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UNITED STATES V. APPLE: A REVIEW OF THE DOJ'S CASE

Abstract: In its recent antitrust *Complaint*, the United States Department of Justice (“DOJ”) alleges that Apple is a monopoly that suppresses competition in the smartphone market through deliberate quality degradation to raise switching costs. In this BULLETIN, we question the economic foundations of the DOJ’s case. First, the DOJ mischaracterizes Apple’s market position and misinterprets the effects of its business practices. Apple’s global market share of less than 30%, and the uniformity of its design choices and pricing strategy, undermines the DOJ’s claim that Apple’s monopoly power and market share drive its design choices. Second, customer satisfaction data, including from sophisticated enterprise users, contradict allegations of quality degradation. Third, Apple’s pricing is stable over time, and its profit margins are comparable to industry standards, refuting claims of price increases and extraordinary profits. Fourth, Apple’s higher U.S. market share is better explained by income levels than anticompetitive practices. Fifth, the economic literature on switching costs reveals ambiguous implications for competition, further weakening the DOJ’s position. Given the allegations contained in the *Complaint*, we conclude that the DOJ’s antitrust case against Apple lacks strong economic support.

I. Introduction

Adding to a lengthening list of antitrust complaints against large technology firms, on March 21, 2024, the United States Department of Justice (“DOJ”)—joined by several state attorneys general—filed an antitrust complaint against Apple (hereinafter the “*Complaint*”), alleging that Apple suppresses competition in the “market for performance smartphones and smartphones

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generally.”¹ The DOJ’s Apple case falls under Section 2 of the Sherman Act, which makes it unlawful for a firm to “monopolize any part of [interstate] trade or commerce.”² A Section 2 case requires proof of 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.”³

In support of its case, the DOJ contends that Apple’s monopoly power in the smartphone market is evidenced by the company’s “substantial and durable market share[,]” and the presence of “significant barriers to entry, network effects, and switching costs.”⁴ The *Complaint* then alleges that “to protect its smartphone monopoly—and the extraordinary profits that monopoly generates—Apple repeatedly chooses to make its products worse for consumers to prevent competition from emerging,” and its design choices “individually and collectively have contributed to Apple’s ability to secure, grow, and maintain its smartphone monopoly by increasing switching costs for users, which leads to higher prices and less innovation for users and developers.”⁵ Apple disputes these allegations, and on August 1, 2024 filed a motion to dismiss, arguing that: (1) the DOJ’s *Complaint* does not allege anticompetitive conduct; (2) the DOJ’s *Complaint* does not allege substantial anticompetitive effects; and (3) the DOJ’s *Complaint* does not allege monopoly power in a relevant market.⁶ On September 12, 2024, the DOJ filed a response to Apple’s motion to dismiss.⁷

The DOJ’s *Complaint* against Apple is not a model of economic clarity; it is essentially an airing of grievances, or, as one analyst describes it, “nerd rage.”⁸ Nonetheless, the DOJ’s *Complaint* makes several claims which should be subject to scrutiny. First, the DOJ’s principal argument is that Apple is a monopoly and, because of its monopoly, it chooses to make its product *worse* to attract customers and deter entry. If you think the DOJ’s argument sounds absurd, then you are not alone. Apple is not a monopoly—it competes with many handset vendors and its global market share is less than 30%. And, if Apple wants to grow and protect its consumer base, then

¹ *United States et al. v. Apple*, Case 2:24-cv-04055, United States District Court for the District of New Jersey (filed March 21, 2024) (available at: <https://www.justice.gov/opa/media/1344546/dl?inline>).

² 15 U.S.C. § 2.

³ See, e.g., *United States v. Grinnell Corp.*, 384 U.S. 563, 570–71 (1966); *United States v. Microsoft*, 253 F.3rd 34, 50 (D.C. Cir.), cert. denied 53 U.S. 952 (2001).

⁴ *Complaint*, supra n. [redacted] at ¶ 180.

⁵ *Id.* at ¶ 10.

⁶ Available at: <https://www.courtlistener.com/docket/68362334/86/1/united-states-of-america-v-apple-inc>.

⁷ Available at <https://www.justice.gov/atr/media/1368741/dl>.

