitive margin.<sup>189</sup>

In sum, *Avaya* shows that information costs can lead to the exercise of market power in the aftermarket, even when purchasers are businesses rather than consumers and even when the primary market is

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181. *Id.* at 398.

182. *Id.*

183. *Id.* at 405.

184. *Id.* at 401 & n.46.

185. *Id.* at 405.

186. *Id.* at 367.

187. If Avaya were pricing at cost in the primary market, it had to be pricing above cost in the aftermarket. If Avaya were pricing below cost in the primary market, its price in the aftermarket had to exceed cost by an even greater margin or it could not have survived.

188. *Avaya*, 838 F.3d at 367.

189. See Shapiro, *supra* note 15, at 494.

competitive. *Avaya* also shows that when firms compete for aftermarket sales by lowering prices in the primary market, there may be no overall customer harm. The only adverse consequence would be a resource misallocation—an allocative inefficiency—caused by supracompetitive prices in the aftermarket, which would artificially discourage the maintenance of equipment.<sup>190</sup>

While *Avaya* appears to have reached the correct result, it does not show that the aftermarket limit is universally valid. On the contrary, *Avaya* involved business customers who were on “clear notice” of Avaya’s aftermarket restriction,<sup>191</sup> not individual consumers hampered by difficulties accessing and interpreting information. Further, there was no evidence that Avaya earned monopoly profits in the aftermarket or supracompetitive profits overall. Thus, when a case involves individual consumers and excess total profits, *Avaya* does not bar relief.

In fact, *Avaya* said as much. It stated that “an ‘aftermarket policy change’ is not the *sine qua non* of a *Kodak* claim.”<sup>192</sup> Instead, a plaintiff may base an action on evidence that the defendant’s aftermarket restriction led to “supracompetitive pricing.”<sup>193</sup> Likewise, *Kodak* should not be “read as confined to the lock-in situation that was that opinion’s focus.”<sup>194</sup> The test is broader: the plaintiff need only “present evidence to support a plausible economic explanation that competition in the primary market is ‘dissociat[ed] . . . from conditions in the aftermarket.’”<sup>195</sup> A plaintiff could satisfy that broader test by showing that the defendant earns high profits in the aftermarket and supracompetitive profits overall, and that its ability to exercise market power rests on the information costs its customers face.

Another frequently cited case, *DSM Desotech Inc. v. 3D Systems Corp.*,<sup>196</sup> is consistent. The customers in that case were not consumers but sophisticated buyers like government agencies, the military, and academic researchers.<sup>197</sup> Information problems were reduced because aftermarket prices could be “readily obtained.”<sup>198</sup> Finally, there was no

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190. See *id.* at 495 (noting this adverse effect).

191. *Avaya*, 838 F.3d at 405.

192. *Id.* at 401 (quoting *Harrison Aire, Inc. v. Aerostar Int’l, Inc.*, 423 F.3d 374, 384 (3d Cir. 2005)).

193. *Id.*

194. *Id.* at 403.

195. *Id.* at 404 (quoting *Harrison Aire*, 423 F.3d at 384).

196. 749 F.3d 1332 (Fed. Cir. 2014).

197. See *id.* at 1336.

198. *Id.* at 1347.

evidence that aftermarket profit margins were high or that overall margins were supracompetitive.<sup>199</sup>

In contrast, in *Epic Games*, the products were purchased by ordinary consumers, not sophisticated businesses, and the defendant earned extraordinary profits in the aftermarket and supracompetitive profits overall. These features differentiate the case from *Avaya*, *Desotech*, *SMS System Maintenance*, and similar decisions. In *Epic Games*, competition between Apple, producer of the iPhone, and Google, producer of the Android operating system, did not eliminate Apple's aftermarket restrictions, its high commission rate, or its exceptional profits.

The Ninth Circuit nevertheless affirmed the district court's application of the aftermarket limit, ruling that "our precedent requires" that Epic prove that consumers were generally unaware of Apple's distribution restraints—proof that Epic did not supply.<sup>200</sup> But even if most consumers were aware of Apple's distribution restraints, there was no evidence that they were aware of Apple's high commission rates. As a result, they had no reason to seek out lower commission rates. The next section explains, in the most thorough discussion of the issue to date, why price competition did not break out in the iPhone aftermarket.

### B. Restrictions on iPhone App Distribution

Apple restricts the distribution of iPhone apps in two principal ways. First, Apple prohibits app developers from distributing their apps to iPhone users except through the App Store. This form of exclusive distribution means that app developers cannot reach Apple's enormous customer base—over a billion consumers own iPhones<sup>201</sup>—except through Apple. As a result, Apple can exact a very high price for the privilege. Second, Apple bars app developers from steering users to any payment system other than Apple's, preventing app developers and consumers from avoiding Apple's high price—a 30% commission charge on most app transactions. In consequence, Apple has earned exceptional profits on App Store transactions for at least a decade.<sup>202</sup>

The district court nevertheless applied the aftermarket limit. Following *Avaya*, *Desotech*, and *SMS System Maintenance*, it held that if consumers knew about Apple's closed distribution system when they

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199. See *id.* at 1345 (mentioning no evidence that overall margins were supracompetitive and noting that the plaintiff had introduced no evidence that aftermarket prices were supracompetitive). But advance announcement removes only one source of aftermarket power: lock-in. The other source—information costs—remains. Even if purchasers are aware of the defendant's restrictive policy, they may not be able to assess its full consequences and, as a result, their ability to comparison shop for better terms would be weakened.

