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White Paper

April 19, 2021

# What Drives and Defines Digital Platform Power?

A framework, with an illustration of App dynamics in the Apple Ecosystem

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## Executive Summary

The seemingly inexorable growth of the leading platform businesses coupled with the growing wave of complaints about platform businesses' anti-competitive behavior has drawn attention to the conditions and strategies that give rise to dominance in digital marketplaces. A platform can impose itself as a necessary trading partner, and become a gatekeeper between its consumers and sellers, when these participants do not have alternative channels in which to transact and cannot viably opt-out altogether. Such conditions preclude competition, allowing the dominant platform to exclude sellers or rival platforms from providing certain services and to impose an excessive charge. The harm flows to consumers in the form of higher prices as well as lower quality, less diverse, and less innovative products.

The growing body of work on the drivers of value and competitive advantage in platform businesses, coupled with similar research on the conditions that leave platform participants (buyers and sellers) without alternative channels in which to transact, can be distilled into practical criteria for identifying platform power in major digital marketplaces. The criteria include: (1) Does the platform have exclusive access to a large body of consumers? (2) Is it difficult for users to multi-home or switch platforms? (3) Can sellers be replaced without substantial harm to the platform? (4) Do users benefit from network effects, requiring sellers to multi-home across platforms? (5) Does the platform have an established set of buyers and sellers, creating an effective entry barrier to rival platforms?

These criteria can be used to evaluate competition in platform marketplaces and identify actors that, due to their gatekeeper power, should be held to a heightened standard of conduct and duty of care. When applying the criteria to several platform marketplaces, I find that in PC gaming, livestreaming, and ridesharing, the inability of platforms to control access to consumers and the prevalence of multi-homing by consumers, among other factors, limit the power of the leading platforms. Not surprisingly, platforms in these three markets face competitive pressures on their fees and services and are limited in their ability to engage in conduct designed to strengthen their market power.

In contrast, the iPhone platform—including the device, operating system, and app store—does control developers' access to consumers. Today, most consumers already own a smartphone. As such, consumers are not making a completely new buying decision, but are typically upgrading their device while continuing to leverage the same operating system and associated apps. Users of iPhones tend to be locked-in to the iPhone family and iOS due to the device's cost, the difficulty in learning a new operating system, and its "stickiness" associated with the cost of and limitations to migrating app purchases and user data to Android due to Apple's restrictions. Although web apps can be accessed on mobile devices outside of the App Store, they are not a substitute for apps that are "native" to (i.e., purpose-built for) the mobile operating system because they are generally inferior in features, functionality, and performance. Developers, in turn, have no viable alternative to the App Store on iPhones and, for the success of their business, often must offer services in the App Store to reach iPhone users and increase the value they deliver to Android users. Thus, developers must tolerate Apple's fees and terms to access consumers. This is true for even the most powerful apps, such as the dating service Tinder.

I further investigate how Apple behaves given its dominant market position. I find direct evidence that Apple exercises its platform power and structural advantages to impose limits to competition—in particular, in distribution and payment options—and extract a (30%) commission that is excessive for some apps. This results in higher prices and a reduction in quality, diversity, and innovation for consumers and, in a vicious circle, puts Apple in a position to strengthen its market power.

# 1. What Shapes and Defines Platform Dominance

## 1.1 The Broader Context: Responding to the Growth of Platform Firms

The last few years have seen an explosive growth in the power of platform-based firms (Cusumano, Gawer & Yoffie, 2019), which now occupy four of the top five spots in terms of market capitalization worldwide.<sup>1</sup>

Platform firms have grown even further through the COVID-19 crisis, as we manage our personal and professional world ever more exclusively on our smart devices and as firms further change their business models to accommodate and engage with these new ways of organizing (Jacobides & Reeves, 2020). The question is, should we be concerned with this development and with the growth in market capitalization and margin increase of these firms?

While some pundits have asserted that this all comes down to the prowess of these trailblazers (e.g., Bitton & Lewis, 2020; Voelcker & Baker, 2020), there is growing unease among academics about the rise of platform dominance and abuse. Their concern lies with our ability to identify and address how platform firms restrict competition (Parker et al., 2000) and potentially limit innovation (Scott Morton et al., 2019), to the detriment of final consumers and firms that participate in the ecosystems these platform giants orchestrate (Jacobides, Cennamo & Gawer, 2018).<sup>2</sup> Academics are joined by a growing chorus of parties alleging harm—Apple alone is facing legal battles from Epic in the US and from Spotify in the EU regarding the App Store’s exclusionary conduct and the (30%) commission it enables.<sup>3</sup>

Regulators have raised questions concerning the efficacy of existing tools for competition analysis, which tend to apply market definition narrowly, one market at a time, and thereby miss the exercise of dominance by platform giants that harness their power across markets (Khan, 2017; Dolmans & Pesch, 2019). Ecosystems can be regarded as communities of firms that collectively—and, when healthy, collaboratively—produce a good. Production is characterized by “supermodular complementarities that are non-generic, requiring the creation of specific structures of relationships” to create value (Jacobides et al, 2018). In other words, as the players in these communities start to rely heavily on specific interactions with each other in order to realize the greater benefit to the whole community and for the consumer, power can arise as much from dominance in a given market as from the ties between markets.