⁸ S. Jeong, *United States v. Apple is Pure Nerd Rage*, THE VERGE (March 22, 2024) (available at: <https://www.theverge.com/2024/3/22/24109168/us-doj-apple-antitrust-complaint-nerd-rage>).

making its products better, not worse, is the economically rational strategy. The DOJ's appeal to second-order effects from the switching cost literature, which offers no clear guidance on competitive effects or consumer welfare, does not help its case. Second, the *Complaint* alleges that Apple's design choices "lead to higher prices" and the company makes "extraordinary profits." But the (real) price of iPhones is virtually unchanged over time, and iPhone prices are essentially identical to comparable smartphones from other vendors. Apple's gross margins are not "extraordinary," and its domestic market share (about 57%) and profit margins can be explained by relative efficiency. Third, the DOJ's theory of the case links Apple's behavior to its market share. Yet Apple's design choices, absent regulatory intervention, are globally identical, as are its prices; neither are related to its market share. Thus, Apple's design choices presumably reflect reasonable business practices compatible with the company's design philosophy, which appears to target elegance, ease-of-use and security. In this POLICY BULLETIN, we address each of these points in more detail.

II. The Overall Case

The DOJ's *Complaint* against Apple may be concisely summarized as follows:

[T]o protect its smartphone monopoly—and the extraordinary profits that monopoly generates—Apple repeatedly chooses to make its products worse for consumers to prevent competition from emerging. *** [Apple] maintain[s] its smartphone monopoly by increasing switching costs for users, which leads to higher prices and less innovation for users and developers.⁹

The core of the DOJ's case is that Apple chooses to make its product worse and set high prices so that it can retain customers and deter entry. It is an implausible argument.

First, Apple is not a monopolist. Today, Apple competes with many smartphone manufacturers. Apple's market share (based on devices) in the U.S. is about 57% and globally it is about 27%.¹⁰ GSMA, a global trade group for the mobile ecosystem, provides a list of 125 manufacturers of mobile devices.¹¹ And, from a sample of 36 nations, StatCounter reports market share data for 70 different handset vendors. The handset market is competitive, and the large count of device vendors, many with small shares, implies the lack of meaningful entry barriers. As observed by the Ninth Circuit in *Epic Games*, "[f]or antitrust purposes, market power is generally inferred from the defendant's possession of a high market share and the existence of

⁹ *Complaint*, *supra* n. 1 at ¶ 10.

¹⁰ Data available at: <http://www.statcounter.com>, among other sources.

¹¹ <https://m.gsmarena.com/makers.php3>.

significant barriers to entry,”¹² and the recent District Court ruling in the Google antitrust litigation held that a market share below 50% is rarely evidence of monopoly power, while a share between 50% and 70% can occasionally suggest monopoly power.¹³ With a global market share of 30%, and even a U.S. market share of 57%, a monopoly claim is a tough sell.¹⁴

Second, reducing quality in the face of actual competition invites the loss of market share. If Apple wants to attract customers, then a better strategy is for Apple to make superior products. It appears to be doing exactly that. Surveys of user satisfaction show Apple offers among the best – if not the best – smartphones. Table 1 summarizes the survey results from the American Customer Satisfaction Index (“ACSI”) from 2023 and 2024 and Statista from 2022. Apple ranks best among the top brands.¹⁵ Likewise, a survey from 2021 indicates 91.9% of iPhone users intend to buy another iPhone, with only 8.1% expressing an intent to switch to a different brand, while 26% of Samsung phone users intend to switch to a different brand.¹⁶ The DOJ’s claim that Apple has lowered quality in some bizarre anticompetitive strategy conflicts with actual user experience. Of customers that have switched from iOS to Android (or vice versa), 47% of Android-to-Apple switchers say Apple provides a better user experience, while only 30% of Apple-to-Android users say Android provides a better experience.¹⁷

¹² *Epic Games, Inc. v. Apple, Inc.*, 67 F.4th 946, 983 (9th Cir. 2023).

¹³ *United States of America et al., v. Google LLC*, Case No. 20-cv-3010 (APM), United States District Court for the District of Columbia, MEMORANDUM OPINION (August 5, 2024); also see, e.g., *Broadway Delivery Corp. v. United Parcel Serv. of Am., Inc.*, 651 F.2d 122, 129 (2d Cir. 1981).

¹⁴ See, e.g., D.E. Lazaroff, *Entry Barriers and Contemporary Antitrust Litigation*, 7 BUSINESS LAW JOURNAL (2006) (available at: <https://blj.ucdavis.edu/archives/7/1/entry-barriers-and-contemporary-antitrust-litigation>).

¹⁵ *Comprehensive Benchmarking for Smartphone Manufacturers*, American Customer Satisfaction Index (2024) (available at: <https://theacsi.org/industries/manufacturing/cell-phones>); F. Richter, *How Happy and Loyal are U.S. Smartphone Users*, STATISTA (June 28, 2022) (available at: <https://www.statista.com/chart/27694/satisfaction-and-brand-loyalty-among-us-smartphone-users>).

¹⁶ A. Mahipal, *Report: Brand loyalty at an all-time high of 92% for Apple as Android brands take a dive*, SellCell.com (March 16, 2021) (available at: <https://www.sellcell.com/blog/cell-phone-brand-loyalty-2021>). (The survey included more than 5000 US-based smartphone users, aged 18 years or older, with any of the five major smartphone brands, including Apple, Samsung, Google, LG, and Motorola.)

