

ECOSYSTEMS, ANTITRUST ERRORS & THE NUMERATOR BIAS

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ABSTRACT

This Article examines how U.S. antitrust law, with its fixation on narrowly defined markets, fails to capture the economic realities of the digital age. In particular, it explores how dominant technology firms—Apple, Google, Amazon, Meta, and Microsoft—derive their power not from a single product, but from their control over vast ecosystems of interconnected services, platforms, and devices. These ecosystems allow Big Tech firms to distort competition, suppress innovation, and extract monopoly rents across multiple markets—effects that traditional antitrust tools often overlook.

This Article argues that current antitrust methodology, especially the rigid requirement of defining a relevant market using tools like the SSNIP test or *Brown Shoe* factors, creates a dangerous enforcement gap. Courts, as shown, are preoccupied with abstract market definitions and numerical thresholds while ignoring direct evidence of monopoly power and anticompetitive harm. At the same time, the Article cautions against a simplistic turn to ecosystem analysis. It warns of the “numerator bias,” where courts and plaintiffs may overstate a firm’s market power by focusing solely on the size or reach of its ecosystem, without considering competitive constraints.

To bridge this gap, this Article proposes a more nuanced analytical framework that accounts for how ecosystem control can confer monopoly power—without turning every large platform into a presumptive monopolist. Through case studies and comparative analysis, particularly with European competition law, this Article calls for an evolution in antitrust enforcement that better reflects today’s digital economy.

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DOI: <https://doi.org/10.15779/Z385X25F4D>

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I. INTRODUCTION	

The notion of markets remains a cornerstone in antitrust legal analysis. Despite criticisms of antitrust’s market definition exercise,¹ courts and antitrust plaintiffs continue to spend considerable time and resources on

1. Most notably, see Louis Kaplow, *Why (Ever) Define Markets?*, 124 HARV. L. REV. 437, 440 (2010) (arguing why courts should abandon defining markets). As Prof. Kaplow argues: The central, conceptual argument is that there does not exist any coherent way to choose a relevant market without first formulating one’s best assessment of market power, whereas the entire rationale for the market definition process is to enable an inference about market power. Why ever define markets when the only sensible way to do so presumes an answer to the very question that the method is designed to address? A market definition conclusion can never contain more or better information about market power than that used to define the market in the first place. Even worse, the inferences drawn from market shares in relevant markets generally contain less information and accordingly can generate erroneous legal conclusions — unless one adopts a purely results-oriented market definition stratagem under which one first determines the right legal answer and then announces a market definition that ratifies it.

defining the relevant market. This exercise is supposed to subsequently illuminate findings of market power, which underscores monopolization cases, and the analysis of competitive effects.

While market definition plays an important role in the brick-and-mortar economy, it is becoming increasingly inapt in the digital economy when the defendant's monopoly power arises from its control over an entire ecosystem of interconnected platforms, products and services.² Although antitrust analysis has incorporated some of the important features of the digital economy (such as network effects and the competitive importance of personal data), the legal framework remains hampered by its outdated approach to market definition and power.

The failure to properly encapsulate ecosystems into the antitrust legal framework enabled ongoing consolidation and abuses of power by dominant tech firms, such as Google (Alphabet), Apple, Meta, Amazon, and Microsoft. Courts and until recently enforcers turned a blind eye to the Big Tech Barons' increased power, which was not captured through the simplistic market definition tools of yesteryear. Indeed, monopoly power has proven more durable in the digital economy, and more elusive when it stems from control over ecosystems and its weaponization. Furthermore, large ecosystems now not only compete in multiple markets, but also operate private markets in which others compete. Think of the online environment where you shop, search, engage with others, or watch videos. What may appear as an organic interaction between sellers, service providers, customers, and users, is often part of an ecosystem, controlled by a single entity that determines the rules, fees, flow of information, and competitive dynamics between sellers and users.

And yet, astonishingly, this powerful position often remains below the radar screen of U.S. courts. Preoccupied with defining a relevant antitrust market and relying on it to identify power, courts may reach conclusions about competitive dynamics and effects that are divorced from economic realities. Often, courts mediate the tactical battles over whether the plaintiff accurately defined a relevant market and established monopoly power within this narrow theoretical boundary, without considering the defendant's increasing power over its ecosystem. In diverting the courts' focus to a traditional market

2. On the notion of ecosystems, see Michael G. Jacobides, Carmelo Cennamo & Annabelle Gawer, *Towards a Theory of Ecosystems*, 39 STRATEGIC MGMT. J. 2255 (2018); Michael G. Jacobides & Ioannis Lianos, *Ecosystems and Competition Law in Theory and Practice*, 30 INDUS. & CORP. CHANGE 1199 (2021); Marc Bourreau, Note, *Some Economics of Digital Ecosystems*, ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT [OECD], OECD Doc. DAF/COMP/WD(2020)89 (2020).

definition, these dominant ecosystems can dilute their perceived power and circumvent enforcement action.

Suppose one had direct evidence of a monopolist acting like a monopolist, namely using anticompetitive tactics that harmed app developers and customers. Also suppose that the monopolist controls the dynamic of competition within its ecosystem. It imposes monopolistic fees on sellers and advertisers and excludes them if they threaten its value chains; it harvests users' data and uses it against their interests. Furthermore, suppose that the monopolist's actions were stifling innovation. One would imagine a straightforward antitrust case, where the monopolist would be liable for violating the Sherman Act. After all, the court need not struggle with issues of market definition when presented with direct evidence of both monopoly power and anticompetitive effects. This is not so.

This Article addresses the analytical gap that surrounds the antitrust analysis of ecosystems and makes two important contributions.

First, we show how courts (and until recently agencies) are often slow to recognize changes in business landscapes and models, relying on outdated or inapplicable economic tools, like market definition and relative market power. We highlight how the case law is hindering a much-needed change in analysis of the digital economy. As a result, consumers and sellers subject to the dominant ecosystems' anticompetitive behavior pay the price. Since the Sherman Act does not mandate the courts' market definition exercise, we provide an alternative, namely, using ecosystems in its appraisal of monopoly power.

Second, while noting the need to develop the current antitrust analytical framework to encompass ecosystems' monopoly power, the Article notes the risks associated with treating all "ecosystems" as a proxy for monopoly power. This is of particular concern, when most antitrust enforcement in the United States is by private plaintiffs, not state or federal antitrust agencies. Once courts accept ecosystems as a potential source of monopoly power, private plaintiffs have the incentive to allege that many large tech firms with interlocking platforms are ecosystems, as this implies that firms have monopoly power. We show how courts may fall victim to the numerator bias, where they focus on the headline number (the numerator, which would be the size of the ecosystem), without considering countervailing or qualifying factors (the denominator, such as the contestability of the ecosystem from within or by outside forces). Indeed, the numerator bias is undermining current antitrust analysis, where the courts rely on arbitrary market shares without assessing important qualifying factors.

We highlight the need to develop a more robust analytical framework for antitrust enforcement in ecosystem settings, that can, on the one hand, ensure that ecosystems that abuse their power and distort competition are not left unchallenged, and on the other hand, offer limiting principles that will prevent the numerator bias leading to over-enforcement.

Part II examines the rise of a few powerful ecosystems, and how they differ from popular apps, platforms, and other ecosystems. The Big Tech Barons' ecosystems differ from platform markets and narrowly defined antitrust markets in terms of the (a) source of the Tech Baron's power, (b) area of anticompetitive effects, and (c) nature of anticompetitive harm, in terms of influencing innovation paths.

Although antitrust analysis is supposed to account for these economic realities, Part III explores how the "threshold step" for most antitrust cases today is in defining and proving the relevant market. This market definition exercise ostensibly serves several purposes, such as measuring the defendant's market power and assessing competitive effects of the challenged restraint. However, the current tools typically yield narrow markets that ignore the wider boundaries of the ecosystem.

Part IV discusses the breakdown in antitrust analysis: the courts fail to address (or even see) the dominant ecosystems' abuses, since ecosystems, under the courts' framework, cannot provide monopoly power. That power for the courts comes only when the defendant has a very high market share in a narrowly defined market. While competition agencies push to integrate ecosystem analysis to better reflect market reality, they are met with the courts' formalistic approach. As seen in one recent monopolization case against Apple, there was ample direct evidence that Apple behaved like a monopoly. However, the district court instead spent much of its opinion on the threshold issue of market definition, an inquiry that yielded an inaccurate, subjective, and unpredictable result.

Given the multiple harms from U.S. courts' fixation on market definition, Part V plots efforts to adjust the courts' analytical approach to take account of ecosystems. We review the way in which European enforcement agencies and courts are starting to acknowledge ecosystems in their analysis of markets, and how ecosystems considerations increasingly inform the assessment of power.

While it is vital for antitrust analysis to evolve and integrate ecosystems in the legal framework, it is also important to identify limiting principles to ensure accurate, predictable, and objective results. Therefore, Part VI highlights the risk of oversimplification of the ecosystems analysis. We explain how judges are prone to the numerator bias and could be biased when they accept

ecosystems as a source of monopoly power. To put it plainly, just because a defendant controls an ecosystem does not mean it is a monopoly. We consider how courts can mitigate this bias by examining several other factors besides the numerator.

II. THE CHANGING DIGITAL LANDSCAPE

Apps are worth millions, and platforms are worth billions. But on top of the food chain are a few powerful firms' ecosystems. As Google's CEO told investors in 2019, his company builds ecosystems, not products: "If you look at an ecosystem like Android, this is what we do. And so that's going to be a focus for us."³

In the management literature, an ecosystem commonly refers to "a network of interconnected organizations that are linked to or operate around an organization or a technology platform and that produce valuable goods and services."⁴ Of course, not all online ecosystems are alike—some are more open, horizontal, and democratic than others.⁵

A few tech firms have captured a large share of the S&P 500⁶ and the attention of antitrust enforcers: namely, Google, Apple, Meta, Amazon, and Microsoft. Tech Barons derive their market power not from a particular product or service, but from their control over an ecosystem of products and

3. Motley Fool Transcribers, *Alphabet Inc (GOOG) (GOOGL) Q2 2019 Earnings Call*, MOTLEY FOOL (July 30, 2019), <https://www.fool.com/earnings/call-transcripts/2019/07/25/alphabet-inc-googl-q2-2019-earnings-call-transcrip.aspx>.

4. Tomás Dias Sant'Ana, Paulo Henrique de Souza Bermejo, Marina Figueiredo Moreira & Wagner Vilas Boas de Souza, *The Structure of an Innovation Ecosystem: Foundations for Future Research*, 58 MGMT. DECISION 2725, 2725 (2020) (noting how "[t]he importance of building an ecosystem has gained prominence in both the strategy and practice of organizations").

5. Edward Curry, *The Big Data Value Chain: Definitions, Concepts, and Theoretical Approaches*, in NEW HORIZONS FOR A DATA-DRIVEN ECONOMY: A ROADMAP FOR USAGE AND EXPLOITATION OF BIG DATA IN EUROPE 33 (José María Cavanillas, Edward Curry & Wolfgang Wahlster eds., Springer 2016) (noting definitions and how within a healthy business ecosystem, companies can work together in a complex business web where they can easily exchange and share vital resources).

6. Bank of America analyst Michael Hartnett dubbed the following seven tech-focused firms as the "Magnificent Seven": Microsoft, Apple, Nvidia, Alphabet, Amazon, Meta Platforms, and Tesla. Daniel Foelber, *35% of the S&P 500 Is Concentrated in the "Magnificent Seven." Here's What That Means for Your Portfolio*, MOTLEY FOOL (July 9, 2024), <https://www.fool.com/investing/2024/07/09/sp-500-magnificent-seven-growth-stock-value/>. In July 2024, these seven firms collectively accounted for 35.5% of the market capitalization of the leading stock index, the S&P 500. *Id.*

services.⁷ Apple, for example, attributes the source of its strength not to a particular product, such as the iPhone, but its ecosystem.⁸ Meta’s vision likewise, “does not center on any single product, but rather an entire ecosystem of experiences, devices, and new technologies.”⁹ Similarly, an “important element” of Microsoft’s business model “has been to create platform-based ecosystems on which many participants can build diverse solutions. A well-established ecosystem creates beneficial network effects among users, application developers, and the platform provider that can accelerate growth. Establishing significant scale in the marketplace is necessary to achieve and maintain attractive margins.”¹⁰ To achieve and maintain monopoly margins, the Tech Barons focus on building “platform-based ecosystems.”¹¹

This Part examines multiple factors that distinguish powerful ecosystems from popular apps, platforms, and other ecosystems. The Big Tech Barons’ ecosystems differ from platform markets and narrowly defined antitrust markets in terms of (a) the source of the Big Tech Baron’s power, (b) the area of anticompetitive effects, and (c) the nature of anticompetitive harm to innovation. This Part next explores how ecosystems can empower the Big Tech Barons, and how the anticompetitive effects from their abuses can go beyond narrowly defined markets.

A. WHAT DISTINGUISHES A BIG TECH BARON’S ECOSYSTEM FROM POPULAR APPS, PLATFORMS, AND OTHER ECOSYSTEMS?

At least seven features distinguish a Big Tech Baron’s ecosystem from popular apps, platforms, and other ecosystems.

First, looking at the profits and current market capitalizations of Google, Apple, Meta, Amazon, and Microsoft, their power does not arise from one platform or market; rather, it arises from their control of multiple, popular interlocking platforms, products, and services, which, in turn, attract many

7. See generally ARIEL EZRACHI & MAURICE E. STUCKE, *HOW BIG-TECH BARONS SMASH INNOVATION AND HOW TO STRIKE BACK* 9–40 (2022).

8. Apple Inc., Current Report (Form 8-K) (Nov. 2, 2023) (“Our active installed base of devices has again reached a new all-time high across all products and all geographic segments, thanks to the strength of our ecosystem and unparalleled customer loyalty,” quoting Luca Maestri, Apple’s CFO); Apple Inc., Current Report (Form 8-K Ex. 99.1) (Oct. 27, 2022) (“The strength of our ecosystem, unmatched customer loyalty, and record sales spurred our active installed base of devices to a new all-time high. This quarter capped another record-breaking year for Apple, with revenue growing over \$28 billion and operating cash flow up \$18 billion versus last year,” quoting Luca Maestri, Apple’s CFO).

9. Meta Platforms, Inc. Annual Report (Form 10-K) (Feb. 2, 2023).

10. Microsoft Corp. Annual Report (Form 10-K) (July 28, 2022).

11. *Id.*

developers, sellers, and consumers. For example, 60 percent of iPhone users also use an iPad (tablet), and Apple seeks to decrease switching costs from iPhones and iPads to “lock customers into [its] ecosystem.”¹² Thus, the ecosystem is more powerful than the sum of its parts—the platforms, services, the data collected, and the analytics undertaken. Why? Because one might avoid a platform, but not the Big Tech Baron’s expanding and tightly controlled ecosystem.¹³

Second, in designing the ecosystem and supporting infrastructure, the Big Tech Baron ensures itself unparalleled access to data and other critical inputs of the digital economy.¹⁴ Big Tech Barons use these large amounts of data to improve their products, services, technology, and algorithms, and provide a significant advantage over others in the market. The data also alerts them of competitive threats and changes in market dynamics.¹⁵ For instance, Uber as a platform has a detailed view of where people are traveling.¹⁶ But the Big Tech Barons that control the ecosystem in which Uber resides have a broader view and more data about the individuals and the wider digital economy. This data advantage is further amplified with enhanced analytics and the use of artificial intelligence.

Third, the Big Tech Baron controls the ecosystem’s interconnections—the bridges (interoperability) and the information flows (basically what companies or individuals receive). Thus, in contrast to open ecosystems, the Big Tech Barons determine the configuration patterns within the ecosystem and external relationships outside the ecosystem.¹⁷

The fourth is governance. As a gatekeeper, the Big Tech Baron creates and enforces the rules of the ecosystem. For example, Google sets the rules for not only its search advertising and YouTube display ads; it, along with Meta, effectively determines and enforces the rules for display advertising on millions of apps and websites. And the Big Tech Baron makes sure that the rules (and dynamics of competition) within its ecosystem ultimately benefit them. The

12. *Epic Games, Inc. v. Apple Inc.*, 559 F. Supp. 3d 898, 965 (N.D. Cal. 2021).