Major studies calling for a rethink of the regulatory apparatus have been undertaken in the UK (UK Digital Competition Expert Panel, 2019), the EU (Cremer et al., 2019), the US, and many

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<sup>1</sup> “The 100 Largest Companies in the World by Market Capitalization in 2020.” Statista.  
<https://www.statista.com/statistics/263264/top-companies-in-the-world-by-market-capitalization/>.

<sup>2</sup> This paper looks narrowly at the (anti)competitive effects of platform firms, without entering into the discussion of broader implications to broader societal issues, like issues around platform-based social media and the risk of undermining the democratic process (Cohen, 2019), enhancing misinformation and increasing polarization (Del Vicario, 2016), or drawing on dependencies that ultimately reduce consumer welfare while increasing consumption (Alcott, 2020; Zuboff, 2019).

<sup>3</sup> “The 5 best zingers from Epic’s lawsuit against Apple.” *Fortune*, August 14, 2020.  
<https://fortune.com/2020/08/14/fortnite-apple-epic-games-lawsuit-app-store/>. “Spotify Targets Apple with European Commission Complaint About Music Service, Alleging “Unfair Advantage” Due to Fees for Streaming,” *Deadline*, March 13, 2019. <https://deadline.com/2019/03/spotify-sues-apple-in-europe-over-music-service-alleging-unfair-advantage-due-to-fees-for-streaming-1202574949/>.

other countries (see, e.g., Lianos & Ivanov, 2019, on the BRICS, and Kerber, 2019, on Germany and Australia as well). For example, the UK's competition authority, following an extensive study, has recommended more robust reforms designed to ensure the principles of "fair trading," "open choices," and "trust and transparency" are protected in digital marketplaces (Competition and Markets Authority, 2020: 322). Collectively, the proposed rules aim to reduce the opportunity for platforms to manipulate trading terms, self-preference, or engineer information asymmetries. In the US, the House Judiciary Antitrust Subcommittee suggested similarly comprehensive reforms to combat the abuse of market power. Following its investigation into the state of competition in the digital economy, the body recommended: tighter guidelines to prevent mergers and acquisitions that could reduce competition, requirements for interoperability and data portability, restrictions against tying, and controls against self-preferencing.<sup>4</sup>

New laws are emerging to tackle the power of platform businesses, and the EU seems to be at the forefront at these efforts, with a number of new regulatory initiatives and consultations in 2020. These include the New Competition Tool, an update to its Platform-to-Business regulation, the Market Definition Consultation, and the workstreams around the Digital Services Act, including determining regulatory instruments for the large online platforms that depend on network effects and can act as gatekeepers in the EU.

Above all, the new wave of regulation includes the Digital Markets Act (DMA), a proposal released in December 2020 by the EU that is designed to address gatekeepers head-on. The DMA focuses on limiting barriers to entry for new platform competitors and curbing such platforms' ability to abuse dependent businesses and consumers.<sup>5</sup> As proposed, the regulation would initially target firms providing "core platform services," which include online marketplaces, app stores, social networks, web browsers, online search engines, operating systems, and cloud computing services. The draft regulation includes quantitative criteria around levels of revenue, market capitalization, and users for designating a core platform service as a gatekeeper.<sup>6</sup> These quantitative thresholds would apply *ex ante*, meaning the platforms that qualify would be subject to the DMA's rules irrespective of evidence of harm in the marketplace. An initial estimate suggests that the biggest of Big Tech—the "GAFAM" players of Google, Apple, Facebook, Amazon, and Microsoft—as well as several others would qualify (Caffarra & Scott Morton, 2020).<sup>7</sup>

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<sup>4</sup> "Investigation of Competition in the Digital Marketplace: Majority Staff Report and Recommendations." Subcommittee on Antitrust, Commercial and Administrative Law of the Committee of the Judiciary. October 6, 2020. [https://judiciary.house.gov/uploadedfiles/competition\\_in\\_digital\\_markets.pdf?utm\\_campaign=4493-519](https://judiciary.house.gov/uploadedfiles/competition_in_digital_markets.pdf?utm_campaign=4493-519).