200. *Epic Games, Inc. v. Apple, Inc.*, 67 F.4th 946, 973 (9th Cir. 2023).

201. *Id.* at 967.

202. See *supra* Part II.

purchased their iPhone, they could not be hurt. And the court found that consumers almost certainly did know about Apple's walled garden. More precisely, it found that Epic had not proved that consumers were unaware of Apple's distribution restriction.<sup>203</sup> The Ninth Circuit agreed. "Given the total lack of evidence on consumer-unawareness,"<sup>204</sup> it held that "Epic cannot establish its proposed aftermarkets."<sup>205</sup>

In short, both the district court and the Ninth Circuit held that Apple could not be exercising monopoly power over iPhone app distribution because consumers surely knew that Apple restricted distribution and, if they objected, they could switch to an Android phone. But consumers did not know about Apple's high commission charges or its immense profit margins. There was no evidence that consumers were aware of either fact. In consequence, their *incentive* to switch phones was sharply reduced. And in fact, consumers rarely switched. Each year only a tiny percentage of consumers replaced their iPhone with an Android phone, even when they were upgrading their phone.<sup>206</sup> Moreover, there is no evidence that consumers *ever* switched from an iPhone to an Android phone—or bought an iPhone initially—because Apple's commission charges on app transactions were too high.

In short, competition in the smart phone market does not actually discipline competition in the app store market. The issue is why? Why don't consumers compare the commission charges on Apple's App Store with the commission charges on Google's Play Store and purchase the smart phone with the lowest commission charges? Why doesn't competition between Apple and Google drive down commission charges? Why don't they each attempt to gain market share by reducing their commissions on app transactions?<sup>207</sup>

The answer is rooted in consumer behavior. Consumers face substantial costs in determining which smart phone to buy. Given these costs, even a hyper-rational consumer would place little weight on app store commission charges. In addition, consumers are not hyper-

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203. See *Epic Games, Inc. v. Apple Inc.*, 559 F. Supp. 3d 898, 1025 (N.D. Cal. 2021) ("[T]here is no evidence in the record demonstrating that consumers *are unaware* that the App Store is the sole means of digital distribution on the iOS platform."), *aff'd in part, rev'd in part*, 67 F.4th 946 (9th Cir. 2023); *id.* at 1024 ("For consumers, iOS has always been a closed system, and the App Store has been a 'walled garden' with respect to native apps from its inception . . .").

204. *Epic Games*, 67 F.4th at 981.

205. *Id.*

206. *Epic Games*, 559 F. Supp. 3d at 960 ("[V]ery low switching rates exist, with only about 2% of iPhone users switching to Android each year.")

207. Google's commission charges are the same as Apple's and its restraints on app distribution have essentially the same effect. After an extensive investigation, the United Kingdom's Competition and Markets Authority (CMA) concluded: "Apple prohibits other app stores and sideloading on iOS. Google allows alternatives, yet the outcome on Android is much the same, in part due to material barriers to entry and expansion faced by rival app stores." COMPETITION & MKTS. AUTH., MOBILE ECOSYSTEMS: MARKET STUDY FINAL REPORT 82 (2022) [hereinafter CMA REPORT].

rational; they exhibit both bounded rationality (a limited ability to solve problems)<sup>208</sup> and, as explained below, a set of biases (systematic distortions in their choices) which cause them to be indifferent to Apple's commission charges. As a result, consumers are generally unaware of Apple's commission charges and do not attempt to find them out. In turn, Apple and Google see little gain in competing on the basis of app store commission charges.

There are two sets of consumers: those who have already purchased a smart phone and those who are considering a new smart phone. Those who have already purchased a smart phone will not change phones because the app store commission rate on another phone is lower. Even if they knew of the competing rate, they would not switch because the switching costs are too high. Once they own a phone, they are locked into it until they decide they need to upgrade. The switching costs they face include (1) the major cost of a new phone, (2) the cost of replacing or losing apps and music that cannot be transferred to a new smart phone ecosystem, (3) the loss of network externalities (i.e., the interactions with other users in the same ecosystem through, e.g., FaceTime, iMessage, or iPhoto sharing), (4) the costs of losing connectivity with other devices within the same ecosystem (iPhone, iPad, Apple Watch, Apple TV, Mac Book); and (5) the costs of learning a new ecosystem.<sup>209</sup>

In addition, several decisionmaking biases tend to keep consumers wedded to their existing phones. The first is called anchoring, which refers to consumers' tendency to make decisions by anchoring to a familiar reference point and adjusting for differences.<sup>210</sup> In the smartphone industry, consumers use their current phone as their

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208. For the classic descriptions of bounded rationality, see Herbert A. Simon, *A Behavioral Model of Rational Choice*, 69 Q.J. ECON. 99 (1955); Herbert A. Simon, *Rational Choice and the Structure of the Environment*, 63 PSYCHOLOGICAL REV. 129 (1956); see also Christine Jolls, Cass R. Sunstein & Richard Thaler, *A Behavioral Approach to Law and Economics*, 50 STAN. L. REV. 1471, 1477 (1998) ("Bounded rationality . . . refers to the obvious fact that human cognitive abilities are not infinite. We have limited computational skills and seriously flawed memories.").