¹⁷ *Android vs iOS Users: A Detailed Behavioral Comparison*, appmysite.com (February 14, 2024) (available at: <https://www.appmysite.com/blog/android-vs-ios-users-a-detailed-behavioural-comparison>).

Table 1. ACSI Satisfaction Survey

Brand	ACSI		Statista
	2023	2024	2022
Apple	81	82	92
Samsung	80	82	91
Google	78	77	85
Motorola (Lenovo)	75	77	81
All Others	71	72	79

The *Complaint* also alleges that “Apple is knowingly and deliberately degrading quality, privacy, and security for its users.”¹⁸ Yet, Apple claims a key factor in its design choices is quality, privacy and security. So, who is right? In a practical sense, the competitive effects of switching costs are likely to depend on the sophistication of buyers and whether any restrictions are “generally known.”¹⁹ This circumstance applies with force in the Apple case under consideration here. The most sophisticated users are surely enterprise users. Buyers in this realm fully understand the implications of any device or contract feature that gives rise to exploitable switching costs. So, how do these sophisticated buyers respond to Apple’s alleged switching cost strategy? They buy Apple phones at high rates: Survey evidence of enterprise managers, who are very interested in privacy and security, side with Apple.²⁰ The survey finds that 56% of enterprise users say that Apple devices are better than those of its competitors, while only 15% say other devices are better than Apple’s products—a ratio of nearly 4-to-1. As for security, 76% of enterprise users say Apple devices are more secure than either Windows or Android devices, with only 7% saying they are less secure and only 17% saying there is no difference. Consumers likewise list privacy and security as a primary reason they prefer iPhones.²¹

Third, although most users get new phones on about a three-year cycle, the iPhone has a longer service life and thus retains some value at trade-in. Again, the claim Apple has degraded

¹⁸ *Complaint, supra* n. 1 at ¶ 85.

¹⁹ See generally, *Epic Games, supra* n. 12, 67 F.4th at 977; see also *Eastman Kodak Co. v. Image Tech. Servs., Inc.*, 504 U.S. 451, 477 (1992).

²⁰ *Survey: Why Apple is Booming in the Enterprise*, Kandji (August 29, 2023) (available at: [https://www.kandji.io/blog/apple-enterprise-survey-2023#:~:text=Link%20to%20this%20section%20Apple%20Enterprise%20Benefits&text=By%20a%20wide%20margin%20\(56,reason%20they're%20adopting%20Apple\)](https://www.kandji.io/blog/apple-enterprise-survey-2023#:~:text=Link%20to%20this%20section%20Apple%20Enterprise%20Benefits&text=By%20a%20wide%20margin%20(56,reason%20they're%20adopting%20Apple).)).

²¹ K. Bruning, *The Top 10 Reasons Why People Say They Prefer iPhone Over Android*, SLASHGEAR (November 27, 2023) (available at: <https://www.slashgear.com/1455500/reasons-people-prefer-iphone-over-android/>); M. Diaz, *iPhone Users Keep Their Phones Longer Than Android Owners*, ZDNET (October 27, 2023) (available at: <https://www.zdnet.com/article/iphone-users-keep-their-phones-longer-than-android-owners/>).

the value of their phones to entrap customers finds no support: Apple phones, on average, last longer than their rivals.²² As with the proverbial lightbulb, a device that renders even identical levels of service, but for longer than another, will be proportionally more valuable.

Fourth, to support its case, the DOJ resorts to a switching cost argument, claiming the alleged quality degradations of Apple's products "increase[s] switching cost for users."²³ A "switching cost" is a cost that a customer must pay to use a product different from the one previously selected. Switching costs are ubiquitous in the economy—they are not unique to the mobile marketplace. While the notion that switching costs, whether incidental or intentional, can affect the level of competitive pressure has by now accrued a large theoretical literature, this literature offers no apparent help for the DOJ's case.

The analysis of switching costs necessarily requires consideration of markets over time, the dynamics of consumer behavior, consumer sophistication, and the presence of price discrimination, horizontal and vertical product differentiation, learning costs, and so forth. The basic idea is that the presence of a switching cost introduces a pricing advantage to the incumbent against a rival seeking to steal a customer. The rival must set prices sufficiently low to overcome the cost the consumer incurs by switching. If the products were otherwise identical, then the rival would need to underprice the incumbent by the full amount of the switching cost. Switching costs may or may not represent real social costs: for example, early termination of a contract might require a payment to the service provider, which is a transfer.²⁴

This theoretical literature does not provide particularly clear guidance for antitrust analysis. Given the complexity of analyzing these sorts of intertemporal problems, these models are extreme abstractions of reality and offer inconsistent and opposing predictions. In some models, switching costs make the market less competitive and lead to higher prices, while in others such costs make the market more competitive and lead to lower prices.²⁵ Perhaps such contradictions explain why the DOJ's *Complaint* offers little more than a list of grievances instead of a detailed economic analysis of the mobile marketplace.