13. EZRACHI & STUCKE, *supra* note 7, at 11–14.

14. On the data advantage that the ecosystems enjoy, *see id.* at 66, 105–06, 110–11, 156–57, 191–93; MAURICE E. STUCKE, *BREAKING AWAY* 13–22 (2022).

15. We refer to this as their nowcasting radar. EZRACHI & STUCKE, *supra* note 7, at 42–44, 53, 56, 163, 168; STUCKE, *supra* note 14, at 33–38.

16. Johana Bhuiyan, *Uber Settles With New York Attorney General Over “God View” Tracking Program*, BUZZFEED NEWS (Jan. 6, 2016), <https://www.buzzfeednews.com/article/johanabhuiyan/uber-settles-godview>.

17. EZRACHI & STUCKE, *supra* note 7, at 50–54.

Big Tech Baron's terms are not subject to negotiation. Nor is there a right to due process when access is denied.¹⁸

Fifth, while the Big Tech Baron is not immune from competitive pressure, its gatekeeper position enables it to block innovations that might jeopardize its ecosystem. It takes the destruction out of innovation's potential creative destruction, and its influence extends beyond its ecosystem.¹⁹

Sixth, by controlling the ecosystem, the Big Tech Baron ensures that it obtains a significant share of its value chain. For example, Google obtains monopoly rents not only from one single market (such as search advertising), but across the value chain of digital advertising. As a result, Google profits from advertisements on third-party websites as well as those on its properties, like YouTube.

Seventh, in controlling their ecosystems, Big Tech Barons have more weapons to neutralize competitive threats.²⁰ Moreover, the anticompetitive effects of their actions can ripple across many platforms and markets, and beyond their ecosystems.²¹

Thus, Big Tech Barons' ecosystems differ from platform markets and narrowly defined antitrust markets in terms of (a) the source of the Big Tech Baron's power, (b) the area of anticompetitive effects, and (c) the nature of anticompetitive harm, in terms of influencing innovation paths.

B. HOW ECOSYSTEMS CAN EMPOWER THE BIG TECH BARONS

To illustrate how the Big Tech Baron derives its power from its control over its ecosystem, not from a particular constituent component, let us consider Google and Apple.

Alphabet (which, for our purposes, we will call Google) has dominated general search and general search advertising in the United States, Europe, and elsewhere over the past decade. Google has leveraged its search monopoly to dominate other markets, including web browsers (Chrome),²² mobile

18. STUCKE, *supra* note 14, at 90–109.

19. EZRACHI & STUCKE, *supra* note 7, at 123–39.

20. *Id.* at 44–57.

21. *Id.* at 81–100.

22. *Browser Market Share Worldwide*, STATCOUNTER, <https://gs.statcounter.com/browser-market-share/> (filtered to display data from June 2024 to June 2025).

operating systems (Android),²³ web-mapping (Google Maps and Waze),²⁴ and YouTube, one of the leading user-generated entertainment and video content platforms.²⁵

By 2020, nine of Google's products—Android, Chrome, Gmail, Google Search, Google Drive, Google Maps, Google Photos, Google Play Store, and YouTube—had over a billion users each.²⁶ Google Pay, by 2018, was the most downloaded financial technology app worldwide, with millions of consumers spending and transferring “tens of billions of dollars.”²⁷ By 2019, Google Home and Assistant products were the market leaders in that category on a global basis.²⁸

Apple's power originates from its closed ecosystem of distinct products, such as its iPhones, iPads, AirPods, Apple Watches, and Macs, and services (e.g., Apple TV, Apple Music, and cloud storage). Apple's power increases as more users stay within its ecosystem, for example, buying a Mac to pair with one's iPhone, and then an Apple Watch to pair with the other two Apple devices. As the United States and state attorneys general allege in their monopolization complaint against Apple, this lock-in effect is intentional: “as early as 2010, then-CEO Steve Jobs discussed how to ‘further lock customers into our ecosystem’ and ‘make Apple[s] ecosystem even more sticky.’ Three years later, Apple executives were still strategizing how to ‘get people hooked to the ecosystem.’”²⁹

For example, Apple allegedly leveraged the power of its ecosystem to gain an unfair competitive advantage in the sale of its Apple Watch. Good smart watches can be expensive (costing between \$200 and \$400³⁰), but they are not standalone devices. Their functionality improves when they are paired with one's smartphone. As the United States alleged, Apple not only favored its

23. *Mobile Operating System Market Share Worldwide*, STATCOUNTER, <https://gs.statcounter.com/os-market-share/mobile/worldwide> (filtered to display data from June 2024 to June 2025).

24. *Leading Mapping Apps in the United States in 2023, by Downloads*, STATISTA (Feb. 2024), <https://www.statista.com/statistics/865413/most-popular-us-mapping-apps-ranked-by-audience/>.

25. Laura Ceci, *YouTube – Statistics & Facts*, STATISTA (Jan. 28, 2025), <https://www.statista.com/topics/2019/youtube/#topicOverview>.

26. STUCKE, *supra* note 14, at 2.

27. *Id.*

28. *Id.*

29. Complaint at ¶ 3, *United States v. Apple Inc.*, No. 2:24-cv-04055 (D.N.J. Mar. 21, 2024) [hereinafter US Apple Compl.].

30. Mackenzie Frazier, *The Best Smartwatch Sales and Deals*, TECHRADAR (Nov. 19, 2024), <https://www.techradar.com/deals/smartwatch-deals-sales-prices>.

own watch, but suppressed “key functions of third-party smartwatches—including the ability to respond to notifications and messages and to maintain consistent connections with the iPhone” and in doing so, “denied users access to high-performing smartwatches with preferred styling, better user interfaces and services, or better batteries, and it has harmed smartwatch developers by decreasing their ability to innovate and sell products.”³¹

To effectively access Android and Apple users, app developers and product and service providers need to be admitted within Google’s and Apple’s ecosystems, and have their products and services work seamlessly with the Big Tech Baron’s products and services. But to access the ecosystem, developers must accede to Google’s and Apple’s nonnegotiable interlocking rules and regulations. These rules benefit primarily the Big Tech Baron, not users or app developers.

For example, Apple unilaterally decides what apps are admitted in its App Store.³² Moreover, app developers distributing their apps via Apple’s App Store must accept Apple’s terms, such as a 30% tax on all in-app purchases.³³ App developers cannot choose alternative in-app payment processors or app stores, as Apple has denied these services.³⁴ As the Ninth Circuit found,

there is periodic friction between Apple and app developers. That is because Apple, when it opened the iPhone to third-party developers, did not create an entirely open ecosystem in which developers and users could transact freely without any mediation. Instead, Apple created a “walled garden” in which Apple plays a significant curating role.³⁵

Nor can app developers “inform their customers of alternative cheaper purchasing possibilities, steer them to those offers and allow them to make purchases.”³⁶ As the European Commission found, consumers are left in the dark about lower prices because of Apple’s anti-steering practices:

31. US Apple Compl. ¶ 10.

32. *Epic Games, Inc. v. Apple, Inc.*, 67 F.4th 946, 967 (9th Cir. 2023).

33. *Id.*

34. *Id.*

35. *Id.*

36. European Commission, *Commission Sends Preliminary Findings to Apple and Opens Additional Non-Compliance Investigation Against Apple* (June 24, 2024), https://digital-markets-act.ec.europa.eu/commission-sends-preliminary-findings-apple-and-opens-additional-non-compliance-investigation-2024-06-24_en.

Apple bans music streaming app developers from fully informing iOS users about alternative and cheaper music subscription services available outside of the app and from providing any instructions about how to subscribe to such offers. In particular, the anti-steering provisions ban app developers from:

Informing iOS users within their apps about the prices of subscription offers available on the internet outside of the app.

Informing iOS users within their apps about the price differences between in-app subscriptions sold through Apple's in-app purchase mechanism and those available elsewhere.

Including links in their apps leading iOS users to the app developer's website on which alternative subscriptions can be bought.

App developers were also prevented from contacting their own newly acquired users, for instance by email, to inform them about alternative pricing options after they set up an account.³⁷

Where did Apple's power come from to force millions of app developers, including powerful ones like Epic, to agree to its anticompetitive terms? Not from its control over a narrow antitrust market, like gaming transactions, but from its control over its closed ecosystem. As Apple adds more products and services and denies functionality or interoperability to rival products and services, users will increasingly adopt and use Apple's products and services, and Apple's ecosystem and power grows.

C. THE ANTICOMPETITIVE EFFECTS ARE NOT CONSTRAINED TO NARROWLY DEFINED MARKETS

Often, the Big Tech Barons not only compete against other companies on various markets, but also operate private markets where others compete and interact. Consider, for example, third-party sellers on Amazon and app developers that compete within Google's and Apple's app stores. Competition in these "private" markets is controlled and often distorted to advance the interests of the ecosystem.³⁸ As a result, the Big Tech Baron determines the nature of services that will access these markets, the conditions of sale, the

37. European Commission Press Release IP/24/1161, Commission Fines Apple Over €1.8 Billion Over Abusive App Store Rules for Music Streaming Providers (Mar. 4, 2024).

38. For more on such self-preferencing, *see* EZRACHI & STUCKE, *supra* note 7, at 68–69; STUCKE, *supra* note 14, at 42–46, 50–53, 102–04.

flow of information, and the overall dynamics of competition. While these marketplaces for goods, services and communications may resemble organic markets, they are not governed by the invisible hand of competition, but rather by a digitalized hand—that of the Big Tech Baron.

Control over the ecosystem not only enables the Big Tech Barons to affect competition dynamics but also bestows on them the power to distort the supply and demand of innovation.³⁹ While Google, Apple, Meta, Amazon, and Microsoft invest a lot in research and development, they use their vast powers to suppress disruptive innovation that threatens their value chains or power. The innovation that we receive is geared to allow the Big Tech Barons to grow their empire and influence. Other innovations that could benefit us may be quashed if they are deemed disruptive to this goal. While we tend to believe that market forces dictate the path and mix of innovation, the reality is more like the film “The Truman Show,” as innovation is not driven by our desires but by the profit motive of the Big Tech Barons. It is perhaps of little surprise that the nature of innovation changes. We often assume that innovation is a good thing. Regulators often posit how they don’t want to chill innovation. But as we already sense, not every innovation creates value. In the digital economy and elsewhere, innovation can also extract or destroy value. As the Big Tech Barons become more powerful, the nature of innovation changes and it may become toxic. Products and services that were originally meant to help us are now being designed to extract value from us by enabling data extraction, targeting and manipulation.

The harm from the toxic innovations and Big Tech Barons’ stifling of value-added innovations ripples beyond these Tech Barons’ ecosystems. Even if we seek to avoid the Big Tech Barons’ ecosystems, the toxic innovations to manipulate our behavior are redeployed elsewhere, such as in the political arena. Ultimately, the toxic innovations from the Big Tech Barons’ ecosystems ripple through society, helping spread conspiracy theories, false news, and hate. For example, when Facebook’s algorithms reward negative stories, the political parties become more negative in their messaging. This rancor and tribalism weaken trust and democratic systems. Similarly, new technologies affect our self-esteem and mental health.

Importantly the effects from the distortion of competition and innovation are not constrained to narrowly defined markets. Ecosystems not only confer greater power than brick-and-mortar markets but can also lead to ripple effects

39. See EZRACHI & STUCKE, *supra* note 7, at 41–80 (discussing how powerful ecosystems can disrupt the supply and demand of disruptive innovations).

that are felt well beyond. Negative effects are not confined to higher prices and reduced output in a particular market (such as paying more for cellophane) but extend to wider areas of society. The distortion of innovation paths can harm our privacy, autonomy, well-being and democracy. With the stakes higher with ecosystems, we consider next whether the main legal avenue, namely, the anti-monopolization law under § 2 of the Sherman Act is up to the task.

III. THE CURRENT ANTITRUST FRAMEWORK IN ASSESSING MARKETS

While the concept of ecosystems has been debated extensively in literature,⁴⁰ and introduced into European regulatory instruments applicable to the digital economy,⁴¹ it has proven more difficult to integrate into competition analysis, and more specifically, U.S. antitrust analysis.

This limitation risks driving antitrust into irrelevance, and stands at odds with the U.S. antitrust law supposing to account the economic realities.⁴² As the Supreme Court noted over thirty years ago, “[l]egal presumptions that rest on formalistic distinctions rather than actual market realities are generally disfavored in antitrust law,” as the Court preferred “to resolve antitrust claims on a case-by-case basis, focusing on the ‘particular facts disclosed by the record.’”⁴³ In “determining the existence of market power,” the Court pointed to examining “the economic reality of the market at issue.”⁴⁴ Likewise, the

40. See Jacobides & Lianos, *supra* note 2; Frederic Jenny, *Competition Law and Digital Ecosystems: Learning to Walk Before We Run*, 30 INDUS. & CORP. CHANGE 1143 (2021); Amelia Fletcher, Note, *Digital Competition Policy: Are Ecosystems Different?*, OECD, OECD Doc. DAF/COMP/WD(2020)96 (2020); Daniel A. Crane, *Ecosystem Competition and the Antitrust Laws*, 98 NEB. L. REV. 412 (2019); Viktoria H. S. E. Robertson, *Antitrust Market Definition for Digital Ecosystems*, CONCURRENCES N° 2-2021 3, 3–9 (2021).

41. See, e.g., Regulation (EU) 2022/1925 of the European Parliament and of the Council of 14 September 2022 on contestable and fair markets in the digital sector and amending Directives (EU) 2019/1937 and (EU) 2020/1828 (Digital Markets Act) 2022 O.J. (L 265) 1–66.

42. *Broad. Music, Inc. v. Columbia Broad. Sys., Inc.*, 441 U.S. 1, 14 (1979) (quoting the Department of Justice that “[t]he Sherman Act has always been discriminatingly applied in the light of economic realities”).

43. *Eastman Kodak Co. v. Image Tech. Servs., Inc.*, 504 U.S. 451, 466–67 (1992) (quoting *Maple Flooring Mfrs. Ass’n v. United States*, 268 U.S. 563, 579 (1925); *United States v. E. I. du Pont de Nemours & Co.*, 351 U.S. 377, 395 n. 22 (1956); *Cont’l T. V., Inc. v. GTE Sylvania Inc.*, 433 U.S. 36, 70 (1977) (White, J., concurring in judgment)).

44. *Id.* at 467.

Court emphasized that “Congress prescribed a pragmatic, factual approach to the definition of the relevant market and not a formal, legalistic one.”⁴⁵

Indeed, the Court struck down anticompetitive restraints based on the market realities at issue. For example, in *Associated Press v. United States*,⁴⁶ the Supreme Court upheld, without any elaborate market definition inquiry, the lower court’s finding that the association’s by-laws restrained trade.⁴⁷ The district court found that AP possessed market power, not as a result of any formulistic market definition exercise, but rather the economic reality: AP was “a vast, intricately reticulated organization, the largest of its kind, gathering news from all over the world, the chief single source of news for the American press, universally agreed to be of great consequence.”⁴⁸

So, if antitrust analysis is supposed to account for the economic realities, and if the economic reality is that ecosystems can be a source of monopoly power, then courts, in considering whether the Big Tech Barons have monopoly power, should consider the control over their ecosystems.

This should not be controversial, from a jurisprudential perspective. But as this Part explores, the U.S. courts, including the Supreme Court in recent years, had elevated the importance of market definition in antitrust over the economic realities.

A. IMPORTANCE OF MARKET DEFINITION IN ANTITRUST

Outside of per se illegal cases, antitrust liability under U.S. law (namely, the Sherman and Clayton Acts) is predicated on defendants’ significant market power, which is determined typically circumstantially by their market share. While there are some exceptions (e.g., cluster markets), parties and courts devote a lot of energy to defining a relevant antitrust market, and the defendants’ share of that market. As the federal courts note, “[a] threshold step in any antitrust case is to accurately define the relevant market, which refers to ‘the area of effective competition.’”⁴⁹ Thus, to state an antitrust claim, and survive a motion to dismiss, antitrust plaintiffs must first plead a plausible

45. *Brown Shoe Co. v. United States*, 370 U.S. 294, 336 (1962).