209. The CMA asked iPhone users to specify why they had not switched, or even considered switching, to an Android device. 51% of iPhone users said that they were discouraged from switching because they had other devices linked to their phone and operating system. ACCENT, CONSUMER PURCHASING BEHAVIOR IN THE UK SMARTPHONE MARKET FOR THE CMA'S MOBILE ECOSYSTEMS MARKET STUDY: FINAL REPORT 39 fig.29 (2022) (discussing research findings commissioned by the CMA) [hereinafter ACCENT REPORT]. Consumers also said: "I didn't want to spend the time learning how to use an Android phone," (40%); "My friends/family use the same operating system," (32%); "I was concerned about losing data when transferring to an Android phone," (29%); "I felt it would be too much hassle to switch to an Android phone," (23%); "I use apps not available on Android," (7%); and "I was concerned about losing paid-for subscriptions/content in apps on my phone," (6%). *Id.*

210. See Amos Tversky & Daniel Kahneman, *Judgment Under Uncertainty: Heuristics and Biases*, 185 SCIENCE 1124, 1128 (1974).

reference point.<sup>211</sup> Reference points matter because consumers tend to overvalue potential costs and undervalue potential savings in departing from their reference point. This is compounded by a second bias called loss aversion, which is consumers' tendency to care more about potential losses than possible gains.<sup>212</sup> Together, anchoring and loss aversion cause consumers to exaggerate the hassle of learning a new smartphone system, the loss of interoperability with other devices, and the costs of abandoning non-transferable apps. A 2016 study confirmed that consumers' smartphone purchasing decisions were made with reference to their current phone and that the losses involved in giving it up were more significant to consumers than any gains from new hardware features.<sup>213</sup> A third bias—status quo bias—reinforces consumers' reluctance to depart from their existing mobile ecosystem.<sup>214</sup>

In combination, these switching costs and biases lock in consumers who have already purchased a smart phone. They do not, however, apply to consumers who have never purchased a smart phone. Those first-time purchasers are free to consider the merits of competing ecosystems, including the commission charges on app or in-app purchases.<sup>215</sup> But for many reasons, they rarely, if ever, discover or pay attention to app commission charges.

First, app developers are responsible for the commission charges on app transactions, not consumers.<sup>216</sup> As a result, those charges are not disclosed to consumers. To find out Apple's commission rates, consumers would have to search for them. That might be easy if Apple and Google publicized their commission rates, but they do not.

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211. See Junghun Kim, Jongsu Lee & Joongha Ahn, *Reference-Dependent Preferences on Smart Phones in South Korea: Focusing on Attributes with Heterogeneous Preference Direction*, 64 COMPUTS. HUM. BEHAV. 393, 394 (2016).

212. See Amos Tversky & Daniel Kahneman, *Loss Aversion in Riskless Choice: A Reference-Dependent Model*, 106 Q.J. ECON. 1039, 1039 (1991).

213. See Yuri Park & Yoonmo Koo, *An Empirical Analysis of Switching Cost in the Smartphone Market in South Korea*, 40 TELECOMMS. POL'Y 307, 308 (2016).

214. Status quo bias (or inertia) is the tendency that consumers have to maintain their current behavior. Adam Candeub states that “[i]f we establish habits and routines to allocate our scarce cognitive resources, these routines—like many other habits—can be quite difficult, *i.e.*, costly, to break, creating high switching costs with possible anti-competitive implications.” Adam Candeub, *Behavioral Economics, Internet Search, and Antitrust*, 9 I/S: J.L. & POL'Y FOR INFO. SOC'Y 407, 409 (2014).

215. Consumers who own a phone but have decided to replace it are distinct from first-time purchasers. They are already embedded in a mobile ecosystem and are likely to be quite reluctant to depart from it. A CMA survey found that 89% of iPhone users and 88% of Android users said they did not consider switching mobile ecosystems the last time they purchased a replacement phone. See ACCENT REPORT, *supra* note 209, at 37. In short, switching costs and other biases affect both customers who have already purchased a smartphone and customers who are considering an upgrade.

216. *Epic Games, Inc. v. Apple, Inc.*, 67 F.4th 946, 968 (9th Cir. 2023).