A search of the literature for a model that would support the DOJ's position proves unfruitful. Still, at the risk of some over-simplification, several observations can be made that are relevant to

²² A. Siddiqui, *How Long Do iPhones Last? How Long Should You Use Your iPhone For?* ANDROID AUTHORITY (August 26, 2024) (available at: <https://www.androidauthority.com/how-long-do-iphones-last-3359069>).

²³ *Complaint*, *supra* n. 1 at ¶ 10.

²⁴ C.f., G.S. Ford and L.J. Spiwak, *FCC Overreach in Mobile Device Regulation? A Legal and Economic Analysis*, PHOENIX CENTER POLICY BULLETIN NO. 69 (September 2024) (available at: <https://phoenix-center.org/PolicyBulletin/PCPB69Final.pdf>).

²⁵ N. Fabra and A. Garcia, *Market Structure and the Competitive Effects of Switching Costs*, 126 ECONOMICS LETTERS 150-155 (2015).

the Apple antitrust litigation. First, and importantly, the expected effects of switching costs when one firm is identified as dominant depend, *inter alia*, on the firm's market share—the incentives of a dominant firm to react to competitive pressures varies depending on how large is its embedded “clientele.” In particular, and consistent with intuition in the simplest cases, higher switching costs lead to higher prices by the dominant firm when it has a high market share. When switching costs are very high and the dominant firm has a very large share, the most profitable strategy is to capitalize on current customers, rather than seek to win new ones—a “fat cat” strategy.²⁶ This “fat cat” scenario appears most consistent with the DOJ's argument.

Yet, a “fat cat” strategy is unhelpful to the DOJ's case. As noted by Klemperer and Farrell (2006), a “fat cat” effect encourages entry when the incumbent's most profitable strategy is to exploit tied customers.²⁷ In effect, by reducing quality or charging higher prices, the incumbent cedes market share to entrants: “incumbent firms' desire to extract profits from their old customers creates a price umbrella under which entrants can profitably win new unattached (or low switching cost) customers.”²⁸ Thus, making its products worse would not allow Apple to attract new customers, even if existing customers face high switching costs, the latter being an indefensible assumption since consumers replace their smartphones about every three years.

Put simply, the DOJ's argument that Apple's success rides on reducing the quality, and increasing the prices, of its devices to attract new customers and deter entry is untenable. The DOJ will find no solace from the theoretical literature on switching costs—it does not provide useful guidance to antitrust authorities tasked with overseeing implicated markets. And the DOJ's argument that Apple reduces quality to raise switching costs to deter entry conflicts with the “fat cat” effect. Besides, Apple is not a monopolist seeking to deter entry—the company competes with many successful rivals, as reflected in a global market share of less than 30%. In fact, the *Complaint's* facts contradict the *Complaint's* claim, since younger users, many unattached to a brand, prefer iPhones, which is improbable if iPhones were of lower quality or excessively costly.²⁹

²⁶ The “fat cat” effect, often mentioned in the switching cost literature, originated in D. Fudenberg and J. Tirole, *The Fat-Cat Effect, The Puppy-Dog Ploy, and the Lean and Hungry Look*, 74 AMERICAN ECONOMIC REVIEW: PAPERS AND PROCEEDINGS 361-366 (1984).

²⁷ J. Farrell and P. Klemperer, *Coordination and Lock-In: Competition with Switching Costs and Network Effects*, Working Paper (May 2006) (available at: <https://ssrn.com/abstract=917785>) (the published version can be found at 3 HANDBOOK OF INDUSTRIAL ORGANIZATION 1967-2072 (2017)).

²⁸ *Id.* at p. 35.

²⁹ *Complaint*, *supra* n. 1 at ¶ 23.

III. Apple's Extraordinary Profits?

The DOJ's *Complaint* alleges that Apple is a monopoly due to its market share and that its design choices aim to protect "the extraordinary profits that monopoly generates," noting that Apple is "routinely commanding profit margins of more than 30 percent on devices alone," and that its margins are "higher than its smartphone competitors."³⁰ There are (at least) two problems with this argument.

First, consider the equilibrium results from a simple Cournot Model of Competition. If one firm is more efficient than its rivals, then that firm's market share and profit margins are higher than its rivals. No anticompetitive behavior is required for that result—it is the consequence of relative efficiency. Efficiency is not an antitrust violation. In the Cournot Model, the prices of rivals are the same (there is a single market price), so it is sensible to compare iPhone prices to those of comparable smartphones. Time series data on the most current iPhone and the comparable Samsung (S series) smartphone prices in the U.S. are obtained for years 2012 through 2023.³¹ Figure 1 illustrates the trend in base level iPhone and Samsung smartphone prices in constant (2023) dollars.