<sup>5</sup> "The core platform services in scope are those where there is strong evidence of i) high concentration, where usually one or very few large online platforms set the commercial conditions with considerable autonomy from their (potential) challengers, customers, or consumers; (ii) dependence on a few large online platforms acting as gateways for business users to reach and have interactions with their customers; and (iii) the power by core platform service providers often being misused by means of unfair behavior vis-à-vis economically dependent business users and customers." ("Regulation of the European Parliament and of the Council on Contestable and Fair Markets in the Digital Sector (Digital Markets Act)." *European Commission*, December 15, 2020. [https://ec.europa.eu/info/sites/info/files/proposal-regulation-single-market-digital-services-digital-services-act\\_en.pdf](https://ec.europa.eu/info/sites/info/files/proposal-regulation-single-market-digital-services-digital-services-act_en.pdf).)

<sup>6</sup> Specifically, these criteria are revenue in the European Economic Area greater than €6.5 billion in the last three years, average market capitalization (or equivalent fair market value) greater than €65 billion in the last year, greater than 45 million monthly active end users and greater than 10,000 annual active business users in the last year in the Area.

<sup>7</sup> The DMA also allows for a case-by-case qualitative review ("market investigation") of platforms that do not qualify as gatekeepers based on the quantitative criteria but exhibit entrenched power. Two sets of "obligations" on designated

A comprehensive antitrust bill has been proposed in the US as well, the Competition and Antitrust Law Enforcement Act, or “the Klobuchar Bill,” after the Senator who introduced it. The bill proposes lowering the standard for regulators to block anticompetitive mergers and switches the burden of proof (for the merger to be justified as procompetitive, rather than not anticompetitive). It also proposes expanding the definition of exclusionary conduct to include behavior that “materially disadvantages” competitors or “tends to foreclose or limit the ability or incentive” of competitors to compete, while giving regulators more resources and tools to identify, challenge, and remedy such behavior.<sup>8</sup>

## 1.2 The Broader Context: Additional Considerations to Ensure Long-Term Regulatory Effectiveness

Reflecting changing economics, the success (and dominance) of platforms depends on forces, such as network effects and lock-in (Iansiti & Lakhani, 2020), with a gravitational pull on the consumers and firms participating in these ecosystems (Jacobides, 2019a; 2019b). Whether in regard to the final version of the DMA enacted or new regimes in other parts of the world, regulation and enforcement must fully reckon with these forces to be effective. To do so, regulation must move beyond a generic conception of platforms and comprehend how platforms operate and monetize (Caffarra et al., 2020) and the rules, roles, relationships (or “architecture”) of the ecosystems which platforms orchestrate (Jacobides & Lianos, 2021). Without such considerations, any fixed criteria for identifying gatekeepers or predefined obligations of gatekeepers could be at risk of falling behind as the Big Tech players find new ways to amass and exercise their power.

A clearer understanding of the forces at play in ecosystems orchestrated by platforms may also allow us to be more clear-eyed in our consideration of the tradeoffs with which we are comfortable as a society—a prerequisite for achieving a “Platform Deal” (Jacobides, 2020). As much of the current literature takes pains to explain, we need a competition framework that distinguishes between competitive dominance and competitive excellence—and its far-reaching benefits—in order to ensure we do not undermine the value-add of the leading platforms (Parker et al, 2020).

We must start by identifying the factors driving platform power and then consider the harms that may require swift regulatory action, whether *ex ante* or *ex post*. The remainder of this paper is devoted to that task.

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gatekeepers would follow: a short list of unqualified obligations and a longer list of tentative obligations that would be “further specified.” These obligations are discussed further in this paper’s final section on potential regulatory solutions. (“Regulation of the European Parliament and of the Council on Contestable and Fair Markets in the Digital Sector (Digital Markets Act.” *European Commission*, December 15, 2020. [https://ec.europa.eu/info/sites/info/files/proposal-regulation-single-market-digital-services-digital-services-act\\_en.pdf](https://ec.europa.eu/info/sites/info/files/proposal-regulation-single-market-digital-services-digital-services-act_en.pdf).)

<sup>8</sup> “Competition and Antitrust Law Enforcement Reform Act of 2021.” United States Congress. February 4, 2021. <https://www.congress.gov/117/bills/s225/BILLS-117s225is.pdf>

### 1.3 What Defines Gatekeeper Power and Platform Dominance? Drawing on Current Views

As economists, business strategists, and regulators have highlighted, network effects and economies of scale enable value creation and cost reduction in a way that can make platform marketplaces prone to “winner takes all” (or “winner takes most”) dynamics. The resulting competitive advantages and entry barriers can be significant, as described by the European Commission in 2020:

“[A]n accumulation of a critical mass of users or device data generates an essentially incontestable competitive advantage that may lead to a situation where once an incumbent is established, the ability to scale up or enter the market may be extremely difficult for any competitor. This is due to the specificities of the platform economy that allow the winner a large competitive advantage due to the economies of scale and of scope, reinforced by data-driven network effects.” (DG Connect, 2020: 2)