Second, app commission charges are only a small proportion of the cost of a new smart phone.<sup>217</sup> When a new iPhone costs more than fifteen hundred dollars, why worry about whether Apple's commission rate is 30% or 10%? On a \$1 in-app purchase, the difference is 20 cents. Over the lifetime of the phone, total commission charges would be much larger, but determining the discounted present value of lifetime commission charges would require a complicated calculation. It is rational, therefore, for a consumer to devote little or no time to the magnitude of app store commission charges.<sup>218</sup>

Third, buying a new smart phone is a complex decision. It depends not only on likely app usage and app commission charges, but also on the quality, durability, features, and price of the phone itself. Given the number and complexity of the variables, it is understandable that consumers focus on the issues that are most important to them—hardware issues. As the district court noted in *Epic Games*, surveys find that when consumers choose between smartphones, they make the choice “for hardware reasons, such [as] ‘speed,’ ‘quality device construction,’ and ‘battery’—not app quality, price, or availability.”<sup>219</sup> The court added: “This reinforces Dr. Evans’ point that apps are a secondary consideration when purchasing a smartphone and would not lead to switching by themselves.”<sup>220</sup> The CMA Report reached the same conclusion:

Apps, the prices of apps and the range of apps appear to have limited importance to users in their choice of device given the multiple dimensions (eg camera type, battery life) considered by users when purchasing a device and the complexity of the costs they have to take into account (eg immediate cost for the phone versus deferred costs for apps, in-app purchases and subscriptions). This is supported by . . . evidence from our consumer survey and the surveys we have received.<sup>221</sup>

Fourth, consumers have limited cognitive skills, which makes it difficult, if not impossible, for them to solve complicated problems. As Nobel Laureate Richard Thaler stated after a lifetime of research, “the

217. See CMA REPORT, *supra* note 207, at 127 (“[T]he cost of a new device is likely to significantly outweigh any differences in the costs of apps.”).

218. When a consumer decides it does not make sense to spend more time or gather more information to solve a problem, it is called “rational inattention.” See Christopher A. Sims, *Implications of Rational Inattention*, 50 J. MONETARY ECON. 665, 665 (2003). In addition, the App Store does not require apps to reveal their charges for in-app purchases. A consumer must download an app and use it to discover those charges. As a result, a consumer cannot determine Apple’s commission charges on in-app purchases without considerable effort.

219. *Epic Games, Inc. v. Apple Inc.*, 559 F. Supp. 3d 898, 959 n.269 (N.D. Cal. 2021), *aff’d in part, rev’d in part*, 67 F.4th 946 (9th Cir. 2023).

220. *Id.* (referring to Epic’s expert Dr. David Evans).

221. CMA REPORT, *supra* note 207, at 126-27.

optimization problems that ordinary people confront are often too hard for them to solve, or even come close to solving.”<sup>222</sup>

Fifth, even if they had the skills, consumers are unlikely to have the stamina to collect all the relevant information. Consumers make less rational decisions when they experience “search fatigue,” and they fatigue faster when they have many products or features to compare.<sup>223</sup> Instead of a full search, they turn to shortcuts.

Sixth, as mentioned earlier, the principal shortcut they use is hardware features. They use this shortcut not only because hardware features are more salient but also because they have to pay for the hardware up front while app charges occur in the future. Numerous studies have shown that consumers pay much more attention to immediate costs than to future costs.<sup>224</sup> Jerry Hausman first documented this “present bias” when he found that consumers are far more responsive to the list prices of household appliances than they are to changes in the net present value of the energy costs necessary to operate those appliances.<sup>225</sup> Subsequent studies have found present bias in multiple industries, including air conditioners, heating systems, cars, photovoltaic systems, and of course mobile phones.<sup>226</sup> Firms take advantage of this bias by “shrouding” their charges for future add-on purchases,<sup>227</sup> just as Apple does with its commission rates.<sup>228</sup> A long line of research shows that firms shroud add-on prices because consumers are unlikely to undertake the effort necessary to discover them.<sup>229</sup>

Seventh, even if consumers did not suffer from bounded rationality, search fatigue, and present bias, they would have no incentive to switch from an iPhone to an Android phone to lower their app charges

222. RICHARD H. THALER, *MISBEHAVING: THE MAKING OF BEHAVIORAL ECONOMICS* 6 (2015).

223. Bruce I. Carlin & Florian Ederer, *Search Fatigue*, 54 *REV. INDUS. ORG.* 485, 486 (2019).

224. See Ambre Nicolle, *Are Consumers Myopic? Evidence from Handset and Mobile Services Choices* 6 (Nov. 13, 2022) (unpublished manuscript), [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=2706391](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2706391) [<https://perma.cc/W4MM-SFQL>] (“A large number of papers has shown that individuals are biased towards the present.”).

225. See Jerry A. Hausman, *Individual Discount Rates and the Purchase and Utilization of Energy-Using Durables*, 10 *BELL J. ECON.* 33, 42 (1979).

226. See Nicolle, *supra* note 224, at 3, 27 (finding present bias in mobile phones and citing studies of other industries).

227. See Xavier Gabaix & David Laibson, *Shrouded Attributes, Consumer Myopia, and Information Suppression in Competitive Markets*, 121 *Q.J. ECON.* 505, 506 (2006).

228. As just noted, Apple permits app developers to shroud their charges for in-app purchases. Further, through its anti-steering provision, Apple prohibits app developers from informing consumers of Apple’s commission rates by telling consumers they can obtain cheaper commission rates via an alternative payment method.