46. *Associated Press v. United States*, 326 U.S. 1, 12–13 (1945).

47. *Id.* (finding that the newspaper organization “had tied the hands of all of its numerous publishers, to the extent that they could not and did not sell any part of their news so that it could reach any of their non-member competitors” and “had hindered and restrained the sale of interstate news to non-members who competed with members”).

48. *Id.* at 18.

49. *Coronavirus Rep. v. Apple Inc.*, No. 21-cv-05567-EMC, 2021 WL 5936910, at *6 (N.D. Cal. Nov. 30, 2021) (quoting *Fed. Trade Comm’n v. Qualcomm Inc.*, 969 F.3d 974, 992 (9th Cir. 2020)) (citation omitted).

relevant market, which encompasses “both a geographic market and a product market.”⁵⁰ If the plaintiffs fail to allege a plausible antitrust market, then the courts typically dismiss their complaint.⁵¹

Most antitrust cases are adjudicated under the Supreme Court’s rule of reason legal standard.⁵² Under that standard, market definition has become the critical threshold legal issue.⁵³ As the Supreme Court stated, “courts usually cannot properly apply the rule of reason without an accurate definition of the relevant market.”⁵⁴ This is because “without a definition of the market there is no way to measure the defendant’s ability to lessen or destroy competition.”⁵⁵

Thus, market definition can determine the case’s outcome.⁵⁶ Even if the plaintiff, as we’ll see with the *Epic* case, has strong evidence of monopoly power and anticompetitive effects, the court will focus initially on whether the plaintiff accurately defines an antitrust market. Nearly all rule of reason cases are dismissed in the first step, which encompasses showing anticompetitive effects in a properly defined antitrust market.⁵⁷ The threshold issue in the first step is whether the plaintiff adequately pleads and proves a relevant antitrust market. So, an inquiry that is supposed to be flexible, in accounting the industry’s economic realities, has become formulaic.

50. *Reilly v. Apple Inc.*, 578 F. Supp. 3d 1098, 1106 (N.D. Cal. 2022) (quoting *Hicks v. PGA Tour, Inc.*, 897 F.3d 1109, 1120 (9th Cir. 2018)); *see also* *hiQ Labs, Inc. v. LinkedIn Corp.*, 485 F. Supp. 3d 1137, 1148 (N.D. Cal. 2020) (“[T]he relevant market must still be plausibly alleged to make it past a 12(b)(6) challenge.”).

51. *See, e.g.*, *NSS Labs, Inc. v. Symantec Corp.*, No. 18-cv-05711-BLF, 2019 WL 3804679, at *9 (N.D. Cal. Aug. 13, 2019) (“Failure to identify a relevant market is a proper ground for dismissing a Sherman Act claim.”) (quoting *Tanaka v. Univ. of S. Cal.*, 252 F.3d 1059, 1063 (9th Cir. 2001)).

52. “Under this rule, the factfinder weighs all of the circumstances of a case in deciding whether a restrictive practice should be prohibited as imposing an unreasonable restraint on competition.” *Cont’l T. V., Inc. v. GTE Sylvania Inc.*, 433 U.S. 36, 49–50 (1977). For criticisms of the rule, *see* Maurice E. Stucke, *Does the Rule of Reason Violate the Rule of Law*, 42 U.C. DAVIS L. REV. 1375 (2009).

53. *See, e.g.*, *Vital Pharms., Inc. v. Berlin Packaging LLC*, 632 F. Supp. 3d 780, 786 (N.D. Ill. 2022) (“[A] plaintiff’s threshold burden under the [r]ule of [r]eason analysis involves the showing of a precise market definition in order to demonstrate that a defendant wields market power, which, by definition, means that the defendant can produce anticompetitive effects.”) (quoting *Agnew v. Nat’l Collegiate Athletic Ass’n*, 683 F.3d 328, 337 (7th Cir. 2012)).

54. *Ohio v. Am. Express Co.*, 585 U.S. 529, 543 (2018).

55. *Id.* (internal quotations and brackets omitted).

56. *Health All. Plan of Mich. v. Blue Cross Blue Shield of Mich. Mut. Ins. Co.*, No. 14-13788, 2018 WL 10322116, at *2 (E.D. Mich. Jan. 2, 2018).

57. *Epic Games, Inc. v. Apple, Inc.*, 67 F.4th 946, 993 n.19 (9th Cir. 2023) (noting an amicus brief reporting that courts have decided 90% of Rule of Reason cases since 1977 at step one, and that the figure rises to 97% when considering only post-1999 cases).

Market definition thus has become “an essential predicate to the entire case.”⁵⁸ Interestingly, the language of the Sherman Act does not impose this requirement.⁵⁹ Nor does the Sherman Act require plaintiffs to show that the challenged restraint produces “significant anticompetitive effects” within a “relevant market.”⁶⁰

Instead, U.S. courts offer two justifications for this rigid threshold. Both justifications, as we shall see later, are flawed. But for now, let us see how the market definition exercise distorts monopolization cases involving the Big Tech Barons’ ecosystems.

B. ANTITRUST MARKETS, BECAUSE OF CURRENT TOOLS (SSNIP OR *BROWN SHOE* FACTORS), TEND TO BE NARROW

Even though “the concept of ‘relevant market’ is central to all section 2 [of the Sherman Act’s monopolization] claims,” courts recognize that this concept “is not easily defined.”⁶¹ The touchstone of defining the relevant antitrust market (which encompasses both a product and geographic market) is cross-elasticity of demand, namely shifts in consumer demand relative to changes in price.⁶² But as courts have found, it is “ordinarily quite difficult to measure cross-elasticities of supply and demand accurately.”⁶³ Thus, the antitrust agencies and courts use two tools to define antitrust markets: the

58. *Coronavirus Rep. v. Apple Inc.*, No. 21-cv-05567-EMC, 2021 WL 5936910, at *6 (N.D. Cal. Nov. 30, 2021).

59. § 1 of the Sherman Act provides that “[e]very contract, combination in the form of trust or otherwise, or conspiracy, in restraint of trade or commerce among the several States, or with foreign nations, is declared to be illegal.” 15 U.S.C. § 1. § 2 provides that “[e]very person who shall monopolize, or attempt to monopolize, or combine or conspire with any other person or persons, to monopolize any part of the trade or commerce among the several States, or with foreign nations, shall be deemed guilty of a felony.” 15 U.S.C. § 2.

60. *Tanaka v. Univ. of S. Cal.*, 252 F.3d 1059, 1063 (9th Cir. 2001).

61. *Telecomm Tech. Servs., Inc. v. Siemens Rolm Commc’ns, Inc.*, 66 F. Supp. 2d 1306, 1316 (N.D. Ga. 1998).

62. *United States v. E. I. du Pont de Nemours & Co.*, 351 U.S. 377, 380 (1956); *United States v. Cont’l Can Co.*, 378 U.S. 441, 449 (1964) (“Though the ‘outer boundaries of a product market are determined by the reasonable interchangeability of use or the cross-elasticity of demand between the product itself and substitutes for it,’ there may be ‘within this broad market, well-defined submarkets * * * which, in themselves, constitute product markets for antitrust purposes.’”) (quoting *Brown Shoe Co. v. United States*, 370 U.S. 294, 325 (1962)); *Coronavirus Rep. v. Apple Inc.*, No. 21-cv-05567-EMC, 2021 WL 5936910, at *6 (N.D. Cal. Nov. 30, 2021) (“The principle most fundamental to product market definition is ‘cross-elasticity of demand’ for certain products or services.”) (quoting *Kaplan v. Burroughs Corp.*, 611 F.2d 286, 291–92 (9th Cir. 1979)).

63. *In re Live Concert Antitrust Litig.*, 247 F.R.D. 98, 124 (C.D. Cal. 2007).

hypothetical monopolist's SSNIP test⁶⁴ and *Brown Shoe* factors.⁶⁵ Both tools typically yield narrowly defined markets.

In undertaking the hypothetical monopolist SSNIP test, economists begin with a very narrow product and geographic market. As the Ninth Circuit noted:

To perform a SSNIP analysis, an economist proposes a narrow geographic and product market definition and then iteratively expands that definition until a hypothetical monopolist in the proposed market would be able to profitably make a small but significant non-transitory increase in price ("SSNIP"). At each step, if consumers would respond to a SSNIP by making purchases outside the proposed market definition, thereby rendering the SSNIP unprofitable, then the proposed market definition is too narrow. At the next step, the economist expands the proposed geographic or product market definition to include the substituted products or area. This process is repeated until a SSNIP in the proposed market is predicted to be profitable for the hypothetical monopolist.⁶⁶

Thus, under the SSNIP test, an economist focuses on narrow categories of goods and services, and asks whether consumers would meaningfully shift, if at all, in response to a small price increase.⁶⁷ Take bread, as one example. The United States in applying the SSNIP test found the relevant product market to be white pan bread (such as that sold under the Wonder brand), as opposed to bread generally.⁶⁸

While it is difficult to measure cross-elasticities of supply and demand accurately, so too, absent good data, it is difficult to accurately assess whether a hypothetical monopolist could impose a SSNIP. Thus, a second method to

64. *Optronic Techs., Inc. v. Ningbo Sunny Elec. Co.*, 20 F.4th 466, 482 (9th Cir. 2021).

65. *Brown Shoe Co.*, 370 U.S. at 325; *see also* *United States v. Bertelsmann SE & Co. KGaA*, 646 F. Supp. 3d 1, 25 (D.D.C. 2022) (noting how courts evaluate relevant product markets in the monopsony context in two ways: (1) by considering qualitative, "practical indicia" as described by the Supreme Court in the *Brown Shoe* case, and (2) by examining "supply substitution" and applying the "hypothetical monopolist test").

66. *Optronic Techs.*, 20 F.4th at 482.

67. *Tevra Brands LLC v. Bayer HealthCare LLC*, No. 19-cv-04312-BLF, 2024 WL 1909156, at *5 (N.D. Cal. May 1, 2024) ("[A]n economist proposes a narrow geographic and product market definition and then iteratively expands that definition until a hypothetical monopolist in the proposed market would be able to profitably make [a SSNIP].").

68. *United States v. Interstate Bakeries Corp.*, No. 95 C 4194, 1995 WL 803559, at *9–10 (N.D. Ill. 1995).

define antitrust markets is using the *Brown Shoe* factors, where courts examine “practical indicia [such] as industry or public recognition of the submarket as a separate economic entity, the product’s peculiar characteristics and uses, unique production facilities, distinct customers, distinct prices, sensitivity to price changes, and specialized vendors.”⁶⁹ These nonexclusive factors are sufficiently supple to reflect economic realities. But courts often employ these factors as a proxy of cross-elasticity of demand, which again can lead to narrowly defined antitrust markets.⁷⁰

Thus, both the SSNIP test and *Brown Shoe* factors typically lead to narrowly defined antitrust markets. Courts, for example, have further delineated the market to “premium” products or services within it. In *United States v. Bertelsmann SE & Co. KGaA*, the relevant antitrust market was “anticipated top-selling books,” as opposed to general fiction or nonfiction books.⁷¹ In one supermarket merger, the court found “premium, natural, and organic supermarkets” that “generally target affluent and well educated customers” as the relevant product market.⁷² This narrowly defined market included Whole Foods but excluded Kroger and Safeway.

Although courts typically do not find a single brand to constitute the relevant product market,⁷³ using either the SSNIP test or *Brown Shoe* factors,

69. *Brown Shoe Co.*, 370 U.S. at 325.

70. *Epic Games, Inc. v. Apple, Inc.*, 67 F.4th 946, 976 (9th Cir. 2023) (describing an antitrust treatise that these indicia have “evidentiary usefulness” in determining cross-elasticity of demand); *NSS Labs, Inc. v. Symantec Corp.*, No. 18-cv-05711-BLF, 2019 WL 3804679, at *9 (N.D. Cal. Aug. 13, 2019) (citing *Newcal Indus., Inc. v. IKON Office Sol.*, 513 F.3d 1038, 1044 (9th Cir. 2008)).

71. *United States v. Bertelsmann SE & Co. KGaA*, 646 F. Supp. 3d 1, 28–29 (D.D.C. 2022) (quoting *Int’l Boxing Club of N.Y., Inc. v. United States*, 358 U.S. 242, 251 (1959)) (noting how the “government’s focus on anticipated top-selling books also is consistent with cases in which courts have recognized the ‘high end’ of other broad markets as distinct submarkets for antitrust purposes”); *see also* *Int’l Boxing Club of N.Y., Inc. v. United States*, 358 U.S. 242, 250–51 (1959) (affirming the district court’s conclusion “that nonchampionship fights are not ‘reasonably interchangeable for the same purpose’ as championship contests” and explaining that defining the relevant market “involves distinction in degree as well as distinctions in kind”); *O’Bannon v. Nat’l Collegiate Athletic Ass’n*, 7 F. Supp. 3d 955, 986–88 (N.D. Cal. 2014) (recognizing relevant submarket of “elite football and basketball recruits”), *rev’d in part on other grounds*, 802 F.3d 1049 (9th Cir. 2015); *United States v. Paramount Pictures, Inc.*, 334 U.S. 131, 172–73 (1948) (recognizing first-run showings of movies as a relevant product market).

72. *F.T.C. v. Whole Foods Mkt., Inc.*, 548 F.3d 1028, 1032 (D.C. Cir. 2008).

73. *In re Fresh Del Monte Pineapples Antitrust Litig.*, No. 04-md-1628, 2009 WL 3241401, at *11 (S.D.N.Y. Sept. 30, 2009), *aff’d sub nom.* *Am. Banana Co. v. J. Bonafede Co.*, 407 F. App’x 520 (2d Cir. 2010); *Nobel Sci. Indus., Inc. v. Beckman Instruments, Inc.*, 670 F. Supp. 1313, 1323 (D. Md. 1986) (“Many cases have rejected a narrow definition of [a] product

courts may find two products to be in different markets, even when the products are functionally fungible.⁷⁴ The key is whether consumers treat them as reasonably interchangeable. As one court noted, “even though the drug Coumadin and its ‘chemically identical’ generic equivalent, warfarin sodium, perform exactly the same function, economic analysis reveals they are in different product markets.”⁷⁵ Although fountain pens perform the same function, the United States alleged, and the court found, a separate antitrust market for fountain pens in the \$50 to \$400 range.⁷⁶ At times, agencies and courts can reach different conclusions, such as whether superpremium ice cream constitutes a relevant product market.⁷⁷

Consequently, as this Part shows, the “threshold step” for most antitrust cases is defining the relevant market. This serves several purposes. First the relevant market is where the defendant enjoys market power. This is often inferred from the defendant having a high market share (say over 65%) in that relevant market⁷⁸ (which we will see later can be problematic). Second, the relevant market is where the alleged restraint occurs. Third, the relevant market is often where the anticompetitive harm manifests itself. Finally, any structural or behavioral remedy will focus on the relevant market. So, the analysis of monopoly power, anticompetitive restraints, harm, and relief are contained in the relevant market, which under the current tools is often narrowly defined. These tools may define markets that reflect the economic realities of some

market, limited to one commodity.”); *Domed Stadium Hotel, Inc. v. Holiday Inns, Inc.*, 732 F.2d 480, 488 (5th Cir. 1984) (“[A]bsent exceptional market conditions, one brand in a market of competing brands cannot constitute a relevant product market.”).

74. *Geneva Pharms. Tech. Corp. v. Barr Labs. Inc.*, 386 F.3d 485, 497 (2d Cir. 2004).

75. *Universal Surveillance Corp. v. Checkpoint Sys., Inc.*, No. 5:11-CV-1755, 2015 WL 6082122, at *4 (N.D. Ohio Sept. 30, 2015) (citing *Geneva Pharms. Tech.*, 386 F.3d at 497).