Network and scale effects can take several forms, and often rely on customer (e.g., buyers and sellers) and data volume. These network effects can provide a competitive advantage for established platforms and be self-reinforcing. For example, as recognized by regulators in Europe, an incumbent platform’s advantage over competitors in access to user data can cement and expand its market position through a feedback loop between user data and user growth (Schallbruch, Schweitzer, and Wambach, 2019; UK Competition and Markets Authority, 2020). As succinctly explained by Holland’s competition office, “[A] platform with more users can collect more data. That data can be used to further improve the platform’s quality, thus attracting more users and allowing even more data to be collected” (Holland Ministry of Economic Affairs and Climate Policy, 2019: 4). For this reason, platforms will sometimes enter into related markets in order to expand their pool of data assets to leverage as a competitive advantage (DG Connect, 2020).

The power of platforms is also shaped by their role in access to consumers. In serving as intermediaries between buyers and sellers, platforms can sometimes become “gatekeepers,” gaining exclusive and irreplaceable (or quasi-irreplaceable) access to a large body of consumers (and their data) (Jacobides & Lianos, 2021: 9-10). Such gatekeepers are of particular interest because they can exclude other platforms from accessing the same body of consumers and control the terms of access for sellers on their platform. As an example, Apple’s control over both the iPhone hardware and operating system grants it significant control over its ecosystem. Alexiadis and de Streel (2020) provide a useful summary of the different concepts associated with this gatekeeper power, including economic dependency, bottlenecks, and unavoidable trading partner. Although distinct, these concepts describe the problem of a party being forced to deal with a powerful platform for lack of reasonable alternatives, and I build on them selectively below.

For a seller, the degree of a powerful platform’s “unavoidability” can vary. In a report published last year, the Australian competition authority notes that many media businesses rely on new referral services from Google and Facebook, providing these platforms with substantial bargaining power over media businesses (Australian Competition & Consumer Commission, 2019). For an iOS developer, the App Store is an entirely unavoidable intermediary because it is the only channel to distribute apps to iPhone users—and many digital services today do not



just offer an app but originate as apps and are therefore nested in the iOS ecosystem. Furthermore, as Cr  mer, de Montjoye, and Schweitzer (2019) highlight, platforms can impose themselves as gatekeepers even over seemingly fragmented marketplaces.

Whether a platform can leverage its role to gain exclusive access to consumers depends on the extent to which consumers and those providing them services (i.e., complementors) are locked-in to the platform. Platform lock-in can be more comprehensive than traditional lock-in, such as the lock-in described by the US Supreme Court in the Eastman Kodak decision (1993) (see Klein, 1996). In that case, Kodak was found guilty of limiting supply to independent servicers, so as to foreclose rival service providers and prevent them from competitively constraining Kodak’s own after-market services for its printers. Consumers with Kodak equipment were locked-in to the Kodak equipment and ecosystem because they had already made significant and hard to reverse investments in that equipment. Kodak’s restriction increased the prices Kodak was able to charge for its services.

As with lock-in in more traditional cases, consumers are locked-in to a platform when they are limited to the use of that platform or find it difficult to switch. However, the stickiness of a platform can be strengthened further by an ecosystem of connected services that are interoperable with each other but not with alternatives. For example, the stickiness of the iPhone is strengthened by the ecosystem of adjacent products that integrate seamlessly with each other but not with non-Apple alternatives: Mac computers, iPads, and iWatches. Unlike with aftermarket goods or services, restrictions on the ability of consumers or complementors to multi-home across or switch platforms weakens competitive threats to the platform, rather than simply affecting the prices that can be charged for complementary services. In platform contexts, such tie-ins are important because consumers may not be able to access services outside the platform and because consumers have behavioural predispositions to stick with defaults (Thaler and Sunstein, 2009; Thaler, 2015).

To return to the nature of platform power, if consumers can use multiple platforms (i.e., “multi-home”), then access to these consumers is not limited exclusively to any single platform, and sellers can switch platforms to avoid abuse of platform power. When one side of the platform cannot easily switch or multi-home, the ecosystem that the platform orchestrates is prone to relationships wherein the platform becomes an “unavoidable intermediary,” enabling the platform to exclude rivals and gain market power (Alexiadis and de Streel, 2020; Dolmans and Pesch, 2019). Even those platforms that seem to most expand the horizons of consumers—connecting people and services across the world with a touch of a button—can become like the traditional local monopolist. If a consumer cannot easily switch operating systems, they may be as “stranded” (for alternatives) as the consumer dependent on one store in a rural area. As noted in a report by an expert panel on digital competition assembled by the UK government, such “stranded-ness” may be due to “high switching costs, such as loss of valued personal data or reputational indicators at the point of switching; contract terms that deter switching; technical barriers to switching, such as complex switching processes or a lack of interoperability between the old service and the new or second service; tying services, which can be by contract or technical; and the inertia of defaults” (Digital Competition Expert Panel, 2019: 36).