229. See Peter A. Diamond, *A Model of Price Adjustment*, 3 *J. ECON. THEORY* 156, 157-58 (1971); Dale O. Stahl II, *Oligopolistic Pricing with Sequential Consumer Search*, 79 *AM. ECON. REV.* 700, 700-01, 710 (1989); Ali Hortaçsu & Chad Syverson, *Product Differentiation, Search Costs, and Competition in the Mutual Fund Industry: A Case Study of S&P 500 Index Funds*, 119 *Q.J. ECON.* 403, 414-15, 454 (2004).

because Google charges essentially the same commission rate as Apple.<sup>230</sup> The smartphone aftermarket appears to be a duopoly, with Apple and Google employing comparable restraints and charging nearly identical, supracompetitive prices.<sup>231</sup> This parallel behavior is unlikely to be undermined by competition over app charges because, for all the reasons just mentioned, lower app charges are unlikely to induce consumers to switch phones.

It is possible, though, that competition could break out in another way. Apple and Google could attempt to gain a larger share of the supracompetitive profits in the aftermarket by lowering their prices in the primary market. Here, the idea is not that competition in the smart phone market would *discipline* behavior in the app market, but that competition in the smart phone market would *compensate* for the lack of competition in the app market.<sup>232</sup> In this case, though, the evidence does not support that theory. The CMA found that “Apple has not provided any empirical or documentary evidence to substantiate its claims that pricing decisions made by Apple at the device level are affected by service revenues such as the revenue from the App Store.”<sup>233</sup> In other words, there is no evidence that Apple has lowered iPhone prices to capture more App Store revenues. On the contrary, both Apple and Google appear to exercise market power at the smart phone level as well as at the app level. The CMA found that “both Apple and Google have substantial and entrenched market power in mobile operating systems.”<sup>234</sup>

In short, the distribution of iPhone apps is not subject to the aftermarket limit. Competition at the smart phone level neither eliminates nor compensates for the extraordinary profit margins that Apple makes in the App Store. The market fails here because consumers rarely, if ever, choose smart phones based on app store commission charges. The charges are a minor expense, they are difficult to determine or estimate, and consumers exhibit characteristics (such as bounded rationality, present bias, and search fatigue) that cause them to ignore or downplay the costs. In addition, competition is blunted by the presence of only two major players, Apple and Google.

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230. See CMA REPORT, *supra* note 207, at 94 (“Apple and Google both currently take a commission of 30% for payments made via Apple IAP and Google Play’s billing system, except in limited circumstances . . .”).

231. See *id.* at 82 (“The lack of competition faced by the App Store and Play Store allows them to charge above a competitive rate of commission . . .”).

232. See Shapiro, *supra* note 15, at 505; Hovenkamp, *supra* note 12, at 1519.

233. CMA REPORT, *supra* note 207, at 128.

234. *Id.* at 81. Of course, this market power also reflects improvements in the quality of smartphones. But the point remains: price competition at the smartphone level has not eliminated supracompetitive profits in the aftermarket.

## IV. THE TWO-SIDED PLATFORM LIMIT

The final limit is the least defensible. It was fashioned by the Supreme Court in *Amex*, and although that decision is less than five years old, it has already become one of the most criticized antitrust cases of all time.<sup>235</sup> *Amex* has produced three mistaken lower court decisions, and most commentators believe its scope should be tightly restricted.

Section IV.A briefly summarizes the Court's principal errors. Section IV.B describes the flawed decisions that flowed from *Amex*. Finally, building on recent scholarship,<sup>236</sup> Section IV.C articulates a strategy for minimizing the impact of the two-sided platform limit.

A. *Amex's Rulings*1. *Market Definition*

*Amex* held that in cases involving two-sided transaction platforms, the relevant market must be two-sided as well. It cannot consist of the product or service offered to users on one side of the platform, or the product or service offered to users on the other side, but instead must be defined as *transactions* between the two sets of users. Thus, if a platform serves merchants on one side and credit cardholders on the other, the relevant market must combine the merchants and cardholders into a single market that consists of transactions between them.<sup>237</sup>

This unprecedented approach to market definition obscures the existence of market power. It requires a court to average market share on both sides of a platform rather than focus on the size of the defendant's market share on one side. If a defendant's market share is greater on one side, the Court's approach requires discounting that share in order to produce a combined market share for both sides. Moreover, the Court endorsed the Second Circuit's parallel approach to determining the defendant's power over price. According to the Second Circuit, the district court must calculate a "net price" that captures the combined impact of a transaction on both sets of users.<sup>238</sup> As scholars have shown, however, such a net price cannot be calculated when the defendant's terms include charges or rebates that are not assessed on a

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235. See *supra* notes 92-94.

236. See generally Salop et al., *supra* note 76; Nancy L. Rose & Jonathan Sallet, *Ohio v. American Express: The Exception That Should Not Become a Rule*, 36 ANTITRUST 76 (2022); Kirkwood, *supra* note 93 (suggesting that *Amex* be confined to its facts, i.e., cases involving two-sided transaction platforms that compete only with other two-sided transaction platforms).