76. *United States v. Gillette Co.*, 828 F. Supp. 78, 81 (D.D.C. 1993).

77. *Thomas J. Horton & Robert H. Lande, Should the Internet Exempt the Media Sector from the Antitrust Laws?*, 65 FLA. L. REV. 1521, 1558 (2013) (noting a divergence in quality versus treatment in antitrust markets. *Compare In re Super Premium Ice Cream Distrib. Antitrust Litig.*, 691 F. Supp. 1262, 1268 (N.D. Cal. 1988) (finding that, despite substantial and material differences in butterfat content, air volume, and the use of natural ingredients, “all grades of ice cream compete with one another for customer preference and for space in the retailers’ freezers”), *aff’d sub nom. Haagen-Dazs Co. v. Double Rainbow Gourmet Ice Creams, Inc.*, 895 F.2d 1417 (9th Cir. 1990), *with Nestle Holdings, Inc.*, 136 F.T.C. 791, 794 (2003) (consent order) (noting the FTC complaint defined the relevant market as “the sale of superpremium ice cream products to the retail channel”)).

78. *See, e.g., Epic Games, Inc. v. Apple Inc.*, 559 F. Supp. 3d 898, 1029 (N.D. Cal. 2021), *aff’d in part, rev’d in part, and remanded*, 67 F.4th 946 (9th Cir. 2023) (citing case law on the threshold market share for finding a prima facie case of monopoly power as “generally no less than 65% market share”).

segments of the brick-and-mortar economy, like bread, facial tissue,⁷⁹ and gypsum board.⁸⁰ But as the next Part examines, these tools do not work well for digital ecosystems, where the parties and courts deconstruct the Big Tech Barons' ecosystems into narrow markets and focus on defendants' market share within these narrow markets.

IV. HOW ANTITRUST LAW CURRENTLY DOES NOT ADDRESS ECOSYSTEMS

As we saw in Part II, the Big Tech Barons derive their power from ecosystems, and not any specific product or service. But, as we saw in Part III, for their antitrust claims to proceed, plaintiffs must allege and prove a relevant antitrust market, where cross-elasticity of demand is the touchstone. This Part highlights some of the many problems in applying the current market definition tools to ecosystems. To illustrate how the current tools can yield the wrong result, we will examine Epic's antitrust lawsuit against Apple.

A. PROBLEMS WITH APPLYING THE SSNIP TEST & *BROWN SHOE* FACTORS

The SSNIP test has many problems when applied to digital ecosystems, especially when the product or service is ostensibly free.⁸¹ For our purposes,

79. *United States v. Kimberly-Clark Corp.*, No. 3-95CV3055-P, 1995 U.S. Dist. LEXIS 21397 (N.D. Tex. 1995) (challenging a merger in tissue and baby wipes industry).

80. *United States v. Georgia-Pacific Corp.*, No. 96-164, 1996 U.S. Dist. LEXIS 14650 (D. Del. 1996) (challenging a merger in gypsum industry).

81. Council Regulation 1/2003 of June 27, 2017, Commission Decision of 27.6.2017 relating to proceedings under Article 102 of the Treaty on the Functioning of the European Union and Article 54 of the Agreement on the European Economic Area (AT.39740 - Google Search (Shopping)), ¶ 245 (“SSNIP test would not have been appropriate in the present case because Google provides its search services for free to users.”). The E.U. Revised Market Definition Notice stipulates that “[w]hen undertakings compete on parameters other than price, such as quality or the level of innovation, the application of the SSNIP test is difficult, in particular in the context of zero monetary price products and highly innovative industries.” The Commission further notes the difficulties associated with gathering reliable empirical information on the amount of losses a hypothetical monopolist would incur when implementing a SSNIP. It subsequently notes that “in most cases the SSNIP test serves only as a conceptual framework for the interpretation of available evidence.” Commission Notice on the definition of the relevant market for the purposes of Union competition law, C/2023/6789, ¶¶ 30, 31; *see also* Michal S. Gal & Daniel L. Rubinfeld, *The Hidden Costs of Free Goods: Implications for Antitrust Enforcement*, 80 ANTITRUST L.J. 521, 549 (2016) (noting that the “SSNIP test generally relates to a single market rather than to a business ecosystem with multiple types of non-competing products” and does not “capture the competitive constraints on the firm offering the free good, which often accrue in a companion market”); John M. Newman, *Antitrust in Zero-Price Markets: Applications*, 94 WASH. U. L. REV. 49, 65 (2016) (“This analytical

the SSNIP inquiry, when applied to ecosystems, yields several results, none of which accurately reflect monopoly power or commercial realities.

The first incongruous result is that the ecosystem is the source of the Big Tech Baron's power, but the ecosystem cannot constitute a relevant market under the SSNIP test since its constituent components are not substitutable with each other. Take Apple's ecosystem as an example. In response to a SSNIP of smart watches, consumers are not likely to switch to laptops. Because there is low cross-elasticity of demand between many of the components of Apple's ecosystem, each product and service would fall into separate, narrow markets. As the leading case notes, the "offense of monopoly under § 2 of the Sherman Act has two elements: (1) the possession of monopoly power in the relevant market and (2) the willful acquisition or maintenance of that power as distinguished from growth or development as a consequence of a superior product, business acumen, or historic accident."⁸² Under this first element, the inquiry would be whether Apple has monopoly power in each of these narrow relevant markets. If not, absent a leveraging or tying claim,⁸³ any monopolization claim involving that narrow product market

framework loses its coherence in zero-price markets, where the basic unit of value extracted from customers is not expressed as a price."); Florian Wagner-von Papp, *Should Google's Secret Sauce Be Organic?*, 16 MELB. J. INT'L L. 609, 628–29 (2015) ("The traditional SSNIP test cannot be applied without modifications on the search side of a market in which most or all participants use a two-sided business model where the search user is charged nothing."). An alternative assessment method may rely on the consideration of a small but significant non-transitory decrease in quality ("quality degradation" or "the SSNDQ test"). Commission Notice on the definition of the relevant market for the purposes of Union competition law, C/2024/1645, ¶ 30. While this approach brings about challenges associated with the quantification of quality, it forms relevant evidence in the assessment. The E.U. Commission considered this approach as part of its market definition in its Android investigation. Case AT.40099, Google Android (July 18, 2018) [hereinafter Case AT.40099 Google Android]. On appeal, the European General Court confirmed the relevance of the SSNDQ test:

In the case of a product that was very unlikely to lend itself to the classic hypothetical monopolist test aimed at verifying the market's response to a small but significant and non-transitory increase in the price of an asset (Small but Significant and Non-Transitory Increase in Price), the SSNDQ test, which envisages the quality degradation of the product at issue, did constitute relevant evidence for the purpose of defining the relevant market. Competition between undertakings can indeed take place in terms of price, but also in terms of quality and innovation.

Case T-604/18, Google LLC v. Commission, EU:T:2022:541, ¶ 177 (Sept. 14, 2022).

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

83. For a tying claim under § 1 of the Sherman Act, the defendant leverages its strength in one market to coerce customers to buy products or services in a second market. In the primary market one does not need monopoly power, but "significant market power—more than the mere ability to raise price only slightly, or only on occasion, or only to a few of a seller's many customers." Chase Mfg., Inc. v. Johns Manville Corp., 84 F.4th 1157, 1179–80

would likely be dismissed. Likewise, if the *Brown Shoe* factors are applied in such a way to assess the cross-elasticity of consumer demand, courts will not find ecosystems to constitute a relevant market.

One way around this is to allege that an ecosystem is the equivalent of a “cluster” market.⁸⁴ After all, the Supreme Court saw “no barrier to combining in a single market a number of different products or services where that combination reflects commercial realities.”⁸⁵ In theory, the ecosystem can constitute the relevant market when that reflects the economic reality.

However, the lower courts have once again limited the concept of cluster markets to cross-elasticity of demand—namely, whether buyers are shifting from one company’s cluster of products and services (e.g., one bank’s portfolio of checking, savings, and lending services) to a rival’s cluster of the same types of products and services.⁸⁶ As one court noted, a “cluster market exists only when the ‘cluster’ is itself an object of consumer demand.”⁸⁷ Under this interpretation, a cluster market may contain products that are *not* substitutable for each other (for instance, bank customers do not consider a checking account as a substitute for a commercial loan). However, customers must expect rivals to offer a similar cluster of products and services and will switch between the competing clusters (such as between different retail banks).

Thus, an antitrust plaintiff challenging a Big Tech Baron’s ecosystem will run into the same dead-end: ecosystems are not cluster markets because consumers do not demand the Big Tech Baron’s ecosystem of products and services. Nor can consumers shift from Google’s cluster of products and services to Amazon’s, Microsoft’s, or Meta’s, as these clusters themselves are not substitutable for one another.

Indeed, as discussed in Part I, consumers may actually be harmed by an ecosystem. For example, consumers do not demand that Google provide a cluster of products and services—including a search engine, browser, smart

(10th Cir. 2023) (quoting *Grappone, Inc. v. Subaru of New Eng.*, 858 F.2d 792, 796 (1st Cir. 1988)).

84. *F.T.C. v. Staples, Inc.*, 190 F. Supp. 3d 100, 117 (D.D.C. 2016); *see also* U.S. DEPT. OF JUST. & FED. TRADE COMM’N, MERGER GUIDELINES 46 (Dec. 18, 2023) [hereinafter *Merger Guidelines*].

85. *Grinnell Corp.*, 384 U.S. at 572.

86. *See, e.g., Emigra Grp., LLC v. Fragomen, Del Rey, Bernsen & Loewy, LLP*, 612 F. Supp. 2d 330, 353 (S.D.N.Y. 2009) (“[A]ny definition of a cluster market must be responsive to the purpose of the market definition process—identification of an area of competition in which variations in price will affect the demand for alternative products.”).

87. *Green Country Food Mkt., Inc. v. Bottling Grp., LLC*, 371 F.3d 1275, 1284 (10th Cir. 2004).

phone operating system, and navigation map. Consumers do not necessarily demand that Apple also sells smart watches. Rather, some iPhone users may prefer a Garmin watch over an Apple Watch.⁸⁸ Instead of demanding that Apple provide a cluster of products and services, consumers may instead seek interoperability and functionality for their products. For example, iPhone users who have Garmin watches will want them to work seamlessly together.⁸⁹ Garmin owners will not want Apple—as the government alleged—to purposefully degrade the functionality of their smart watch preventing them from responding to text messages on their Garmin watch (a feature available on an Apple Watch). They expect a reliable connection between their iPhone and Garmin watch, and do not want Apple to undermine the watch's performance in any way.⁹⁰

The net result is that ecosystems cannot serve as plausible antitrust markets under current market definition tools because (a) the products and services within the ecosystem are not interchangeable,⁹¹ and (b) the ecosystem itself is not an object of consumer demand.⁹²

Because courts reject ecosystem markets, plaintiffs cannot allege them as the source of defendant's market power, even when doing so would better reflect economic reality. Instead, they must define a narrow antitrust market that conforms to the existing market definition frameworks. The result, as seen next in *Epic*, is a market divorced from economic realities.

B. EPIC'S MONOPOLIZATION CASE AGAINST APPLE

Epic, a multi-billion-dollar video company, refused to pay Google's and Apple's 30% in-app tax and sought the ability to launch its own app store on both Google Android and Apple phones. However, like many app developers,

88. Nicole Nguyen, *The Cult of Garmin: Why Athletes Stick With These Smartwatches over Apple or Samsung: In a Category Dominated by Tech Giants, Here's How Garmin Has Held on to Its High-Spending, Sports-Focused Fan Base with Models Including the \$1,000 Epix*, WALL ST. J. (Oct. 30, 2022), <https://www.wsj.com/articles/the-cult-of-garmin-why-athletes-stick-with-these-smartwatches-over-apple-or-samsung-11667088984> (noting that as of 2022, Apple Watch accounted for over 36% of wearables sold globally, followed by Samsung with 10% of the market, but that in the over-\$500 smart watch premium category, Garmin remained the leader).

89. *Id.* (noting that while Garmin watches work with both iOS and Android platforms, they do not have the same smart functionality that Apple Watches have with Apple products, such as unlocking Macs and auto-pairing with AirPods).

90. US Apple Compl. ¶ 100.

91. See, e.g., *In re Payment Card Interchange Fee & Merch. Disc. Antitrust Litig.*, 562 F. Supp. 2d 392, 403 (E.D.N.Y. 2008) (noting that products that cannot be substituted for each other generally should not be lumped together in a relevant market).

92. *Sharif Pharmacy, Inc. v. Prime Therapeutics, LLC*, 950 F.3d 911, 918 (7th Cir. 2020).

it was prevented from doing so, despite clear consumer benefits from increased competition. Epic challenged both Apple⁹³ and Google⁹⁴ in antitrust lawsuits: its antitrust case against Apple was a bench trial, while its case against Google went before a jury. The different outcomes in these cases can be explained in part, by antitrust's market definition tools. This discussion will focus on Apple, since the district court, as the fact finder, devoted much of its opinion to market definition.

Epic alleged that Apple violated the Sherman Act and California law by “restricting app distribution on iOS devices to Apple’s App Store, requiring in-app purchases on iOS devices to use Apple’s in-app payment processor, and limiting the ability of app developers to communicate the availability of alternative payment options to iOS device users.”⁹⁵

As the Ninth Circuit noted early in its opinion, the friction between Apple and app developers was over Apple’s control over its ecosystem.⁹⁶ Both the district and appellate courts referenced Apple’s closed ecosystem.⁹⁷ Epic also introduced into evidence internal Apple documents revealing efforts to lock consumers into the Apple ecosystem.⁹⁸ Yet, in both the bench trial and on appeal, the courts focused primarily on the threshold issue of defining the relevant market under existing antitrust frameworks.⁹⁹

Epic itself bears some responsibility for this outcome. It alleged two very narrow product markets—the “aftermarkets of iOS app distribution and iOS in-app payment solutions.”¹⁰⁰ On appeal, Epic argued that it was “entitled, as a factual matter, to a finding in favor of its proposed aftermarkets,” which ultimately did not sway the Ninth Circuit.¹⁰¹ Although the Ninth Circuit found that the district court erred, as a matter of law, on several antitrust issues, it

93. *Epic Games, Inc. v. Apple Inc.*, 559 F. Supp. 3d 898, 922 (N.D. Cal. 2021), *aff’d in part, rev’d in part and remanded*, 67 F.4th 946 (9th Cir. 2023).

94. *In re Google Play Store Antitrust Litig.*, 3:20-cv-05671-JD, 2024 U.S. Dist. LEXIS 182978 (N.D. Cal. Oct. 7, 2024).

95. *Epic*, 67 F.4th at 966.

96. *Id.* at 967.

97. *Epic*, 559 F. Supp. 3d at 922.

98. *Id.* at 956.

99. *Id.* at 955–91, 1014–27.

100. *Epic*, 67 F.4th at 973.

101. *Id.* at 980 (holding that Epic failed to carry its “heavy of burden on appeal of showing that the district court clearly erred in finding that (1) Epic failed to show a lack of general consumer awareness regarding Apple’s restrictions on iOS distribution and payment processing, (2) Epic failed to show significant switching costs, and (3) the empirical evidence in the record and the Brown Shoe practical indicia support a market of mobile-game transactions, not Epic’s iOS-specific aftermarkets”).

ruled that Epic failed to establish its proposed market definition as a factual matter.¹⁰²

As discussed in Part III, an antitrust plaintiff must define a relevant market, and that market must be supported by the current tools, which focus on cross-elasticity of demand. If Epic had instead alleged Apple's entire ecosystem as the relevant market, the complaint would likely have been dismissed outright.