Due to the high stakes in many platform marketplaces, an incumbent platform can advance its position from market leader constrained by competition to (unconstrained) monopolist through strategies designed to impede switching or multi-homing, and thereby “tip” a market towards a

winner-takes-all outcome in its favor (Kerber, 2019). One such strategy to “tip” the market towards a favorable winner-takes-all outcome is to increase customers dependence on the ecosystem and the interconnected web of platforms (Jacobides, 2019a; 2019b), thus ensuring that such barriers to switching become ever stronger. This makes the growth of the “ecosystems” of complementors to these platforms all the more important to platforms (Jacobides et al., 2018; Fuller et al., 2019). As the report by the Stigler Center notes, “The increased scale and scope of control has provided modern digital platform owners with increased power over their ecosystems. Today’s platforms understand that they can obtain higher margins if they either make all of the necessary complements themselves or position themselves as a mandatory bottleneck between partners and customers” (2019: 49).

The competitive dynamics of platform marketplaces are also shaped by the bargaining power of the supply side (or “sellers”). As noted in a recent report by an expert panel on digital competition assembled by the UK government, there tends to be a power asymmetry between platforms and the sellers on them (Digital Competition Expert Panel, 2019). This is because consumers are aggregated on one side of the platform, with their access controlled by the platform, whereas sellers are not organized as a collective and individually lack bargaining power to rival the platform’s (Digital Competition Expert Panel, 2019). Unfortunately, regulators’ overall approach to anticompetitive behavior by platform owners vis-à-vis their complementors seems to be rooted in the imagery of a few strong platforms dealing with a multitude of (at best) small and medium enterprises.<sup>9</sup> Yet, the control and extraction exhibited by dominant platforms may be applied to complementors beyond the small and weak. In a later section of this paper, I will explain that even large players, including those operating with significant network effects to strengthen their user base, may be affected by the power of platform owners in particular circumstances. It is also important to build a framework that can accommodate the role of the intersection between different platforms, where a series of platforms interact (e.g., Apple and Uber, not just Apple and a set of developers, or Uber and a set of drivers).

Finally, beyond enabling monopoly prices, a platform’s market power, or “platform power,” can enable it to engage in exclusionary conduct that can increase its ecosystem dominance. An example is a platform leveraging its position or adjusting its rules to preference its own complementary or downstream services (Crémer, de Montjoye, and Schweitzer, 2019; Schallbruch, Schweitzer, and Wambach, 2019; Rietveld et al., 2020). This can enable faster innovation or it can exclude rival products at the expense of consumers. Rietveld et al. (2020) studied how platforms changed their policies as the ecosystem they presided over grew and found that platforms tended to shift from initially creating monetization and market-expanding opportunities for those in their ecosystem, to appropriating such opportunities for themselves. Such “leveraging” of power over a marketplace was one of the main concerns raised by firms in Sweden selling through platforms, according to a 2019 report by the country’s competition authority. Among the specific forms of leveraging platforms used, according to the survey, were tying (making use of one service conditional upon the use of another), self- preferencing (by

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<sup>9</sup> Indeed, the German law on dependencies that platforms engender rests on the principle of constraints against competition. Its Section 20(1) refers explicitly to “undertakings and associations of undertakings to the extent that small or medium-sized enterprises as suppliers or purchasers of a certain type of goods or commercial services depend on them in such a way that sufficient and reasonable possibilities of switching to other undertakings do not exist (relative market power)” (Alexiadis & de Streel, 2020: 7).

directing users to their own offerings in preference to competitors'<sup>10</sup>), and data hoarding (using customer data to expand into new markets while not sharing the data with their sellers) (Swedish Competition Authority, 2020).

Unlike traditional vertical integration, which eliminates conflicts of interest to reduce double marginalization, platform power can increase conflicts of interest and introduce double (or more) marginalization. The revised Vertical Merger Guidelines from the United States Federal Trade Commission and Department of Justice (2020) address this issue in the context of related products and highlight the incentives of a firm using a related product to disadvantage rival firms. This concept applies well to a platform, which can use its power to foreclose rival complementors or lock in its complementors to reduce the strength of rival platforms.

When platforms have platform power, the harm is not isolated to the sellers they can monopolize. As noted by the British panel of competition experts cited earlier—and as will be illustrated later in this paper—the harm will “feed through to consumers in the prices they pay, the quality they receive, and the range of innovative new products and services they are able to choose from” (Digital Competition Expert Panel, 2019: 50).