237. See *Ohio v. Am. Express Co. (Amex)*, 585 U.S. 529, 545 (2018).

238. See *United States v. Am. Express Co.*, 838 F.3d 179, 204 (2d Cir. 2016) (stating that the district court "failed to consider the two-sided net price accounting for the effects of [Amex's conduct] on both merchants and cardholders"), *aff'd sub nom. Amex*, 585 U.S. 529 (2018).

per-transaction basis.<sup>239</sup> And if there is no “net price” for the platform as a whole, the defendant’s ability to profitably charge a price above the competitive level cannot be determined by the usual test, the Hypothetical Monopolist Test.<sup>240</sup>

In short, the proper approach to the identification of market power requires focusing on one side of the platform at a time. If the defendant can exert market power on one side of its platform, it does not matter whether it can also exert market power on the other side. To be sure, an attempt to raise price on one side is likely to reduce usage on the other side, but that indirect network effect can be taken into account in determining whether it is profitable to exert market power on one side.<sup>241</sup> It is unnecessary to define a two-sided market.

## 2. Anticompetitive Effects

The Court compounded the problem by ruling that anticompetitive effects must also be measured across the entire platform.<sup>242</sup> Showing harm on one side of the platform is insufficient. The plaintiff must demonstrate that this harm was not offset by benefits to users on the other side. The Court’s approach, however, is mistaken in two ways. First, it misallocates the burden of proof. The burden of showing benefits on one side of the platform, like the burden of establishing procompetitive effects generally, should rest on the defendant. The plaintiff should not have to identify the potential procompetitive benefits of the defendant’s conduct and then disprove them. This is “backwards.”<sup>243</sup> The defendant is in a “far better position” to substantiate its claims.<sup>244</sup>

Second, the Court’s ruling allows a platform to exploit users on one side so long as it funnels the supracompetitive profits it makes to users on the other side. But benefits to one group of consumers are not a valid justification when they are funded by profits obtained by

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239. See Kirkwood, *supra* note 93, at 1844 (“The price of a transaction can be determined only if the platform’s charges are assessed on a per-transaction basis. If significant charges are assessed on some other basis (e.g., annually or when joining the platform), the price of a transaction cannot be identified.”); Rose & Sallet, *supra* note 236, at 79 (any proposal for computing a “net price” for a credit card transaction is likely “doomed to be wrong” because of the “highly nonlinear and heterogeneous pricing structure for cardholders”); Erik Hovenkamp, *Platform Antitrust*, 44 J. CORP. L. 713, 741 (2019) (“[T]here simply is no concrete, objective two-sided price.”).

240. See Kirkwood, *supra* note 93, at 1843-44 (stating that the Hypothetical Monopolist Test “asks whether a putative sole seller of the candidate product would find it profitable to impose a significant price increase” and that the Test cannot be applied without identifying the “current price” of the candidate product).

241. See Michael Katz & Jonathan Sallet, *Multisided Platforms and Antitrust Enforcement*, 127 YALE L.J. 2142, 2159-60 (2018); Kirkwood, *supra* note 93, at 1840.

242. See *Amex*, 585 U.S. at 546.

243. Salop et al., *supra* note 76, at 910.

244. Herbert Hovenkamp, *Platforms and the Rule of Reason: The American Express Case*, 2019 COLUM. BUS. L. REV. 35, 57 (2019).

exploiting another group.<sup>245</sup> Amex cannot immunize its anti-steering provisions by using the extra revenues to increase rewards to cardholders. The Court's approach is also inconsistent with the principle that "anticompetitive effects in one market [cannot] be justified by pro-competitive consequences in another."<sup>246</sup>

In sum, *Amex* erroneously broadened market definition and hampered proof of anticompetitive effects. These flawed rulings quickly led to three mistaken district court decisions for defendants, only one of which has been reversed.

## B. District Court Decisions

### 1. Sabre

The first decision was the most extreme. The district court held that *Amex* required it to exclude the acquired firm from the relevant market, even though the acquiring firm competed with the acquired firm. The case, *United States v. Sabre Corp.*,<sup>247</sup> involved Sabre's acquisition of Farelogix. Sabre is the well-known two-sided platform that links airlines to travel agents by allowing travel agents to identify and book flights for their clients.<sup>248</sup> Farelogix also serves both airlines and travel agents but in a different way: it offers software that enables an airline to provide a "direct connect" to a travel agent.<sup>249</sup> Once that direct connect is installed, the travel agent can reserve flights on the airline, but Farelogix, unlike Sabre, plays no part in transactions between travel agents and airlines.<sup>250</sup>

Farelogix nevertheless put competitive pressure on Sabre. Farelogix made it possible for airlines to switch business from Sabre's platform to direct connects with travel agents, a switch that could save airlines considerable money. American Airlines "estimated that it is 80-90 percent cheaper to book through a Farelogix direct connect than

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245. See John M. Newman, *Antitrust in Zero-Price Markets: Applications*, 94 WASH. U. L. REV. 49, 81 (2016) ("It is an ancient tenet of the law that disposing of ill-gotten gains in an admirable manner is no defense."); Katz & Sallet, *supra* note 241, at 2171 (stating that users on one side of a platform are entitled to protection from anticompetitive harm "regardless of whether the platform shares with users on some other side some of the fruits of the harm to competition"); C. Scott Hemphill & Nancy L. Rose, *Mergers that Harm Sellers*, 127 YALE L.J. 2078, 2107 (2018) ("Nor may a horizontal agreement be defended on the ground that the resulting extra profit induces or is spent on increased innovation.").