Ultimately, the district court crafted its own narrow product market, limiting it to digital mobile gaming transactions.¹⁰³ It then found that Apple's market share in this court-defined market was between 52% and 57%—which was “below the general ranges of where courts found monopoly power under Section 2” of the Sherman Act.¹⁰⁴ However, the court reasoned that Apple's market share put it “near the precipice of substantial market power, or monopoly power.”¹⁰⁵ As a result, the district court dismissed Epic's monopolization claims.¹⁰⁶

This outcome is reminiscent of the 1956 Supreme Court case, *United States v. E. I. du Pont de Nemours & Co.*, where the Court's market definition exercise dictated the outcome.¹⁰⁷ In *du Pont*, the majority applied the cross-elasticity test, but reached an incorrect result, making the case better known for its blunder (the *Cellophane Fallacy*) rather than its holding.¹⁰⁸ Ironically, in *Epic*, the Ninth

102. *Id.* at 973 (finding that Epic also failed to prove the existence of any substantially less restrictive alternative means for Apple to accomplish the procompetitive justifications supporting iOS's walled-garden ecosystem).

103. *Id.*

104. *Epic*, 559 F. Supp. 3d at 1030.

105. *Id.* at 1032.

106. The district court also dismissed the monopolization claims on a second ground, namely that Epic Games failed to satisfy the rule of reason analysis under § 1—“an acknowledged less exacting test as compared to Section 2.” *Id.* at 1044.

107. *See generally* *United States v. E. I. du Pont de Nemours & Co.*, 351 U.S. 377 (1956).

108. *See, e.g.*, *Pac. Steel Grp. v. Com. Metals Co.*, 600 F. Supp. 3d 1056, 1071 (N.D. Cal. 2022) (citing the fallacy and Donald F. Turner, *Antitrust Policy and the Cellophane Case*, 70 HARV. L. REV. 281, 285 (1956)); *Eastman Kodak Co. v. Image Tech. Servs., Inc.*, 504 U.S. 451, 471 (1992) (“[T]he existence of significant substitution in the event of *further* price increases or even at the *current* price does not tell us whether the defendant *already* exercises significant market power.”); *Insight Equity v. Transitions Optical, Inc.*, 252 F. Supp. 3d 382, 390 (D. Del. 2017) (noting how economists “have criticized the Court's analysis for failing to account for the possibility that DuPont had already exercised its monopoly power to charge a supracompetitive price, *i.e.*, a price above the competitive price”); *In re Aggrenox Antitrust Litig.*, 199 F. Supp. 3d 662, 667 (D. Conn. 2016); *United States v. Eastman Kodak Co.*, 63 F.3d 95, 105 (2d Cir. 1995).

Circuit both recognized the Cellophane Fallacy,¹⁰⁹ and acknowledged the Supreme Court’s instruction that courts “should conduct market-definition inquiries based not on ‘formalistic distinctions’ but on ‘actual market realities.’”¹¹⁰ Yet, the Ninth Circuit failed to consider the factors cited by the dissent in *du Pont*, which were more probative of Apple’s monopoly power than the market definition tools that it and the lower court employed. Had the court taken these factors into account, it would have found plenty of evidence of Apple’s monopoly power.

In *du Pont*, the key issue was market definition: namely, whether the relevant market was cellophane (in which case, *du Pont* would be a monopoly and potentially liable under § 2 of the Sherman Act) or whether the market included other flexible packaging materials (in which case *du Pont* would lack monopoly power, a prerequisite for § 2 liability). In upholding flexible packaging materials as the relevant market, the majority relied on cross-elasticity of demand: “If a slight decrease in the price of cellophane causes a considerable number of customers of other flexible wrappings to switch to cellophane, it would be an indication that a high cross-elasticity of demand exists between them—that the products compete in the same market.”¹¹¹

The Court’s error was that this high cross-elasticity of demand exists when the defendant charges a monopoly price. To see why, suppose the monopoly seeks to impose a small, but significant, non-transitory increase in price (SSNIP) above the already high monopoly price. The monopoly price, by definition, yields the greatest profits. That SSNIP will cause the monopolist’s profits to drop, as customers will use other products. For example, a monopoly gas station can raise prices to a certain point, beyond which it will be less profitable as customers start walking more, taking public transportation, or biking. Likewise, any price decrease from the monopoly level will increase consumer demand (as customers switch from walking and biking to driving their cars). It was not surprising that the Court found buyers switching to (or from) cellophane from other flexible wrappings, when the Court used the monopolist price as the benchmark for its analysis. That switching did not mean *du Pont* lacked monopoly power over cellophane. If the Court were to apply the SSNIP test to a lower price which would have existed under

109. *Epic Games, Inc. v. Apple Inc.*, 67 F.4th 946, 975–76 n.7 (N.D. Cal. 2021) (noting that the court runs the risk of a false negative in applying the SSNIP test to a monopoly price: “over-defining a market and finding no market power where, in fact, it does exist”).

110. *Id.* at 978.

111. *du Pont*, 351 U.S. at 400.

competitive conditions, it would have realized that other flexible wrappings do not form part of the market.

In contrast, the dissenting justices in *du Pont* looked at the commercial realities to assess whether *du Pont* acted like a monopoly. Many of the factors were also present in *Epic*. Although the Cellophane Fallacy was not at issue in *Epic*, the case is a warning how applying any market definition tool mechanically and disregarding the economic realities can lead to flawed outcomes.

First in highly competitive markets, companies are more likely to be price-takers, rather than price-setters.¹¹² In competitive markets, customers can threaten to switch if the seller charges unfair prices. In both *du Pont* and *Epic*, the companies had great latitude in setting prices. For example, *du Pont*'s "independent pricing policy and the great profits consistently yielded by that policy" left "no room for doubt that it had [the] power to control the price of cellophane."¹¹³ In *Epic*, "nothing other than legal action seems to motivate Apple to reconsider pricing and reduce rates."¹¹⁴ Undisputed in the *Epic* case was that "Apple chose the 30% commission without regard to or analysis of the costs to run the App Store."¹¹⁵ As the district court noted, competition did not play a role in how Apple determined the app tax.¹¹⁶ This is evidence that Apple had significant flexibility in choosing its app tax and was not constrained by competition.

Second is the company's profit margins. In highly competitive markets, the margins can be razor thin. Apple's profit margin, on the other hand, exceeded 75% for its app store, which further evidenced significant market power.¹¹⁷ Indeed, Apple's operating margin was far greater than *du Pont*'s 31% "operative return" (before taxes), which for the Court suggested monopoly power.¹¹⁸

Third is whether other companies constrain the defendant's behavior. In competitive markets, a company would fear losing many customers if it tried to exploit them. In *du Pont*, the company "recognized that it need not concern itself with competition from other packaging materials."¹¹⁹ *Du Pont*'s "every

112. *Epic*, 67 F.4th at 983 ("[A] firm with market power is a price-maker, not the price-takers that economic theory expects in a competitive market.").

113. *du Pont*, 351 U.S. at 423.

114. *Epic Games, Inc. v. Apple Inc.*, 559 F. Supp. 3d 898, 948 (N.D. Cal. 2021).

115. *Id.* at 947.

116. *Id.* at 947–48.

117. *Id.* at 952.

118. *du Pont*, 351 U.S. at 420.

119. *Id.* at 418.

action was directed toward maintaining dominance over cellophane.”¹²⁰ Likewise, in *Epic*, Apple was not deterred by concerns over losing app developers to other platforms. Instead, Apple insisted that developers “distribute their apps to Apple’s iOS devices only through Apple’s App Store and after Apple has reviewed an app to ensure that it meets certain security, privacy, content, and reliability requirements.”¹²¹ Apple also demanded that developers “use Apple’s in-app payment processor (IAP) for any purchases that occur within their apps” and pay “a 30% commission on initial app purchases (downloading an app from the App Store) and subsequent in-app purchases (purchasing add-on content within an app).”¹²²

Fourth is consumer behavior. In *du Pont*, commercial buyers could not use other products to lower du Pont’s price for its cellophane. As the dissent noted, “We cannot believe that buyers, practical businessmen, would have bought cellophane in increasing amounts over a quarter of a century if close substitutes were available at from one-seventh to one-half cellophane’s price.”¹²³ Likewise, app developers, including large ones like Epic, could not play off other gaming app platforms or Google’s ecosystem for better terms: “To distribute apps to iOS users, a developer must pay a flat \$99 fee and execute the Developer Program Licensing Agreement (DPLA). The DPLA is a contract of adhesion; out of the millions of registered iOS developers, only a handful have convinced Apple to modify its terms.”¹²⁴ Thus, it would make no sense for practical businesses to fork over billions of dollars in commissions to Apple if there were lower-priced substitutes.¹²⁵

Finally is evidence that the defendant’s unilateral conduct had anticompetitive effects. Du Pont, for example, “sought and maintained dominance through illegal agreements dividing the world market, concealing and suppressing technological information, and restricting its licensee’s production by prohibitive royalties, and through numerous maneuvers which

120. *Id.*

121. *Epic Games, Inc. v. Apple Inc.*, 67 F.4th 946, 967 (9th Cir. 2023).

122. *Id.*

123. *du Pont*, 351 U.S. at 417.

124. *Epic*, 67 F.4th at 968. As the district court found, Apple’s “contractual terms are standardized and nonnegotiable—a contract of adhesion. Only a few developers have succeeded in modifying these terms by threatening to go to other platforms. Specifically, Spotify and Netflix have removed in-app purchasing functionality from iOS apps.” *Epic Games, Inc. v. Apple Inc.*, 559 F. Supp. 3d 898, 993 (N.D. Cal. 2021).

125. Kif Leswing, *Apple Implies It Generated Record Revenue from the App Store During 2021*, CNBC (Jan. 10, 2022), <https://www.cnbc.com/2022/01/10/apple-implies-it-generated-record-revenue-from-app-store-during-2021.html> (estimating that Apple grossed between \$70 and \$85 billion in App Store sales in 2021).

might have been ‘honestly industrial’ but whose necessary effect was nevertheless exclusionary.”¹²⁶ Likewise, Apple’s ecosystem did not arise organically through superior products and services. Instead, Apple created its “walled-garden ecosystem through both technical and contractual means.”¹²⁷ As the district court found, “Apple’s anti-steering restrictions artificially increase[d] Apple’s market power by preventing developers from communicating about lower prices on other platforms.”¹²⁸

Apple’s actions also stifled innovation. As it came out in trial, Apple was not innovating in its app store: “Apple’s slow innovation stems in part from its low investment in the App Store.”¹²⁹ Indeed, Apple’s own former Head of App Review, Philip Shoemaker, described the App Store as “antiquated,” with “no radical innovation, only evolution” for the last ten years.¹³⁰ In summary, while the Ninth Circuit recognized the Cellophane Fallacy, it, like the majority in *du Pont*, downplayed the commercial realities, which pointed to Apple’s monopoly power.

Epic’s other antitrust claims failed for other reasons (notably its failure to show less restrictive alternatives under the third step of the rule of reason). But both the district and appellate courts focused so much on how to apply the existing market definition tool that they missed the Supreme Court’s “instruction that courts should conduct market-definition inquiries based not on ‘formalistic distinctions’ but on ‘actual market realities.’”¹³¹ Had they heeded the Court’s instruction, both courts would have recognized that a mechanical analysis results in a narrowly defined product market that fails to reflect market reality and ignores the power Apple derives from its ecosystem.

In sum, antitrust’s market definition exercise, which yields narrow product markets, did not help the courts in assessing Apple’s market power. Instead, the elaborate inquiry that consumed much of the courts’ attention was divorced from the economic realities. The only relief Epic received was under

126. *du Pont*, 351 U.S. at 425.

127. *Epic*, 67 F.4th at 968.

128. *Epic*, 559 F. Supp. 3d at 898 (noting that Apple “created an ecosystem with interlocking rules and regulations,” which made it “difficult to evaluate any specific restriction in isolation or in a vacuum”).

129. *Id.* at 1000.

130. *Id.*

131. *Epic*, 67 F.4th at 978 (quoting *Ohio v. Am. Express Co.*, 585 U.S. 529, 543 (quoting *Eastman Kodak Co. v. Image Tech. Servs., Inc.*, 504 U.S. 451, 466–67)).

the California Unfair Competition Law, which does not require market definition as a threshold matter.¹³²

As we mentioned earlier, in addition to it challenging Apple, Epic also launched an antitrust case against Google. There, Epic raised similar allegations of Google monopolizing app distribution and in-app payment processing in Android phones.¹³³ Ostensibly, the facts were better for Google than Apple, as Android consumers could in theory download third-party apps directly on their phones (a process called sideloading, which was impossible for Apple phones).¹³⁴

But in the Google case, the jury was the finder of fact, and that jury took “little more than three hours” to rule in Epic’s favor that “Google had maintained a monopoly in the smartphone app store market and engaged in anticompetitive conduct that harmed the videogame maker.”¹³⁵ Indeed, although Epic’s antitrust allegations against Google were similar to its claims against Apple (including the 30% app tax), the jury in Google defined a different relevant market (namely, an “Android app distribution market” and “Android in-app billing services for digital goods and services transactions”).¹³⁶ Given the swiftness in the jury’s verdict, the jury likely focused on the commercial realities of Google’s anticompetitive behavior, and did not fixate on whether its markets comported with any SSNIP test.

C. APPLE—TAKE TWO

In contrast to Epic’s largely unsuccessful antitrust litigation against Apple, the United States and state attorneys general in their 88-page monopolization complaint against Apple allege a slightly broader antitrust market: performance smartphones and alternatively smartphones generally, sold in the United States.¹³⁷ But in reading the complaint, one realizes that Apple’s power stems from its growing ecosystem of products and services. While the government alleges that Apple has monopoly power in these markets, the complaint

132. *Id.* at 1002 (rejecting Apple’s argument that the state law requires courts to define a relevant antitrust market).

133. *See* Complaint, Epic Games, Inc. v. Google LLC, No. 3:20-cv-05671 (N.D. Cal. Aug. 13, 2020) [hereinafter *Android Compl.*].

134. *See id.* ¶¶ 62, 94, 98, 101 (alleging how Google made it difficult for consumers to sideload apps).

135. Nico Grant, *Google Loses Antitrust Court Battle with Makers of Fortnite Video Game*, N.Y. TIMES (Dec. 11, 2023), <https://www.nytimes.com/2023/12/11/technology/epic-games-google-antitrust-ruling.html>.

136. Verdict Form, *In re* Google Play Store Antitrust Litig. (N.D. Cal. Dec. 11, 2023) (No. 21-md-02981-JD).

137. US Apple Compl. ¶ 7.

focuses on Apple's dominant ecosystem, which has driven the company's "astronomical valuation."¹³⁸

As expected, Apple has attacked the government's complaint, alleging, in significant part, the government's failure to "properly define the relevant market or establish that Apple has monopoly power in it."¹³⁹ As Apple argues:

the alleged markets are legally disconnected from the challenged conduct. While the complaint seeks to define two hardware markets (smartphones and "performance" smartphones), the alleged anticompetitive conduct purportedly occurred in other markets, such as Apple's policies and practices concerning messaging apps, cloud-streaming apps, digital wallets, and smartwatches. Those products all exist in their own separate markets with their own competitive dynamics, and the Government's failure to define the proper market for those products is fatal.¹⁴⁰

The district court, as of 2024, had not ruled on Apple's motion to dismiss. However, defining these additional markets adds little to the analysis if Apple's monopoly power arises from its control over the Apple ecosystem, rather than from constituent products and services.

Returning to antitrust's first principles, the analysis must account for the economic realities. It makes little sense to require the government to circumstantially prove market power through evidence of a high market share in an artificially narrow market if there is direct evidence of monopoly power or anticompetitive effects. As the Court noted, market power is "the power 'to force a purchaser to do something that he would not do in a competitive market.'"¹⁴¹ If Apple, and by extension, the Big Tech Barons, are forcing market participants (like app developers) to do things they would not do in a competitive market (like pay the 30% app tax), then they have significant market power. Nor does it make sense to require the government to use faulty market definition tools to narrowly define the markets where the anticompetitive effects are occurring.

138. *Id.* at 3.

139. Apple's Letter to Honorable Julien X. Neals, *United States v. Apple Inc.*, No. 2:24-cv-04055-JXN-LDW (D.N.J. May 21, 2024).