## 2. A Simple Framework to Define Platform Power

The complexities of platforms and the host of issues they engender—some of which receive short shrift in this paper to maintain focus—often lead to more questions than answers. At the same time, it is imperative that regulators, policy makers, and business strategists converge on straightforward ways to assess the power of platforms. The objective of this section is to offer such a framework, which is intentionally limited. Its focus is not to consider the broader competitive issues that pertain to platforms—for instance, it eschews issues of the leveraging of information and overall consumer welfare loss by the (ab)use of customer behavioural propensities through targeted advertising. Instead, it looks at a few aspects characterizing multi-sided markets that can be used to assess the presence of platform power in digital marketplaces. Our objective is to find platforms that are a combination of a “bottleneck” and an “unavoidable intermediary” and that can leverage their position to control and extract rents. Rather than looking at each platform in terms of objective characteristics (e.g., user or engagement levels), I consider some key qualitative attributes that collectively describe the platform. A guiding principle in this exercise is the question of the “relative replaceability”—a key concept which has also been shown to be significant in explaining who, in a sector or ecosystem, is able to capture value (see Jacobides & Tae, 2015 on the computer sector, or Jacobides, MacDuffie & Tae, 2016, on automobiles). Because a platform benefits when it is less replaceable, it can benefit by engaging in certain exclusionary conduct that makes it essential.

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<sup>10</sup> For more details on self-preferencing, see, for example, Crémer, de Montjoye, and Schweitzer (2019).

The factors shaping platform power discussed above can be distilled into a set of criteria to assess whether a platform has market power over sellers in a particular marketplace. Whether or not a platform has power, and the strength of its power, can be assessed by the degree to which a platform meets the conditions described below.

### **2.1 Does the platform have exclusive access to a large body of consumers?**

If sellers can only access consumers through a single platform, then switching platforms or opting out of that platform results in a seller forgoing access to those consumers. In a competitive market, consumers can be accessed—and accessed equally—through various channels, preventing any given platform from controlling exclusive access to a body of consumers.

### **2.2 Is it difficult for users to multi-home or switch platforms?**

If it is difficult—due to cost, effort, or other behavioural or economic reasons—for consumers to use more than one platform or easily switch platforms in a short timeframe in response to a seller being unavailable on a given platform, then a seller cannot leave a platform without forgoing access to the consumers on it. That is to say, if a seller were to switch away from a platform with high switching costs for (single-homing) consumers, that seller would forgo access to the consumers on that platform.

### **2.3 Are sellers substitutable?**

If sellers are easily substitutable to users (e.g., many sellers sell similar goods and services) and the platform controls a substantial part of the customer relationship, users can switch easily between sellers. As a result, consumers can switch sellers more easily than they can switch platforms, and platforms are unaffected by the departure of any given seller, allowing the platform to exercise its power over the seller and foreclose competition without consequences.

### **2.4 Do users benefit from network effects requiring sellers to multi-home across platforms?**

If a seller is required to serve a platform in order to maximize the value it can provide to consumers on other platforms, then the seller is inordinately harmed by forgoing service to the first platform. Not only does the seller lose access to the consumers on that platform, the seller provides less value to its consumers on the other platforms, further constraining its ability to opt-out of a platform even in the face of restrictive terms or high pricing.

## **2.5 Platform has an established network, so that network effects and/or its ecosystem and related “stickiness” are an effective barrier to entry for alternative platforms.**

If a platform is established, it may have limited need to invest in attracting sellers to stimulate network effects. In contrast, an early-stage platform typically needs to invest in building network effects by attracting sellers, in order to attract users—a hurdle that can present a formidable barrier to entry.

To recap, an analysis of the relative ease of multi-homing and of the options available to different parties—an analysis that can be modelled in terms of collaborative game theory—highlights the nature of power according to basic structural features. For a seller in a platform marketplace, the gatekeeper role of platforms can have severe repercussions when the seller possesses limited bargaining power (e.g., because, individually, it is substitutable) against the platform and lacks alternative channels to access consumers. When a platform has exclusive control of consumers, a “competitive bottleneck” can arise in two-sided markets when the consumer side of the market single-homes (e.g., uses only one smartphone) and the seller side is compelled to multi-home (e.g., develops applications for multiple platforms). Sellers are compelled to multi-home if, due to network effects, their service is less valuable to consumers on one platform if they are disconnected from sellers on another platform. Economic principles predict that when a platform controls access to consumers, consumers single-home, and sellers are required to multi-home due to the scale of those consumers or their importance to other consumers due to network effects, the platform will compete for consumers while charging monopoly prices to sellers for access to those consumers (Athey, 2016). If a platform is seen to satisfy all these criteria, then we have to hold it to account, as its strength is based on structural features that give it inordinate power and the ability to leverage its position—whether this position was begotten because of impeccable product design and service and a record of innovation or by acquiring rivals and engaging in anticompetitive actions. What matters for firms that have such positions is whether their actions place undue pressure on their complementors and customers alike.