³⁰ *Id.* at ¶ 20.

³¹ Data available at: <https://www.perfectrec.com/posts/samsung-galaxy-price-history>;
<https://www.perfectrec.com/posts/iPhone15-price>.

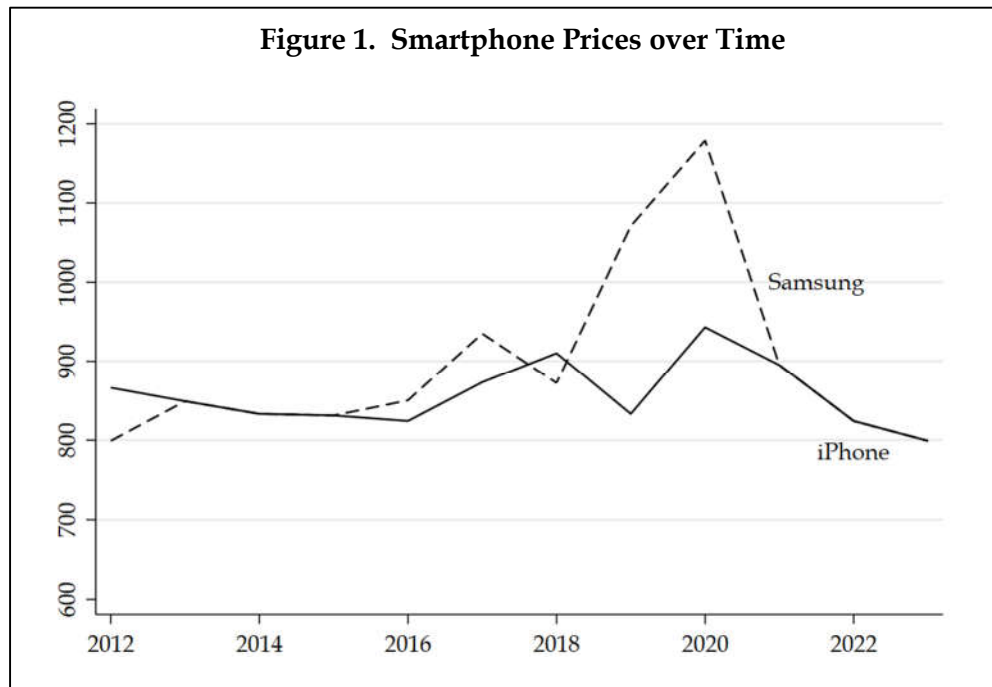


Figure 1 offers (at least) two key insights. The DOJ’s argument that Apple is engaging in anticompetitive conduct to raise prices is unsupported by the data. Base level iPhone prices have not increased over time and have been quite stable, despite many costly technological advances. Also, the prices for comparable devices from Samsung have closely followed iPhone prices except in years 2019 and 2020, when Samsung’s base level phones (with the release of the S10 and S20) rose sharply.³² For the most part, the prices are the same, and a larger profit margin for Apple suggests only that Apple is more efficient than Samsung, an advantage likewise supported by Samsung’s other financial troubles.³³

The DOJ’s *Complaint* also claims that Apple is not “offering lower smartphone prices.”³⁴ In Table 2, the current prices of the four most popular smartphone brands are summarized across

³² G. Kelley, *Galaxy S10 Leak Details Samsung’s Prices Increases*, FORBES (February 12, 2019) (available at: <https://www.forbes.com/sites/gordonkelly/2019/02/10/samsung-galaxy-s10-price-cost-release-date-upgrade-galaxy-s9-note9-s8>); R. Amadeo, *Galaxy S10+ review: Too Many Compromises for the Sky-High Price*, ARSTECHNICA (April 22, 2019).

³³ I. Bonet Bailén, *A Perfect Storm Hits Samsung*, EL PAÍS (January 31, 2024) (available at: <https://english.elpais.com/economy-and-business/2024-01-31/a-perfect-storm-hits-samsung.html>).