140. *US Apple Compl.* ¶ 3.

141. *Eastman Kodak Co. v. Image Tech. Servs., Inc.*, 504 U.S. 451, 464 (1992) (quoting *Jefferson Par. Hosp. Dist. No. 2 v. Hyde*, 466 U.S. 2, 14 (1984)).

D. ANTITRUST LAW DOES NOT MANDATE MARKET DEFINITION

As observed, courts have made market definition the essential predicate to the entire antitrust case. This is not because the Sherman Act's language requires it. In criminal prosecutions of per se violations under the Sherman Act, where the stakes are often greater, the courts do not define antitrust markets.¹⁴² So, if the statute does not mandate market definition, why do the courts?

Courts have provided two justifications. First, “[w]ithout a definition of [the] market there is no way to measure [the defendant’s] ability to lessen or destroy competition.”¹⁴³ Second, the court must first define the relevant market to undertake the rule of reason analysis, which is now the default antitrust legal standard.¹⁴⁴

Both justifications are mistaken. First, to prove an antitrust violation, like any violation, one can rely on direct or circumstantial evidence. If, as we saw in *Epic*, there is direct evidence of either the restraint's anticompetitive effects or the defendant's market power, then market definition is less critical. Courts, in the past, noted that direct evidence of either market power or anticompetitive effects, obviates the need for market definition.¹⁴⁵

142. *F.T.C. v. Super. Ct. Trial Laws. Ass'n*, 493 U.S. 411, 430–31 (1990) (noting how per se rules avoid “the necessity for an incredibly complicated and prolonged economic investigation into the entire history of the industry involved, as well as related industries, in an effort to determine at large whether a particular restraint has been unreasonable” (quoting *N. Pac. R. Co. v. United States*, 356 U.S. 1, 5 (1958)) and that if small parties “were allowed to prove lack of market power, all parties would have that right, thus introducing the enormous complexities of market definition into every price-fixing case” (quoting ROBERT BORK, *THE ANTITRUST PARADOX* 269 (1978))).

143. *Ohio v. Am. Express Co.*, 585 U.S. 529, 543 (2018) (quoting *Walker Process Equip., Inc. v. Food Mach. & Chem. Corp.*, 382 U.S. 172, 177 (1965)).

144. *Am. Express Co.*, 585 U.S. at 543 (“courts usually cannot properly apply the rule of reason without an accurate definition of the relevant market”).

145. *F.T.C. v. Ind. Fed'n of Dentists*, 476 U.S. 447, 460–61 (1986) (“Since the purpose of the inquiries into market definition and market power is to determine whether an arrangement has the potential for genuine adverse effects on competition, ‘proof of actual detrimental effects, such as a reduction of output,’ can obviate the need for an inquiry into market power, which is but a ‘surrogate for detrimental effects.’ 7 P. Areeda, *Antitrust Law* ¶ 1511, p. 429 (1986). In this case, we conclude that the finding of actual, sustained adverse effects on competition in those areas where IFD dentists predominated, viewed in light of the reality that markets for dental services tend to be relatively localized, is legally sufficient to support a finding that the challenged restraint was unreasonable even in the absence of elaborate market analysis.”); see also *Eastman Kodak Co. v. Image Tech. Servs., Inc.*, 504 U.S. 451, 477 (1992) (holding that it was “clearly reasonable to infer that Kodak has market power to raise prices and drive out competition in the aftermarkets, since respondents offer direct evidence that Kodak did so”).

Second, the Sherman Act does not mandate the usage of the rule of reason. The Supreme Court created that legal standard, which, as the Court acknowledged, has many significant infirmities.¹⁴⁶ But even under this flawed legal standard, the plaintiff can satisfy the first step of the rule of reason with direct evidence—namely, “by proving the existence of actual anticompetitive effects, such as reduction of output, increase in price, or deterioration in quality of goods or services.”¹⁴⁷

Third, even if direct evidence of monopoly power or anticompetitive effects is lacking, one need not equate market definition with the narrow-market definition tools that the courts employ. As we saw, the market definition must reflect economic realities. The SSNIP test is unhelpful with respect to ecosystems and can lead to the wrong result. If the Big Tech Baron’s power arises from its control over the ecosystem (and not a particular platform, product, or service), and if the Big Tech Baron leverages this power to quash innovation that disrupts its power or profits, then one can miss many of these anticompetitive effects if one focuses only on narrowly defined markets. The government’s Apple complaint avoids this mistake, by focusing on Apple’s ecosystem, rather than narrowly defined markets. Indeed, the SSNIP test traditionally used to define narrow markets is notably absent from the complaint. However, Apple, like other monopolies, will press the district courts to mandate the plaintiff first to define and prove a relevant antitrust market using the existing market definition tools.

E. THE ENFORCEMENT GAP

As a result of the mismatch between the current legal approach that relies on a mechanical market definition exercise, and the market reality in which Big Tech Barons’ monopoly power stems from their control over an ecosystem, courts fail to acknowledge the importance of a dynamic shift from markets to ecosystems and the rise of new forms of power. This enforcement gap has significant implications.

146. *See, e.g.*, *Kimble v. Marvel Ent., LLC*, 576 U.S. 446, 459 (2015) (“[W]hatever its merits may be for deciding antitrust claims,” the “elaborate inquiry” required under that standard “produces notoriously high litigation costs and unpredictable results.”); *Oneok, Inc. v. Learjet, Inc.*, 575 U.S. 373, 398 (2015) (Scalia, J., dissenting, joined by Roberts, C.J.) (calling the rule of reason “amorphous”); *F.T.C. v. Actavis, Inc.*, 570 U.S. 136, 173 (2013) (Roberts, C.J., dissenting, joined by Scalia & Thomas, JJ.) (calling the standard “unruly” and commenting “[g]ood luck to the district courts that must, when faced with a patent settlement, weigh the likely anti-competitive effects, redeeming virtues, market power, and potentially offsetting legal considerations present in the circumstances”).

147. *United States v. Brown Univ.*, 5 F.3d 658, 668–69 (3d Cir. 1993).

One problem is false negatives. Big Tech Barons will avoid antitrust liability when their power comes from ecosystems, rather than narrow product markets. Plaintiffs cannot allege ecosystems as the Big Tech Baron's power source. Instead, they must prove that the power comes from a narrowly defined market supported by the courts' current market definition tools and where the defendant enjoys a significant market share (at least over 65%).

A second problem is relief. Regarding fashioning an antitrust remedy, the Supreme Court said, "[C]autious is key."¹⁴⁸ Even if the plaintiff can prove monopoly power in a narrow market, relief will likely focus on the narrowly defined market, rather than the ecosystem overall. Thus, the behavioral or structural relief will likely be inadequate when it seeks to restore competition in only those narrowly defined markets where the defendant has a very high market share. The relief will not address the source of the monopoly's power (the ecosystem). This would be as if the doctor focuses on the patient's cancer in her toe, while ignoring the cancer spreading throughout the rest of the body.

A third problem is antitrust's deviation from the rule of law. The Supreme Court often cautions against an antitrust legal standard that would put litigants into a "sea of doubt."¹⁴⁹ That is the case here, where the market definition exercise is divorced from economic realities. Indeed, Judge Thomas in *Epic* recognized this when dissenting in part with the Ninth Circuit's finding that the district court's market definition errors were harmless. He noted that, "[u]nless the correct relevant market is identified, one cannot properly assess anticompetitive effects, procompetitive justifications, and the satisfaction of procompetitive justifications through less anticompetitive means. The analysis is different; therefore, the errors affected substantial rights and cannot be considered harmless."¹⁵⁰ After all, how can the parties prepare and argue their case, when so much depends on market definition, under the current antitrust framework or when the judge can unilaterally define its own market that is divorced from economic realities?

148. *Nat'l Collegiate Athletic Ass'n v. Alston*, 594 U.S. 69, 106 (2021).

149. *Id.* at 107; *Nat'l Soc. of Pro. Eng'rs v. United States*, 435 U.S. 679, 696 (1978); *Cline v. Frink Dairy Co.*, 274 U.S. 445, 462 (1927) (quoting *United States v. Addyston Pipe & Steel Co.*, 85 F. 271, 283–84 (6th Cir. 1898), where Justice Taft said, "[i]t is true that there are some cases in which the courts, mistaking, as we conceive, the proper limits of the relaxation of the rules for determining the unreasonableness of restraints of trade, have set sail on a sea of doubt, and have assumed the power to say, in respect to contracts which have no other purpose and no other consideration on either side than the mutual restraint of the parties, how much restraint of competition is in the public interest, and how much is not.").

150. *Epic Games, Inc. v. Apple, Inc.*, 67 F.4th 946, 1005–06 (9th Cir. 2023).

V. THE SLOW SHIFT TO ECOSYSTEM ANALYSIS

As noted, past case law has hampered the U.S.'s attempts to advance ecosystem analysis. Despite the principle understanding that the "[c]ourt should be cautious about putting dispositive weight on doctrines from antiquity but of slight relevance,"¹⁵¹ implementing change has been difficult. Agencies and plaintiffs therefore often opt for narrow market definitions that poorly reflect the economic reality. Attempts to include ecosystem analysis are unsurprisingly hampered by constant criticism from large corporations that intercept attempts to challenge their power.

This Part focuses on the way in which enforcers and courts in Europe and the United States have taken steps to acknowledge ecosystems in their analysis. We start by reviewing attempts to integrate ecosystem analysis into market definition. We then consider attempts to integrate ecosystem considerations in the analysis of monopoly power.

A. MARKET DEFINITION

Mindful of the limitations of traditional market definition, the European Commission has integrated ecosystem competition into its analysis. In its notice on market definition, the Commission extends its traditional analysis of primary and secondary markets to more complex ecosystems. It notes that digital ecosystems "can, in certain circumstances, be thought of as consisting of a primary core product and several secondary (digital) products whose consumption is connected to the core product, for instance, by technological links or interoperability."¹⁵² The Commission acknowledges that "not all (digital) ecosystems fit an after-market or bundle market approach" and indicates that it "takes into account, where relevant, factors such as network effects, switching costs (including factors capable of leading to customer lock-in) and (single- or multi-) homing decisions for the purpose of defining the relevant product market(s)."¹⁵³

That approach reflects earlier developments in European case law, where the Commission and E.U. courts took ecosystems into account in their market analyses. In *Google and Alphabet v. Commission (Google Android)*,¹⁵⁴ for example, the European General Court evaluated the E.U. Commission's decision to fine Google €4.34 billion for illegal restrictions it imposed on Android device

151. *Leegin Creative Leather Prods., Inc. v. PSKS, Inc.*, 551 U.S. 877, 888 (2007).

152. Commission Notice on the Definition of the Relevant Market for the Purposes of Union Competition Law, 2024 O.J. (C/2024/1645) ¶ 104.

153. *Id.*

154. Case T-604/18, *Google LLC v. Commission*, EU:T:2022:541 (Sept. 14, 2022).

manufacturers and mobile network operators to cement the dominant position of Google's search engine.¹⁵⁵ In its judgment, the Court considered the definition of the relevant market in the context of an "ecosystem."¹⁵⁶ The Court noted the validity of the traditional approach to market definition, but emphasized the need to go "beyond mere segmentation into markets" to better assess Google's economic strength.¹⁵⁷ The Court noted that in the digital economy, "traditional parameters such as the price of products or services or the market share of the undertaking concerned may be less important than in traditional markets, compared to other variables such as innovation, access to data, multi-sidedness, user behaviour or network effects."¹⁵⁸ It then stated:

in a digital 'ecosystem,' which brings together several categories of supplier, customer and consumer and causes them to interact within a platform, the products or services which form part of the relevant markets that make up that ecosystem may overlap or be connected to each other on the basis of their horizontal or vertical complementarity. Taken together, the relevant markets may also have a global dimension in the light of the system that brings its components together and of any competitive constraints within that system or from other systems.¹⁵⁹

The Court subsequently upheld the Commission's market analysis, as well as its consideration of quality degradation of Android, as part of that analysis.¹⁶⁰ Implicit in this trajectory is the acceptance of a more loosely defined boundary in which competition is assessed. This broader approach is significant, in particular when endorsed by the European courts, as it opens the door to

155. Case AT.40099 Google Android, § 20.3.11, art. 2.

156. Case T-604/18, *Google LLC*, ¶¶ 104–19.

157. *Id.* ¶ 114.

158. *Id.* ¶ 115.

159. *Id.* ¶ 116.

160. The Court held:

In the case of a product that was very unlikely to lend itself to the classic hypothetical monopolist test aimed at verifying the market's response to a small but significant and non-transitory increase in the price of an asset (Small but Significant and Non-Transitory Increase in Price), the SSNDQ test, which envisages the quality degradation of the product at issue, did constitute relevant evidence for the purpose of defining the relevant market. Competition between undertakings can indeed take place in terms of price, but also in terms of quality and innovation.

Id. ¶ 177.

market analysis that extends beyond narrowly defined markets and is more in tune with economic reality.

In the United States, the federal antitrust agencies have attempted to similarly align market analysis with economic reality. However, the U.S. courts have yet to incorporate ecosystem considerations in their antitrust market analysis. Some private plaintiffs, as in *Epic*, reference the Big Tech Barons' ecosystems, but then plead narrower product markets, which the courts then find as implausible.¹⁶¹ No U.S. court has, as of 2024, accepted ecosystems as a relevant market in which to assess defendants' monopoly power.

B. MARKET POWER AND COMPETITIVE EFFECTS

Returning to why courts define markets, there are two important justifications: first, to assess whether the defendant possesses monopoly power and second, to assess the challenged restraints' competitive effects. As illustrated above, in the digital economy, the analysis of market power and anticompetitive effects may necessitate an assessment at the level of the ecosystem rather than at the level of individual narrowly defined product markets.¹⁶² Increasingly, competition agencies in Europe weave these elements into their analysis.

In its Google Android decision, the European Commission found that "Android app stores constituted an ecosystem-specific market, rejecting Google's arguments that app stores and mobile operating systems compete together as a system against other 'mobile platforms.'"¹⁶³ The Commission noted how the combination of assets within the Google Android ecosystem

161. See, e.g., *Reilly v. Apple Inc.*, 578 F. Supp. 3d 1098, 1108 (2022) (dismissing claims because plaintiff's complaint fails to allege plausible product or geographic markets, which are threshold showings for plaintiff's antitrust claims); *Coronavirus Rep. v. Apple Inc.*, No. 21-cv-05567-EMC, 2021 WL 5936910, at *6–7 (N.D. Cal. Nov. 30, 2021) (dismissing claims for the same reason); *In re Google Digit. Advert. Antitrust Litig.*, No. 20-cv-03556-BLF, 2021 WL 2021990, at *3 (N.D. Cal. May 13, 2021) (dismissing allegations of Google's online advertising ecosystem because, inter alia, plaintiffs' "proposed market improperly includes services for both advertisers and publishers"); *Bookhouse of Stuyvesant Plaza, Inc. v. Amazon.com, Inc.*, 985 F. Supp. 2d 612, 621 (S.D.N.Y. 2013) (dismissing claims over Amazon's closed ebook ecosystem because plaintiffs failed to plausibly allege a properly defined market within which defendants have price-setting power).

162. European Union, Note, *The Evolving Concept of Market Power in the Digital Economy*, OECD, OECD Doc. DAF/COMP/WD(2022)30, ¶¶ 39, 40 (2022).