To put it in more technical (legal) terms, in a ruling of the EU’s General Court, on the (analogous) case of a dominant position, “a finding that an undertaking has a dominant position is not in itself a recrimination but simply means that, irrespective of the reasons for which it has such a dominant position, the undertaking concerned has a special responsibility not to allow its conduct to impair genuine undistorted competition in the Common Market.”<sup>11</sup> This doctrine of “special responsibility,” broadly held in a number of legal systems, may, as Sauter (2019) argues, translate in the online world as a “duty of care.” The doctrine should go beyond the foreclosure of rivals and, given the multi-sided nature of platforms, apply to the abuse of relationships with direct customers and end consumers. This means that, even absent any other potentially anticompetitive practices such as self-preferencing or data hoarding, dominant platforms have to demonstrate that they do not abuse their relationships with their complementors to extract outsized revenue. This may be particularly relevant in the context of platforms that broaden their scope, potentially “enveloping” other platforms, so as to subsume

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<sup>11</sup> See, e.g., Cases C-322/81, *Michelin v. Commission* EU:C:1983:313, at paragraph 57 and C-413/14 P, *Intel v Commission* EU:C:2017:632, paragraphs 135-136.

them, thus reducing competition. While beneficial to the platform from a strategic perspective (see Eisenmann et al., 2011), such behavior raises significant concerns in terms of competition.<sup>12</sup>

But, first, let us apply the framework outlined above, before moving to an examination of whether firms that have such extraordinary power, structural or otherwise, engage in appropriate competitive behavior.

I apply the framework to four marketplaces of significant size and assess the power of their leading platforms. A comparison of the markets for iOS app distribution, PC gaming, live streaming, and ridesharing puts these principles in action and, as we learn, showcases the unique power of Apple. I then delve more deeply into the case of Apple to examine how exactly it uses its position of power, considering a specific case-study of its relationship with a major seller in its own right: Tinder.

### 3. Applying the Framework: Lessons from Practice

I begin with the marketplace for iOS apps, one of the biggest in terms of number of businesses and consumers involved and the scale of revenue. I then, for comparison, apply these criteria to three other digital marketplaces: PC gaming, livestreaming, and ridesharing.

**Figure 1: Summary of Platform Power Criteria Applied to Digital Marketplaces**

Platform Power Criteria	iOS App Distribution	Digital Marketplaces		Ride-sharing
		PC Gaming	Live Streaming	
1. Does the platform have exclusive access to a large body of consumers?	✓	×	×	×
2. Is it difficult for users to multi-home or switch platforms?	✓	×	×	×
3. Are sellers substitutable?	— <sup>13</sup>	×	×	✓
4. Do users benefit from network effects, requiring sellers to multi-home across platforms	✓	×	×	×
5. Does platform have an established network / ecosystem lock-ins, increasing barriers to entry?	✓	✓	✓	×

<sup>12</sup> This makes envelopment via M&A a particularly important area for further investigation, where arguably the burden of proof may need to be reversed, so that the acquirer should demonstrate that no harm will come to competition.

<sup>13</sup> Indicates a mixed result—i.e., there is market power under this criterion but with exceptions.

As discussed below, and as summarized in Figure 1, I find that these other three platforms face competitive constraints that the App Store does not, and I identify some of the results—in terms of product pricing, quality, and innovation—of the competitive pressures exhibited in these other marketplaces.

### 3.1 iOS App Distribution (and the related market of iOS)

#### 3.1.1 Does the platform have exclusive access to a large body of consumers?

The answer to this question is quite straightforward: Apple controls the functionality of the iPhone, iOS, and the App Store, and by Apple's policy, the App Store is the only way that users can install apps on its iOS devices (Shoemaker, 2019). As a result, there are no viable alternatives to the App Store for developers to reach users on iPhones. "Sideloading," the practice of installing an app through an unofficial distribution channel, is an unrealistic alternative given that it requires removing Apple's software restrictions on the phone (or "jailbreaking"), a process that is technically difficult and can harm the phone's functionality. Pre-installing of apps is not a possibility because Apple does not allow third-party apps to be pre-installed.

Behavioral economics and empirical evidence suggest that developers cannot easily reach consumers through web apps, either, as they are a poor substitute for native apps. A report published this year arguing that Apple is competitively constrained states that "the App Store is by no means the exclusive gatekeeper for contracting with iOS users" and that "iOS users can, and do, interact with app developers in various ways... as well as having access to the internet from their smartphone... the vast majority of users also have a PC or Mac and thus access to various web-based app stores" (Voelcker and Baker, 2020: 57).