246. *United States v. Phila. Nat'l Bank*, 374 U.S. 321, 370 (1963).

247. 452 F. Supp. 3d 97 (D. Del. 2020), *vacated as moot*, No. 20-1767, 2020 WL 4915824 (3d Cir. July 20, 2020).

248. *Id.* at 108.

249. *Id.* at 113.

250. *Id.* ("Farelogix has no travel agency customers and no commercial relationship with travel agencies.").

through the Sabre [platform].”<sup>251</sup> As a result, “Delta’s managing director of distribution strategy testified that having Farelogix as [an] alternative improved Delta’s bargaining position with [Sabre and smaller platforms].”<sup>252</sup> Even Sabre conceded the point: “In its SEC filings, Sabre acknowledged that airlines with ‘direct connect initiatives’ can use the threat of direct connects to ‘apply pricing pressure’ and negotiate [platform] contracts that are ‘less favorable’ to Sabre.”<sup>253</sup>

Despite this direct evidence of competition, the district court ruled that “Sabre and Farelogix do not compete in a relevant market.”<sup>254</sup> The court felt boxed in by *Amex*, which declared: “Only other two-sided platforms can compete with a two-sided platform . . . .”<sup>255</sup> Under this logic, because Farelogix was not a two-sided platform, it could not compete with Sabre and had to be excluded from the relevant market. The court acknowledged that this result was inconsistent with “real-world economic reality.”<sup>256</sup> But the court said it had no choice: “the facts presented in the instant case cannot change the binding precedential law issued by the Supreme Court.”<sup>257</sup>

In *Sabre*, in short, *Amex* led to a ruling that contradicted the evidence. One way to prevent this result is to limit *Amex* to two-sided transaction platforms that compete solely with other two-sided transaction platforms. After all, *Amex* noted that “[n]ontransaction platforms . . . often . . . compete with companies that do not operate on both sides of their platform.”<sup>258</sup> This means if a platform competes with a one-sided platform, the platform is not a transaction platform and is not governed by *Amex*.<sup>259</sup> This would exempt Sabre and similar firms from the two-sided platform limit.

## 2. PLS

This case involved “pocket listings”—real estate listings that are not shared on a multiple listing service (MLS).<sup>260</sup> A pocket listing can be withdrawn quickly and allows sellers to keep certain details of their property private.<sup>261</sup> Buyers’ agents wanted access to pocket listings

251. *Id.* at 114; *see also id.* at 122 (“American estimates it has achieved annual cost savings of \$35 million from shifting [online travel agencies] to direct connects.”)

252. *Id.* at 135.

253. *Id.* at 114.

254. *Id.* at 136.

255. *Ohio v. Am. Express Co. (Amex)*, 585 U.S. 529, 546 (2018).

256. *Sabre*, 452 F. Supp. 3d at 139 n.16 (“[T]he Court has found as a matter of real-world economic reality that Sabre and Farelogix do compete to a certain extent . . . .”).

257. *Id.* at 137.

258. *Amex*, 585 U.S. at 546 n.9.

259. *See Rose & Sallet*, *supra* note 236, at 78.

260. *See PLS.com, LLC v. Nat’l Ass’n of Realtors*, 32 F.4th 824, 830 (9th Cir. 2022).

261. *See id.* (“For instance, a public figure may not wish to share certain details about his or her home with an entire MLS.”).

because properties could be sold based on a pocket listing before they appeared on an MLS.

PLS and a few smaller firms started offering searchable databases of pocket listings. PLS quickly became the leading pocket listing service, charging less for access to its database than agents were charged for joining an MLS.<sup>262</sup> Pocket listing databases soon became so popular that sellers' agents began to list properties exclusively on them, and traditional MLSs began to fear that they might be replaced.<sup>263</sup> In response, several MLSs embarked on a joint campaign to suppress the innovators.<sup>264</sup> Their collective action eventually caused the National Association of Realtors (NAR) to issue a rule prohibiting members from marketing real estate to the public unless they promptly listed it on the MLS.<sup>265</sup> This rule sharply reduced listings on PLS.com and eventually drove it from the market.<sup>266</sup>

The district court dismissed PLS's lawsuit.<sup>267</sup> Relying on *Amex*, the court held that PLS could not state a cause of action unless it alleged that NAR's rule harmed users on both sides of PLS's platform—buyers' agents as well as sellers' agents.<sup>268</sup> The Ninth Circuit reversed, stating that *Amex* only required showing injury to the "market as a whole."<sup>269</sup> Thus, if a plaintiff establishes that users on one side were harmed and that the benefits to users on the other side did not outweigh that harm, the plaintiff has demonstrated "anticompetitive effects on the market as a whole."<sup>270</sup> In short, although the district court decision was overturned, it represented another perverse result of *Amex*.

### 3. *Epic Games*

*Epic Games* appears frequently in this Article because it erroneously applied all four new limits. To recap, Epic challenged Apple's control of the App Store for iPhones. Apple is one of the world's most valuable corporations; the iPhone is arguably Apple's most significant innovation—over a billion consumers have an iPhone—and the App Store (with over a million apps) adds tremendous value to the device. But Apple also tightly controls this important channel of distribution. Apple prohibits app developers from distributing their apps to iPhone

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262. *Id.*

263. *Id.*

264. *Id.*

265. *Id.*

266. *Id.* at 831.