163. *Id.*

increases users' switching costs,¹⁶⁴ and creates barriers to entry, as competitors cannot easily replicate the ecosystem.¹⁶⁵

In its OECD submission on "Market Power in the Digital Economy," the European Commission elaborated on its approach. It noted that a firm could manifest its market power throughout its ecosystem by, among other things, preventing or degrading interoperability with third parties' products, raising entry barriers, or leveraging its power to dominate other sectors.¹⁶⁶ Illustrative of this approach is the Commission's Amazon e-book decision, in which the Commission opined that the closed ecosystem operated by Amazon could support customer lock-in.¹⁶⁷

Beyond conduct cases, ecosystem power has been evaluated in merger cases where the aggregation of power raised concerns.¹⁶⁸

In its prohibition of the *Booking/eTraveli* transaction, the European Commission appraised the proposed acquisition by Booking (an online travel agency (OTA) mainly active in the provision of hotel accommodation) of a main customer acquisition channel operated by eTraveli (a flight OTA).¹⁶⁹ The Commission was concerned that, following the transaction, "Booking would leverage its ability to acquire customers in the neighbouring flight OTA market to strengthen its dominant position in the hotel OTA market."¹⁷⁰ It referred to its 2019 report on the digital economy¹⁷¹ and noted that "in cases where the acquirer operates an ecosystem that benefits from strong positive network effects, which act as a significant barrier to entry, 'the risk to competition resulting from an acquisition is not limited to the foreclosure of rivals' access to inputs, but extends to the strengthening of dominance as it fortifies the dominance of the ecosystem, in part because the new services add value to the consumers for which they are complements and in part because they help retain other users for which they are partial substitutes.'"¹⁷² The Commission

164. Case AT.40099 Google Android, ¶¶ 522–32.

165. *Id.* ¶ 624.

166. European Union, Note, *The Evolving Concept of Market Power in the Digital Economy*, OECD, OECD Doc. DAF/COMP/WD(2022)30, ¶ 42 (2022).

167. Case AT.40153 – E-book MFNs and Related Matters (Amazon), ¶ 65 (EC) (May 4, 2017).

168. Eliana Garces, Olga Kozlova Guglielmi & Devin Reilly, *Ecosystem Theories of Harm in Merger Enforcement: Current Direction and Open Questions*, 15 J. EUR. COMPETITION L. & PRAC. 272, 274–76 (2024).

169. Case M.10615, *Booking Holdings v. eTraveli Grp.*, ¶ 202 (Sept. 25, 2023).

170. *Id.*

171. See Jacques Crémer, Yves-Alexandre de Montjoye & Heike Schweitzer, *Competition Policy for the Digital Era*, EUR. COMM'N REP. (2019).

172. Case M.10615, *Booking Holdings*, ¶¶ 202, 204.

opined that the transaction would enable Booking to develop a travel ecosystem while leveraging its brand strength, existing customer inertia, and network effects to strengthen its position on the hotel OTA market and to attract end customers earlier on in their trip planning process.¹⁷³

Likewise, the U.K. Competition and Markets Authority (CMA) decision in *Microsoft/Activision* noted the strengths of Microsoft's gaming ecosystem,¹⁷⁴ and its "potential strengths in cloud gaming arising from its broader multi-product ecosystem."¹⁷⁵ The CMA asserted that Microsoft's "multi-product ecosystem gives it a stronger position in cloud gaming than would be suggested by assessing each of its products and services individually."¹⁷⁶ These assertions served as general backdrop to a more conventional vertical foreclosure theory. The CMA's original approach more heavily relied on ecosystem effects and raised concerns that the collection of assets held by Microsoft would bestow it with significant first-mover advantage in the nascent market for cloud streaming games. Following significant push back from Microsoft, and to reduce the risk of appeal, the CMA abandoned this line of argument and focused its analysis on input foreclosure.¹⁷⁷

U.S. antitrust enforcers, like their counterparts in the European Union and United Kingdom, are developing ecosystems as a source of monopoly power within the agencies' theories of harm. In 2022, the head of the Department of Justice Antitrust Division (DOJ) noted how digital ecosystems can confer monopoly power, and how the agencies must examine the monopolies' course of conduct not in narrow markets, but across their entire ecosystems.¹⁷⁸

173. *Id.* ¶¶ 740, 741, 905, 909, 919, 926. Contrast this decision with the Commission decision to clear Amazon's acquisition of MGM (which produces and distributes audio-visual content), where the Commission considered whether the transaction increased lock-in effects by attracting customers to the Amazon ecosystem. There, the Commission concluded that MGM's strength and content would have unlikely raised barriers to entry. Case M.10349, *Amazon/MGM Merger*, ¶¶ 310–12 (Mar. 15, 2022).

174. *Anticipated Acquisition by Microsoft of Activision Blizzard, Inc.*, COMPETITION & MKTS. AUTH. 17 (Summary ¶¶ 63–64) (Apr. 26, 2023), https://assets.publishing.service.gov.uk/media/644939aa529eda000c3b0525/Microsoft_Activision_Final_Report_.pdf.

175. *Id.* at 12 (Summary ¶ 41).

176. *Id.* at 240 (Findings ¶ 8.198).

177. Cristina Caffarra, *Furthering Ecosystem Analysis in Antitrust*, PROMARKET (Dec. 14, 2023), <https://www.promarket.org/2023/12/14/furthering-ecosystem-analysis-in-antitrust>; Cristina Caffarra, Annabelle Gawer & Michael G. Jacobides, *Mapping Antitrust onto Digital Ecosystems*, CPI ANTITRUST CHRONICLE 3 (Apr. 2024).

178. Assistant Attorney General Jonathan Kanter of the Justice Department's Antitrust Division Delivers Keynote at CRA Conference, 2022 WL 971165 (D.O.J. Mar. 31, 2022).

Similar to the *Apple* monopolization case, the United States and a bipartisan coalition of state attorneys general relied on ecosystems as the source of Live Nation's monopoly power. As the government alleges in its 2024 complaint:

Live Nation maintains and exercises its power through a coordinated pattern of anticompetitive conduct that serves a variety of ends: expanding its scope and reach into every crevice of an increasingly more complex and interconnected ecosystem, eliminating rivals, continuing to increase barriers to entry, and inhibiting competition on the merits. Each act is exclusionary on its own. But the acts also work together across the ecosystem, enhanced by the flywheel and scale effects, to magnify the anticompetitive force of the scheme.¹⁷⁹

The government also alleges that Live Nation's control over its "live entertainment" ecosystem enables it to extract monopoly rents throughout the value chain.¹⁸⁰ The ecosystem's "self-reinforcing flywheel" gives the monopoly "multidimensional power."¹⁸¹

Besides the *Apple* and *Live Nation* cases, one can see a recognition of ecosystems in the 2023 Merger Guidelines issued by the DOJ and the Federal Trade Commission. The Guidelines specifically mention ecosystem competition,¹⁸² and put forward other elements that could serve as a steppingstone to ecosystem analysis and deemphasize the rigid distinction between horizontal and vertical effects. In their discussion of limited access to products, services, or routes to market (Guideline 5), the agencies note that anticompetitive foreclosure effects do not necessarily involve traditional vertical relationships. In Guideline 6, the agencies discuss mergers that can violate the law when they entrench or extend a dominant position. The dominant firm may acquire (and thereby eliminate) a nascent threat (for example, a potentially disruptive innovator). Although they do not directly compete, the disruptive innovators may "add features or serve additional customer segments, growing into greater overlap of customer segments or

179. Complaint at ¶ 68, *United States v. Live Nation*, No. 1:24-cv-03973 (S.D.N.Y. May 23, 2024) [hereinafter *Live Nation Compl.*].

180. *Live Nation Compl.* ¶¶ 39, 139.

181. *Id.* ¶ 52.

182. Merger Guidelines, *supra* note 84, at 20 (noting ecosystem competition in one context "where an incumbent firm that offers a wide array of products and services may be partially constrained by other combinations of products and services from one or more providers, even if the business model of those competing services is different").

features over time, thereby intensifying competition with the dominant firm.”¹⁸³ The agencies add that “the success and independence of the nascent threat may both provide for a direct threat of competition by the niche or nascent firm and may facilitate competition or encourage entry by other, potentially complementary providers that may provide a partial competitive constraint.”¹⁸⁴ The agencies further note the risk of entrenchment during technological transitions that may hamper the emergence of more competitive markets. Evidently, the mix of old and new is a characteristic of change, as the U.S. agencies need to operate within the existing legal framework that earlier courts constructed for the brick-and-mortar economy, while trying to update the analysis to reflect the new market realities of the digital economy.

Overall, Europe, while still grappling with ecosystem analysis, is further along in recognizing how analyzing ecosystems can inform the assessment of monopoly power and theories of anticompetitive harm. In this respect, U.S. courts lag by limiting their assessment of market power and anticompetitive effects to a market definition exercise, which is foreign to how businesses see the markets and economics outside of antitrust.

VI. THE RISK OF THE NUMERATOR BIAS

There is little doubt as to the need to accelerate the development of better analytical frameworks that can assess ecosystems’ monopoly power and its effects on competition. As competition agencies and courts move slowly in that direction and remedy the current underenforcement in that area, another risk emerges, which could stem from the oversimplification of the ecosystem analysis.

Here, courts can be subject to the numerator bias; basically, they focus on the headline issue (i.e., whether the defendant is an ecosystem), without assessing the qualifying factors (the denominator). That risk is of particular significance when considering the outsized role of private litigation in the United States. Once ecosystem analysis becomes more prevalent, the numerator bias may result in oversimplification and mistaken findings of monopoly power.

Let us first elaborate on the nature of this bias to which many of us fall prey. One example is personal investing, where we focus primarily on the numerator, namely the investment’s expected return, without fully appreciating other factors such as the risk of the investment (the

183. *Id.*

184. *Id.*

denominator).¹⁸⁵ Some areas of law, like evidence, seek to mitigate the numerator bias by excluding otherwise relevant evidence.¹⁸⁶

Our focus will be antitrust, and particularly the issue of assessing market power. As this Part explores, antitrust litigants and the court have fallen for the numerator bias before, such as when they fixate on a numerator, such as the size of the defendant or transaction or the defendant's market share, without considering qualifying factors. In the context of ecosystems, we note how the numerator bias can result in simple attribution of monopoly power to ecosystems and to false positives. As Part II addresses, ecosystems can vary and not all of them convey monopoly power. Accordingly, just because a defendant controls an ecosystem it is not presumptively a monopoly, and courts should mitigate this bias by assessing several other factors besides the numerator.

A. PAST EXAMPLES OF NUMERATOR BIAS

In assessing whether the defendant possessed significant market power, some courts and plaintiffs considered the defendant's size and number of purchases. At its most basic level, the numerator bias is to focus on the bigness of the defendant, without looking at how big the defendant is relative to others.

A good example is the 1961 *Tampa Electric* case where the district and appellate courts considered the numerator—amount of coal purchased by the plaintiff (and the amount of coal sold by the defendant coal company) without

185. VICTOR HAGHANI & JAMES WHITE, *THE MISSING BILLIONAIRES: A GUIDE TO BETTER FINANCIAL DECISIONS* 36–39 (2023) (discussing that despite the usefulness of the “Merton share” in calculating the optimal allocation of different investments, the authors found that few investment bankers and business school students knew of it). Robert Merton's formula $\kappa = \frac{\mu - r}{\gamma \sigma^2}$ calculates the optimal amount to bet or invest, which is calculated by dividing the numerator (the investment's expected return minus the risk-free rate) by γ (one's personal degree of risk-aversion) and the square of σ (the investment's standard deviation). *Id.* at 36.

186. James S. Liebman, Shawn Blackburn, David Mattern & Jonathan Waisnor, *The Evidence of Things Not Seen: Non-Matches as Evidence of Innocence*, 98 IOWA L. REV. 577, 639–40 (2013) (discussing Federal Rules of Evidence 404 through 411, which seek “to neutralize jurors' tendency to jump to the conclusion that someone who did something bad in the past is likely to offend again or that people who act guilty are guilty, without considering innocent explanations for the behavior. Rephrased in Bayesian terms, the law fears that jurors will treat the evidence as a confession of guilt and (via the representativeness, simulation, and other biases) erroneously jump to a conclusion based on the high numerator probability without considering a non-inconsequential denominator probability. The law consequently excludes the evidence to be sure that jurors do not treat it as unique to guilty people (i.e., as having a high numerator value and a denominator worth no attention).”).

considering the denominator—amount of coal purchased by other utilities (and amount of coal sold by other coal mines besides the plaintiff).¹⁸⁷

Tampa Electric was a public utility that produced and sold electricity in the Tampa Bay area.¹⁸⁸ By 1954, Tampa Electric, like other Florida utilities, used oil to generate electricity.¹⁸⁹ Tampa Electric sought to expand and use coal for two of its six new electricity generating units.¹⁹⁰ Tampa Electric contracted with Nashville Coal to supply Tampa Electric's total requirements of coal with "not less than 225,000 tons of coal per unit/per year" for twenty years.¹⁹¹ Moreover, if Tampa Electric expanded, Nashville Coal would supply it with coal.¹⁹² The contract had set a minimum price of \$6.40 per ton, subject to an escalation clause.¹⁹³ Tampa Electric thereafter expended some \$3 million extra to construct its coal-burning units (than it would if it built oil-burning units).¹⁹⁴ Nashville Coal told Tampa Electric that their contract was void, as it violated § 3 of the Clayton Act.¹⁹⁵ As a result, Tampa Electric had to buy coal on the open market at \$8.80 per ton.¹⁹⁶ One can surmise that Nashville Coal was motivated, not by antitrust concerns but economics: it wanted out of the contract where it sold coal at \$6.40 per ton when the market price had increased to \$8.80 per ton. The Florida utility sought a declaratory judgment that its requirements contract with the coal company was valid and for enforcement according to its terms.¹⁹⁷ The District Court for the Middle District of Tennessee and the Sixth Circuit both ruled for the coal company, holding that the exclusivity agreement violated § 3 of the Clayton Act.¹⁹⁸

In reaching that conclusion, the lower courts focused on two headline numbers: namely the length of the contract (twenty years) and the large amount of coal covered by the contract.¹⁹⁹ But the lower courts did not consider the denominator: namely, the total amount of coal consumed in the southeast.²⁰⁰ When placed in this context, the exclusivity contract did not

187. *Tampa Elec. Co. v. Nashville Coal Co.*, 365 U.S. 320, 324–25, 329–32 (1961).

188. *Id.* at 322.

189. *Id.*

190. *Id.*

191. *Id.*

192. *Id.*

193. *Id.* at 323.

194. *Id.*

195. *Id.*

196. *Id.*

197. *Id.* at 324.

198. *Id.* at 324–25.

199. *Id.* at 325.

200. *Id.* at 329–30.

foreclose competition. Besides Nashville Coal, at least 699 competitors sold over 290 million tons of coal on the open market in 1954, of which over 78 million tons were sold to electric utilities.²⁰¹ Coal consumption in Florida and Georgia was increasing.²⁰² And the amount of coal that the Tampa Electric-Nashville Coal contract foreclosed was less than 1%.²⁰³ Given the insignificant percentage of the market foreclosed, the contract's twenty-year duration was not a concern.²⁰⁴

A second example of the numerator bias is where the courts focus primarily on the defendant's market share in a narrowly defined market. We saw this with the district court in *Epic*, which fixated on Apple's market share, in the court's self-constructed market, without considering other factors. To put it bluntly, as economists have long recognized, market share is overhyped: a firm with a 45% share may have more power than one with a 70% share, once the full market context is taken into account.²⁰⁵ Nonetheless, the courts fixate on the numerator (whether the market share is at least 65%) without considering other important factors (which we'll call the denominator).

Consider monopsonies, where there is one primary buyer or employer in town.²⁰⁶ Besides considering the buyer's market share (the numerator), one would also need to consider the denominator, which, as we'll see, entails (1) an upward sloping or somewhat inelastic supply curve in the input market and (2) an inability or unwillingness for new purchasers to enter the market or current purchasers to expand the amount of their purchases in the market.²⁰⁷ This bias can lead to some false positives (when the defendant lacks monopoly or monopsony power despite its high market share) and false negatives (when

201. *Id.* at 332.

202. *Id.*

203. *Id.* at 333.

204. *Id.* at 333–34.