³⁴ *Complaint*, *supra* n. 1 at p. 3.

models presently available.³⁵ Motorola phones are generally regarded as less capable smartphones and lack some basic functionality found in the better brands, fewer memory options, and sub-standard cameras.³⁶

Table 2. Current iPhone and Samsung Prices

Brand, Model	64GB	128Gb	256GB	512GB	1TB
Apple					
iPhone SE	429	479	579	...	...
iPhone 13	...	499	699	899	...
iPhone 14	...	699	799	999	...
iPhone 14 Plus	...	799	899	1,099	...
iPhone 15	...	799	899	1,099	...
iPhone 15 Plus	...	899	999	1,199	...
iPhone 15 Pro	...	999	1,099	1,299	1,499
iPhone 15 Pro Max	1,199	1,399	1,599
Samsung					
S23	...	700	760	...	...
S23+	1,000	...	...
S23 Ultra	1,300	1,420	1,660
S24	...	800	860	...	...
S24+	1,000	1,200	...
S24 Ultra	1,300	1,420	1,660
Z Flip 6	1,100	1,020*	...
Z Fold 6	1,900	1,900*	2,020*
Google					
Pixel 8a	...	499	559	...	...
Pixel 8	...	699	759	...	...
Pixel 8 Pro	...	999	1,059	1,179	1,399
Pixel 9	...	799	899	...	...
Pixel 9 Pro Fold	1,799	1,919	...
Pixel 9 Pro	...	999	1,099	1,219	1,449
Pixel 9 Pro XL	...	1,099	1,199	1,319	1,549
Motorola					
Edge	450*	...	...
Razr	700	...	...
Razr +	1,000	...	...
Moto G	...	300	...	...	...
Moto G Stylus	350*	...	...

Source: apple.com, samsung.com, google.com, Motorola.com. Samsung and Motorola prices rounded one-penny to nearest dollar.

* Discounted 5-20% at the time the data was collected (September 2024).

The price range is wide across model variants and characteristics. Apple prices are the same or lower than the flagship Samsung models (also see Figure 1). A sensible comparison of devices

³⁵ Share data available at: <https://www.statista.com/forecasts/997241/most-popular-smartphone-brands-in-the-us>.

³⁶ J. Chokkattu, *Which Motorola Phone Should You Buy?*, WIRED (July 18, 2024) (available at: <https://www.wired.com/story/best-motorola-phones>).

is the iPhone 15 (\$899), Samsung's S24 (\$849), and Google's Pixel 9 (\$899), all of which have comparable functionality and nearly identical prices. Apple's smartphone prices are unremarkable relative to the most popular brands. Apple also offers lower-priced handsets (the Phone SE) with prices comparable to these rivals. Also, in its *Complaint*, the DOJ laments that "Apple charges as much as \$1,599 for an iPhone and earns high margins on each one, more than double those of others in the industry."³⁷ Yet, the *Complaint* makes no mention that Samsung charges as much as \$2,020 for a phone (a clear case of cherry picking by the DOJ), and the agency fails to mention that Apple's prices are nearly the same as other vendors' prices for a comparable device.

Second, the *Complaint's* observes that Apple "command[s] profit margins of more than 30 percent on devices alone." A 30% margin is not remarkable. From Apple's Form 10-K over the years 2021-2023, the company's product gross margin was 36%. Data on industry gross profit margins for 94 industries for years 2021-2023 show that gross margins averaged 39.3% with a 95% confidence interval of 37.1% to 41.4%.³⁸ For industries comparable to Apple's product portfolio, the mean is 65.5% with a 95% confidence interval of 58.8% to 72.3%.³⁹ Average margins in the Electronics, Computers, and Software industries averaged 65%. Regulated utilities have higher margins than does Apple (47.1%), and margins in the highly competitive restaurant industry are comparable (31.3%). The retail furniture business has gross margins 43%, and Clorox, a seller of mostly commodities, has a gross profit margin of 43%.⁴⁰

Gross margins reflect costs, demand, product mixes, accounting standards, and so forth. Thus, they must be interpreted carefully. Still, there is no evidence to suggest that Apple's margins are "extraordinary," and a 36% gross margin is not remarkable by any reasonable standard. Apple's relatively high market share (at least in the U.S.) and its higher margins can be explained by relative efficiency – efficiencies that may reflect its design choices.

IV. Market Share and Behavior

The DOJ's argument that Apple exploits its large market share to increase switching cost by degrading quality is suspect on several grounds. Apple's U.S. market share of devices is about

³⁷ *Complaint*, *supra* n. 1 at ¶ 5.

³⁸ Data available at: https://pages.stern.nyu.edu/~adamodar/New_Home_Page/datacurrent.html; https://pages.stern.nyu.edu/~adamodar/New_Home_Page/dataarchived.html (Operating and Net Margins by Industry).

³⁹ These industries include: Software, Electronics, Entertainment, Telecommunications, Computers, Retail (General), Publishing, Information, and Advertising.

⁴⁰ *Five Year Trends, Benchmarks, Furniture Stores*, The Retail Owners Institute (last visited September 18, 2024) (available at: <https://retailowner.com/Benchmarks/Furniture-Interiors/Furniture-Stores#>); Clorox Financials available at: <https://finance.yahoo.com/quote/CLX/financials>.