267. *Id.*

268. *Id.* at 832. The district actually ruled that PLS had to allege harm to home buyers and sellers (the ultimate consumers), but the court of appeals held that injury to their agents was sufficient: "a business that uses a product as an input to create another product or service is a consumer of that input for antitrust purposes and can allege antitrust injury." *Id.*

269. *Id.* at 839 (quoting *Ohio v. Am. Express Co. (Amex)*, 585 U.S. 529, 547 (2018)).

270. *Id.*

users except through the App Store. Moreover, apps in the App Store cannot offer—or tell users about—methods of payment that circumvent Apple’s payment system. As a result, all app purchases and all in-app transactions are subject to Apple’s high commission charges, which has allowed Apple to earn extraordinary profit margins on the App Store for nearly a decade.<sup>271</sup>

Given these enormous and sustained margins, Apple’s monopoly power should not have been in doubt. But the district court, following *Amex*, defined the market as all digital mobile gaming transactions, and Apple’s market share in that market fell short of the monopoly threshold.<sup>272</sup> *Amex*’s focus on transaction platforms diverted the court’s attention from the source of Apple’s monopoly power. It did not come from Apple’s share of gaming transactions across all platforms but from its total control of the distribution of apps on its own platform. No app developer could reach a billion iPhone users except through Apple. As a result, Apple could charge high fees for the privilege, and the relevant market should have been defined as the distribution of iPhone apps. Because of *Amex* and the aftermarket limit,<sup>273</sup> however, the court and the Ninth Circuit rejected that definition.

In sum, *Amex* has produced three flawed district court decisions. One concluded that *Amex* required it to ignore competition that in fact existed. A second held that *Amex* mandated proof that the defendant’s conduct not only harmed the market as a whole but injured users on both sides of the plaintiff’s platform. A third refused to define the market as distribution services, even though the case was about the defendant’s control of distribution, because *Amex* insisted on defining markets in terms of transactions. None of these errors were necessary, and all could have been avoided by restricting the scope of *Amex*.

### C. Restricting *Amex*

*Amex* was a two-sided transaction platform, and all its competitors were other two-sided transaction platforms. The Supreme Court’s rulings in *Amex* should be applied only where both conditions are met.

The Court’s opinion made clear that *Amex* was a “special type of two-sided platform.”<sup>274</sup> It was a transaction platform, and transaction platforms cannot engage in a transaction with users on one side unless they simultaneously engage in a transaction with users on the other side.<sup>275</sup> Because of this feature, the Court stated that two-sided transaction platforms are “different” from other two-sided platforms.<sup>276</sup> As a

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271. See *supra* Section II.B.3.

272. See *supra* Section III.B.

273. See *supra* Section III.B.

274. *Amex*, 585 U.S. at 535.

275. *Id.* at 545.

276. *Id.*

result, many commentators insist that *Amex* applies only to two-sided transaction platforms.<sup>277</sup>

The Court also noted that nontransaction platforms—platforms that do not engage in simultaneous transactions with users on both sides—often compete with other nontransaction platforms.<sup>278</sup> This indicates that a platform that competes with nontransaction platforms is not a transaction platform. As Rose and Sallet assert, “the *Sabre* court applied the reasoning backwards.”<sup>279</sup> Instead of concluding that *Sabre* could not compete with *Farelogix* because *Farelogix* was a one-sided platform, the court should have concluded that because *Farelogix* did compete with *Sabre*, *Sabre* was not a two-sided transaction platform.

In short, *Amex* should be restricted to two-sided transaction platforms that compete exclusively with other two-sided transaction platforms.<sup>280</sup>

#### CONCLUSION

The new limits on antitrust enforcement should be abolished or sharply cut back. Plaintiffs should be allowed to introduce direct evidence of market power or anticompetitive impact without proving that output was reduced. Monopoly power should be inferred from a firm’s ability to earn exceptionally high profit margins for many years. Courts should not conclude that competition in the primary market disciplines conduct in the aftermarket when the purchasers in the primary market are individual consumers who lack the incentive and ability to determine critical terms in the aftermarket. Finally, courts should not require plaintiffs to define a two-sided market unless the defendant’s platform is a transaction platform that competes exclusively with other transaction platforms. Removing these limits would bring new vitality to antitrust enforcement.

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277. See, e.g., Tim Wu, *The American Express Opinion*, Tech Platforms & the Rule of Reason 1-2 (2018) (unpublished manuscript), [https://scholarship.law.columbia.edu/faculty\\_scholarship/2508](https://scholarship.law.columbia.edu/faculty_scholarship/2508) [<https://perma.cc/57RX-9UKF>]; Hovenkamp, *supra* note 244, at 88; Rose & Sallet, *supra* note 236, at 76, 79-80; Salop et al., *supra* note 76, at 930; Kirkwood, *supra* note 93, at 1816-17, 1856-57.

278. *Amex*, 585 U.S. at 546 n.9.

279. Rose & Sallet, *supra* note 236, at 77.

280. See Salop et al., *supra* note 76, at 930.