205. Kaplow, *supra* note 1, at 460–61.

206. *Allen v. Dairy Farmers of Am., Inc.*, No. 5:09-CV-230, 2014 WL 2610613, at *8 (D. Vt. June 11, 2014) (“A monopsony may exist when buyers exert unlawful control over where suppliers may sell their products or the prices at which they can sell them.”) (quoting *Weyerhaeuser Co. v. Ross-Simmons Hardwood Lumber Co.*, 549 U.S. 312, 320 (2007) (“[A] monopsony is to the buy side of the market what a monopoly is to the sell side,” and this monopsony is “market power on the buy side of the market.”)); *Sony Elecs., Inc. v. Soundview Techs., Inc.*, 157 F. Supp. 2d 180, 184 (D. Conn. 2001) (explaining that a monopsony is “an arrangement where a buyer uses its market share power to reduce the purchase price of goods” from a seller or sellers).

207. *See infra* note 215.

the courts dismiss monopolization and monopsonization cases where the defendant's share falls below 65%).²⁰⁸

The district court in *Epic* focused on the numerator, namely, Apple's market share. Why? Because many courts impose a threshold market share for finding a prima facie case of monopoly power.²⁰⁹ Generally the defendant has to have at least a 65% market share.²¹⁰ Some courts even demand a market share of 70% or higher for monopoly power.²¹¹ And a market share below 50% is "presumptively insufficient to establish" the requisite level of market power under a § 2 claim.²¹² But other courts rejected these market share cut-offs.²¹³

One reason is that market share by itself can be misleading. First, the market may be defined too narrowly, thus inflating defendant's share and power, or too broadly, thus understating defendant's share and market power. Second, even if the market is properly defined, a high market share may overstate defendant's market power, and a low share may understate defendant's market power. So, in assessing the significance of a high market

208. *Epic Games, Inc. v. Apple Inc.*, 559 F. Supp. 3d 898, 1029 (N.D. Cal. 2021) (citing cases supporting that the threshold of market share for finding a prima facie case of monopoly power "is generally no less than 65% market share"), *aff'd in part, rev'd in part and remanded*, 67 F.4th 946 (9th Cir. 2023).

209. *Epic*, 559 F. Supp. 3d at 1029.

210. *Id.*

211. *Id.* (citing *Kolon Indus. Inc. v. E.I. DuPont de Nemours & Co.*, 748 F.3d 160, 174 (4th Cir. 2014) ("Although there is no fixed percentage market share that conclusively resolves whether monopoly power exists, the Supreme Court has never found a party with less than 75% market share to have monopoly power. And we have observed that when monopolization has been found the defendant controlled seventy to one hundred percent of the relevant market.") (citations omitted)); *Syufy Enters. v. Am. Multicinema, Inc.*, 793 F.2d 990, 995 (9th Cir. 1986) ("[A]s far as we know, neither the Supreme Court nor any other court has ever decided whether a market share as low as 60–69% is sufficient, standing alone, to sustain such a finding.").

212. *Epic*, 559 F. Supp. 3d at 1029 (quoting *Rebel Oil Co., Inc. v. Atl. Richfield Co.*, 51 F.3d 1421, 1438 (9th Cir. 1995)).

213. *US Airways, Inc. v. Sabre Holdings Corp.*, No. 11 Civ. 2725 (LGS), 2022 WL 874945, at *9 (S.D.N.Y. Mar. 24, 2022) (finding that a share of 49% and 52% of the market "is enough to support a finding of monopoly power when combined with other evidence") (citing *Broadway Delivery Corp. v. United Parcel Serv. of Am., Inc.*, 651 F.2d 122, 129 (2d Cir. 1981) ("Sometimes, but not inevitably, it will be useful to suggest that a market share below 50% is rarely evidence of monopoly power, a share between 50% and 70% can occasionally show monopoly power, and a share above 70% is usually strong evidence of monopoly power.")); *Hayden Publ'g Co., Inc. v. Cox Broad. Corp.*, 730 F.2d 64, 69 n.7 (2d Cir. 1984) ("[A] party may have monopoly power in a particular market, even though its market share is less than 50%."); *Sitts v. Dairy Farmers of Am., Inc.*, 417 F. Supp. 3d 433, 477 (D. Vt. 2019) ("[M]arket share in the range of 50% is evidence of monopsony power . . .").

share (which we'll call the numerator), agencies and courts must consider other factors such as entry barriers, contestability of the market, and changing market dynamics. Rather than rely on market share thresholds alone to find monopoly (dominant seller) and monopsony (dominant buyer), courts should consider additional interrelated factors, such as, for monopsony power: (1) "an upward sloping or somewhat inelastic supply curve in the input market"; and (2) "an inability or unwillingness for new purchasers to enter the market or current purchasers to expand the amount of their purchases in the market."²¹⁴

Let us elaborate more, using an example on buyer power, where we can clearly see the formula, which entails a numerator (market share, which courts often cite) but also a denominator (which courts rarely cite).²¹⁵ In explaining why reliance on market share alone can be misleading,²¹⁶ Professors Blair and Harrison apply the following formula to measure the degree of buyer power (i.e., the percentage deviation from the competitive result):

$$\frac{s}{\varepsilon + \eta(1-s)}$$

where s is the buyer's market share, η is the elasticity of demand of fringe buyers, and ε is the overall elasticity of supply.²¹⁷ From this formula, one can see that market share is by itself not determinative of market power. One also needs to consider several interrelated factors (the denominator) that determine the degree of buyer power. In assessing whether the defendant possesses monopsony power, the competition authority and court should consider first its market share, s , namely the percentage share in either dollars or units of defendant's purchases of that input.

Next is the elasticity of fringe demand, η , which is the capacity of alternative buyers to purchase the goods or services "without undue delay, risk,

214. ROGER D. BLAIR & JEFFREY L. HARRISON, *MONOPSONY IN LAW AND ECONOMICS* 60 (2010).

215. For example, in *In re Se. Milk Antitrust Litig.*, the district court noted that the Supreme Court has not adopted "a uniform standard as to a percentage of market power that triggers monopoly (or monopsony) power for purposes of § 2." 801 F. Supp. 2d 705, 725 (E.D. Tenn. 2011). But the standard for monopoly or monopsony power "appears to be very high, and market share is typically a determining factor." *Id.* So, a high market share, in the range of 75% to 80%, is the starting point in assessing defendant's monopoly or monopsony power.

216. BLAIR & HARRISON, *supra* note 212, at 60; Aravind R. Ganesh, *The Right to Food and Buyer Power*, 11 GERMAN L.J. 1190, 1223 (2010); *see also* Cory S. Capps, *Buyer Power in Health Plan Mergers*, 6 J. COMPETITION L. & ECON. 375, 380, 383 (2009) (discussing how assessing buyer power in health insurance cases based on shares of patients may understate the risk of harm, given the difference in reimbursement levels from commercially insured patients and Medicare and Medicaid patients).

217. BLAIR & HARRISON, *supra* note 212, at 58.

or cost.”²¹⁸ The greater the widget sellers’ difficulty in turning to other buyers to purchase their widgets, the greater the defendant’s buyer power.²¹⁹ One factor is entry barriers. If the defendant attempts to exercise monopsony power by offering too low a price, would other buyers likely enter the market to timely defeat the exercise of monopsony power?

Third is the elasticity of supply, ϵ , namely the sellers’ ability and incentive to switch to providing other goods or services. Buyer power depends in part on the captivity of the sellers in producing and selling that product.²²⁰ An apple orchard owner, facing a powerful buyer, may have fewer options than a carrot farmer, who may more readily switch to another crop (such as beets or turnips) the following year. Another factor is whether the seller “invested in dedicated facilities to serve the existing downstream buyer(s), such as rail infrastructure,” which reduces the seller’s ability to switch to other buyers.²²¹

To illustrate, suppose two firms in two different industries: Firm A has a 65% market share; Firm B has a 45% market share. If η and ϵ are the same in both industries, then we can conclude that Firm A enjoys more buyer power in its industry than Firm B in its industry. But if we change the values of η and ϵ , then Firm B, despite its lower market share, can enjoy greater buyer power.

Suppose in Firm A’s industry,

$\eta = 2$, in that the elasticity of demand of the fringe buyers is greater as they are willing to buy more of the sellers’ products should Firm A lower its purchase price, and

218. *Id.* at 58–59; see also Peter C. Carstensen, *Buyer Power, Competition Policy, and Antitrust: The Competitive Effects of Discrimination Among Suppliers*, 53 ANTITRUST BULL. 271, 278 (2008).

219. If “the equation for measuring market power in monopsony is a ‘mirror image’ of the relationships that create market power in a seller[.]” then a “greater availability of substitute buyers indicates a smaller quantum of market power on the part of the buyers in question.” *Todd v. Exxon Corp.*, 275 F.3d 191, 202 (2d Cir. 2001) (citation omitted); *Sprint Nextel Corp. v. AT&T Inc.*, No. 11-1600 (ESH), 2011 WL 5188081 (D.D.C. Nov. 2, 2011).

220. Merger Guidelines, *supra* note 84, at 27 (noting how “labor markets often exhibit high switching costs and search frictions due to the process of finding, applying, interviewing for, and acclimating to a new job”).

221. *Buyer Power in a Regulatory Context: Myth or Reality?*, OXERA (Apr. 23, 2015), <https://www.oxera.com/insights/agenda/articles/buyer-power-in-a-regulatory-context-myth-or-reality-revisited/>; see also *Adams v. Pilgrim’s Pride Corp.*, 2:09-CV-397, 2011 WL 5330301 (E.D. Tex. Sept. 30, 2011) (noting that a “chicken grower without a buyer for its services is more economically vulnerable than an employee of an integrator. The independent grower, unlike an employee who works for a poultry complex, has incurred the expense of constructing or purchasing physical facilities beneficial to only the integrator in exchange for compensation for grower services.”).

$\varepsilon = 2$, in that the sellers, if Firm A lower its price, can more readily switch from producing widgets to other things.

Firm B, despite its lower market share, now enjoys greater buyer power than Firm A if the elasticity of demand of the fringe buyers and the elasticity of supply are lower (e.g., both η and ε equal 1).

Although this issue has come up less frequently, the numerator bias can lead to false negatives. Courts dismiss monopolization cases when the defendant's market share is too low. But a low market share may understate the defendant's market power. Thus, rather than focusing on defendant's market share (which we'll again call the numerator), agencies and courts should also consider other factors, including η and ε (the denominator). As Professor Daniel Crane aptly noted in his work on market power and monopolization, "Determining market power through randomly established market-share cutoffs was already arbitrary in the industrial age, but it is entirely ill fitting as to the digital age."²²²

B. THE NUMERATOR BIAS FOR ECOSYSTEMS

Courts recognize that they must "hew to the fundamental antitrust principle that courts must consider the commercial realities of the industry involved when defining the relevant market."²²³ Courts will be hard-pressed on justifying the current market definition tools' application to ecosystems when the result does not reflect the economic reality. Thus, faced with evidence of monopoly power, they cannot retreat to SSNIP tests. As one court candidly observed, "the law and economics of market power is a confusing mess."²²⁴ Some courts will likely turn away from this mess and recognize the economic reality that some ecosystems can convey monopoly power. These pioneer courts will find that the defendant's ecosystem confers it with monopoly power, without defining a narrow market and calculating defendant's market share in that market.

With this legal precedent, subsequent antitrust plaintiffs will have the incentive to call any interlocking platform an ecosystem. Once labelled an

222. Daniel A. Crane, *Tying Law for the Digital Age*, 99 NOTRE DAME L. REV. 821, 864 (2024).

223. *F.T.C. v. Hackensack Meridian Health, Inc.*, 30 F.4th 160, 169 (3d Cir. 2022).

224. *In re Loestrin 24 Fe Antitrust Litig.*, 433 F. Supp. 3d 274, 299–300 (D.R.I. 2019) (quoting Louis Kaplow, *Why (Ever) Define Markets?*, 124 HARV. L. REV. 437, 440 (2010) ("Defects [of the market definition/market share paradigm] have been identified by courts, enforcement agencies, and both legal and economic commentators. No one believes that the market definition process is flawless or that market power inferences drawn from market shares are uniformly reliable, or even nearly so.")).

ecosystem, the defendant's antitrust risks increase, even if it lacks monopoly power. As the ecosystem designation becomes central, it can play an outsized role (just as market definition does currently) on the antitrust outcome.

The risk is that the courts focus on the numerator, which is the ecosystem itself. For example, suppose tech firm ABC controls many interlocking platforms, products, and services. Internally, company executives refer to the company as controlling an ecosystem. And suppose the ecosystem records billions of dollars annually in revenues. How does the court put these headline numbers in context to avoid the numerator fallacy?

The courts' prior approaches to avoid the numerator bias will not necessarily work for ecosystems. In contrast to *Tampa Electric*, one cannot put an ecosystem's purchases or revenues in context with other ecosystems' purchases or revenues, as that does not illuminate whether the ecosystem has monopoly power. For example, referencing Apple's revenues against the other Big Tech Barons' revenues does not reveal whether Apple derives monopoly power from its ecosystem. It only demonstrates that Apple makes more or less money than other ecosystems.

Nor can one look at entry barriers and contestability for narrow markets to assess the durability of the ecosystem's power. For example, each Big Tech Baron has had its graveyard of product failures (just consider <https://killedbygoogle.com>).²²⁵ Some of the Big Tech Barons' market segments are more contestable than other segments, and the Barons may face more competition in other countries for some of their products and services. So, one cannot inductively conclude that because parts of the ecosystem are contestable, the ecosystem itself is contestable.

Consequently, to address the numerator bias when assessing the ecosystem's power, courts must consider other factors. First is direct evidence of monopoly power and anticompetitive effects. Returning to *Epic*, Apple revealed its market power in forcing app developers, among others, to do things that they would not do in a competitive market. Rather than try to source that market power to a narrow product market, courts should instead inquire whether it arises from the defendant's power and control over the ecosystem itself.

Absent such direct evidence of monopoly power and anticompetitive effects, the agencies and courts should examine (1) indicia of the defendant's

225. A website dedicated to listing products and services owned or bought by Google and later discontinued for various reasons.

power over the ecosystem, and (2) how this control provides the defendant with monopoly power. Some practical indicia include:

- the openness of the ecosystem generally;
- the ecosystem's value chain and the percentage/amount of that value chain that goes to the defendant;
- the defendant's control in defining, enforcing and arbitrating the ecosystem's rules;
- the defendant's control over data, including personal data, circulated within the ecosystem;
- the defendant's control over interoperability and functionality within the ecosystem; and
- the defendant's control over who is admitted to or excluded from the ecosystem.

In addition, the agency and court must consider the disruption of the ecosystem itself, whether (a) *internally*, by other firms' ability and incentive to displace defendant's control over the ecosystem, and (b) *externally*, by dynamic disruption that displaces the current ecosystem with a new value chain.

VII. CONCLUSION

Despite increased political partisanship, antitrust in the United States has witnessed a bipartisan resurgence over the past five years. However, federal and state antitrust agencies are hampered by the U.S. courts, who are mired in market definition exercises. When it comes to ecosystems, the courts currently face two opposing risks:

Failure to update their analysis for ecosystems, or being too slow to implement it, will result in under-enforcement. As many competition officials have candidly admitted, their agencies missed or underappreciated the digital market dynamics that lead to "a winner-take-most-or-all" that have led to the present Big Tech Barons. As the experience with these Barons reflects, antitrust enforcement, if too little (e.g., primarily monetary fines) or too late (e.g., cases that take years to develop and litigate), will not restore competition and innovation levels.²²⁶ There is little doubt modern antitrust enforcement needs to integrate ecosystem analysis.

On the other hand, *the failure to identify limiting principles to ecosystem analysis may lead to numerator bias and possible over-enforcement.* If courts simply accept ecosystems as a source of monopoly power, there is the risk that this simplified view could encourage frivolous private enforcement.

226. EZRACHI & STUCKE, *supra* note 7, at 161–80.

Under both situations, consumers and those that compete within those ecosystems lose out. Thus, courts must reorient their analysis to market realities: if an ecosystem acts like a monopoly, then it likely is a monopoly. But if the ecosystem does not act like a monopoly, it may or may not be one. So, the court must dig further and assess several additional factors, while leaving the SSNIP test behind for toilet paper and other brick-and-mortar products.