57%, but its global market share is only 27%.⁴¹ Certainly, Apple is not “dominant” in the global market. For the DOJ’s argument to hold water, Apple’s design choices must be correlated with its market share, and its share varies among nations (less than 10% in some nations). Yet, absent regulatory intervention (mainly in the European Union), Apple’s design choices are uniform among nations and, consequently, are unrelated to its market share, which varies widely among nations.

This same uniform treatment is seen in Apple’s prices, based on price data for nine iPhone models in 36 countries for years 2022-2024.⁴² Several relevant questions may be considered using these data. First, are iPhone prices higher in the U.S. given Apple’s relatively high market share? The answer is “no.” Prices in the U.S. are about 6% lower than in other nations ($t = -8.51$, $\text{prob} < 0.001$). Second, are iPhone prices correlated with Apple’s market share? Again, the answer is “no.” Regressing the natural log of price on Apple’s market share (and model fixed effects) produces a coefficient of -0.0011 ($t = -0.92$), so iPhone prices are not higher when Apple’s market share is high, and if anything, are lower.⁴³ Third, are iPhone prices related to HHI based on device manufacturer market shares? Once more the answer is “no.” The coefficient on the HHI is -0.000013 ($t = -0.73$); iPhone prices are unrelated to market concentration. Table 3 summarizes the prices of three iPhone models across HHI groups. For none of these iPhone models is there is any meaningful patterns in prices (consistent with the regression analysis).

Table 3. iPhone Prices by HHI

HHI	iPhone 15 (256GB)	iPhone 15 (256GB)	iPhone SE (256GB)
≤1000	\$817	\$924	\$607
1000-2000	\$881	\$982	\$650
2000-3000	\$859	\$965	\$618
3000-4000	\$815	\$910	\$570
>5000	\$844	\$953	\$599

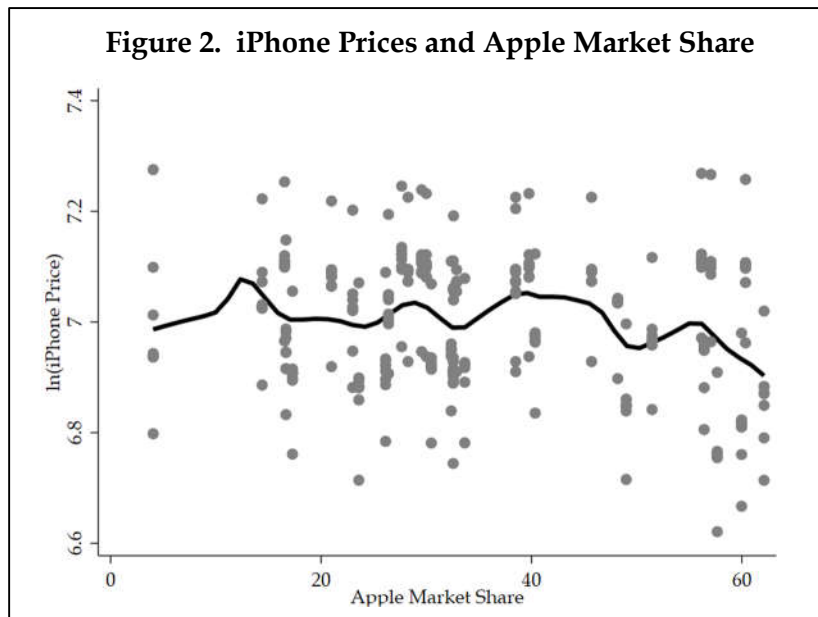
We can visualize the relationship between prices and Apple’s market share using semiparametric regression. The dependent variable is the natural log of price (adjusted for value-added taxes), and the covariates are indicators for the iPhone models. Apple’s market share

⁴¹ Data from <https://www.statcounter.com>.

⁴² Data available at: <https://iphone-worldwide.com/data>. The full sample included 38 nations, but prices in Turkey is excluded, where prices and inflation are exceptionally high. Income data for Taiwan was unavailable. The prices are adjusted for the value-added tax (“VAT”) in each nation, since the tax affects posted prices. This adjustment, as well as the currency conversion to U.S. dollars, may introduce some noise into the prices.

⁴³ Standard errors are clustered on the nation.

enters non-parametrically. Figure 2 illustrates the results. The non-parametric fit is essentially flat, perhaps tailing off very high market shares.



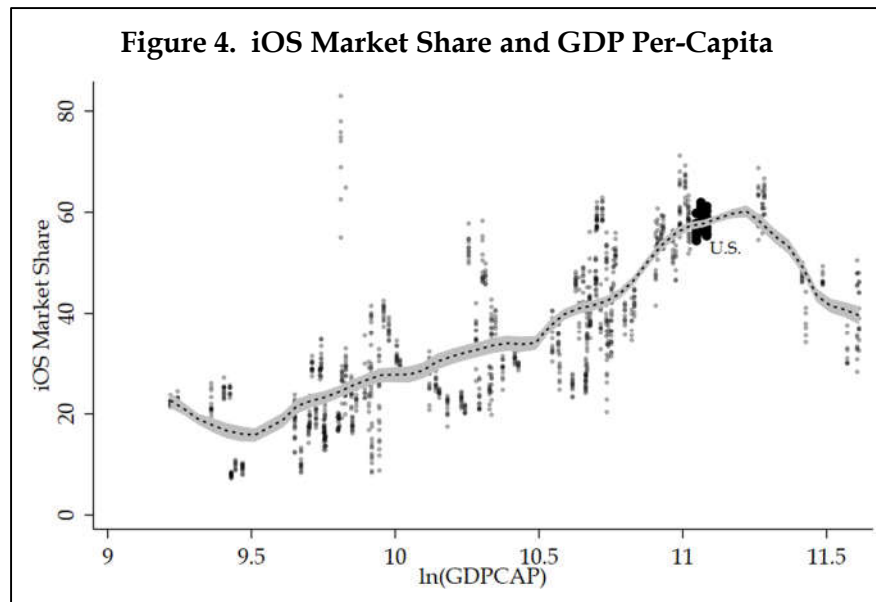
Generally, we may conclude that Apple’s market share and market concentration have no effect on design choices or prices. Design choices, absent regulation, are identical across nations, and thus have no relation to market share. Prices too are unrelated to market share or concentration. The United States, with its relatively higher market share, is treated no differently than are other nations, exposing a weakness in the DOJ *Complaint’s* narrative.

V. Explaining the U.S. Market Share

It might be claimed that Apple’s market share in the U.S. is the nefarious consequence of its design choices. There are better explanations. Survey evidence suggests that iPhones are preferred by consumers with higher incomes.⁴⁴ Noting the differences in the U.S. and global market shares, Professor Herbert Hovenkamp observes: “In the U.S., a wealthier country, a higher

⁴⁴ See, e.g., *Android vs iPhone Users: A Detailed Comparison in 2024*, DESIGNVELOPER (March 25, 2024) (available at: <https://www.designveloper.com/blog/android-vs-iphone-users>). The average income of iPhone users is \$53,251 versus Android users is \$37,040.

percentage of people choose the iPhone. That may be a problem for the government if the iPhone/Android balance is a simple exercise of unconstrained consumer preference.”⁴⁵



In Figure 4, the relationship between the iOS market share for 58 nations and the natural log of GDP-per-capita for years 2018-2023 is illustrated, including a Lowess fit (with a 95% confidence interval). Observations for the U.S. are marked and indicated in bold. Plainly, iOS market share tends to rise in income. Apple’s relatively high market share in the U.S. (57% versus the global share of less than 30%) is fully explained by the U.S.’s relatively high income; it is not the result of some anticompetitive strategy by Apple to raise switching costs in the U.S. market. It is consumers’ choices, not some anticompetitive strategy, that explains Apple’s market share. As Hovenkamp observes, “this may be a problem for the government.”⁴⁶

VI. Conclusion

In its antitrust *Complaint* against Apple, the Department of Justice alleges that Apple suppresses competition in the smartphone market by deliberately degrading product quality to increase switching costs to maintain monopoly power. Here, we argue that the DOJ’s position is undermined by several key factors. First, Apple is not a monopoly, but competes against many

⁴⁵ H. Hovenkamp, *Consumer Welfare Will Determine the Outcome of the Apple Lawsuit*, PROMARKET.ORG (April 2, 2024) (available at: <https://www.promarket.org/2024/04/02/consumer-welfare-will-determine-the-outcome-of-the-apple-lawsuit/>).

⁴⁶ *Id.*

established mobile device manufacturers, with a global market share of less than 30%. Second, degrading product quality as a means of customer retention is counterintuitive and is belied by high customer satisfaction ratings for Apple products, including by sophisticated enterprise users. Third, the DOJ's claim regarding Apple's "extraordinary profits" is inconsistent with the evidence – the company's profit margins are not unusually high compared to industry averages. Fourth, Apple's design choices, absent regulatory intervention, and pricing strategies are uniform globally, contradicting the DOJ's theory that these practices are correlated with market share. Apple's higher U.S. market share is more plausibly explained by higher income levels rather than anticompetitive practices. Thus, the DOJ's case is little more than an airing of grievances, lacking any robust economic support. The Apple case appears to be just another ill-supported attempt by the U.S. antitrust agencies to condemn market success – a disturbing trend in modern antitrust enforcement.

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