However, desktop computers and other electronic devices are not a substitute for smartphones for myriad reasons. Users have continuous access to their smartphones, and, to support such unique access to consumers' attention, smartphones are constantly connected to the internet and are hand-held, with touch controls. This explains in part why many digital services today originated as a mobile app and remain mobile-first in their design. Whether it is instant exchange of pictures and videos or "swiping" to accept matches of interest, many of the most engaging features of digital services today are mobile-centric and best supported by native app functionality, and consumers are increasingly conditioned to access digital services on their mobile device over a desktop device. Web apps on mobile devices are not a viable substitute for native apps either because they are generally inferior in features, functions, and performance. Native apps tend to be faster, use less memory, and can make use of native libraries (software infrastructure common to the operating system that can be leveraged) in a manner web apps cannot.<sup>14</sup> As well, Apple exercises control over the browser on iOS devices and does not support certain web app functionalities enabled by other operating systems, further demoting web apps as a potential substitute for native iOS apps. As shown in a later

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<sup>14</sup> See, for example: Viswanathan, Priya. "Native Apps vs Web Apps." *Lifewire*, March 6, 2020. <https://www.lifewire.com/native-apps-vs-web-apps-2373133>.



section looking at Tinder as a representative example, consumers are unlikely to access a digital service through its website even when doing so is cheaper.

### 3.1.2 Is it difficult for users to multi-home or switch platforms?

If consumers could easily switch from iPhones to Android devices, then Apple would have limited power over developers. This is because consumers could quickly and easily make this switch in response to price changes or the lack of availability of specific applications in the App Store. Advocates for Apple have claimed this, stating: “the appropriately defined product market for assessing Apple’s App Store practices must at least include Google Play and other Android app stores, as well as alternative channels allowing developers to reach and distribute their content to customers (including iOS users) outside the App Store” (Voelcker and Baker, 2020: 46). However, as noted, non-native mobile apps are not a substitute and iPhone users face challenges to switch to Android because they are locked-in to iOS for reasons that include:

- The high price of smartphones makes it costly for consumers to switch from iPhones to Android devices (or vice versa), so consumers generally wait until they are due for an upgrade. The average price of a consumer smartphone in the U.S. in 2019 was \$528.<sup>15</sup> The replacement cycle for smartphones is long and getting longer. 62% of smartphone owners do not intend to buy or get a new smartphone within the next year.<sup>16</sup>
- When consumers upgrade, they prefer features on their existing mobile operating systems. A 2019 Consumer Intelligence Research Partners (CIRP) study of consumers in the U.S. found that 91% of iOS users upgraded to another iPhone.<sup>17</sup>
- Most consumers already own and use many apps, and transferring data and accounts across operating systems (e.g., from an iPhone to an Android device) can be time-consuming and in some cases impossible, resulting in lost user “history” and purchases.<sup>18</sup>
- Apple has created a hardware ecosystem around the iPhone that further increases switching—or, more specifically, “mixing and matching”—costs. Apple offers “Continuity” features between Apple devices—making it easy for consumers to share data across their Macs, iPads and iPhones—but not, for example, between an Apple smartphone and Android tablet.<sup>19</sup> Furthermore, proprietary and costly accessories to devices, such as the

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<sup>15</sup> “Average price of smartphones in the United States from 2014 to 2023, by segment.” Statista, February 28, 2020. <https://www.statista.com/statistics/619830/smartphone-average-price-in-the-us/>. Top end iPhones and Samsung phones (iPhone and Samsung are the most popular smartphone brands in the U.S.; Samsung phones operate an Android operating system) can cost as much as \$1,449 for the iPhone 11 Pro and \$1,449 for the Samsung Galaxy Z Flip 5G. Samsung. “New Arrival Galaxy Z Flip 5G.” <https://www.samsung.com/us/mobile/galaxy-z-flip/buy/?modelCode=SM-F707UZAATT>.

<sup>16</sup> Kevin Westcott et al. “Build it and they will embrace it.” Deloitte, 2019. [https://www2.deloitte.com/content/dam/insights/us/articles/6457\\_Mobile-trends-survey/DI\\_Build-it-and-they-will-embrace-it.pdf](https://www2.deloitte.com/content/dam/insights/us/articles/6457_Mobile-trends-survey/DI_Build-it-and-they-will-embrace-it.pdf).

<sup>17</sup> Ben Lovejoy. “iOS and Android loyalty levels higher than ever; Android just ahead for now.” January 28, 2019. <https://9to5mac.com/2019/01/28/ios-android-loyalty/>.

<sup>18</sup> Jesse Simms. “How to transfer messages from iPhone to Android?” *Ting*, June 10, 2019. <https://ting.com/blog/you-asked-transferring-texts-from-iphone-to-android/>.

<sup>19</sup> “Use Continuity to connect your Mac, iPhone, iPad, iPod touch, and Apple Watch.” Apple, July 24, 2020. <https://support.apple.com/en-us/HT204681>.



Lightning cable, further disincentive switching, as, due to costs and purchasing behavior, consumers may be hesitant to allow such accessories to be rendered useless.

- Apple has introduced consumer programs—warranty, financing, and upgrade—that strengthen consumer lock-in. Apple offers the iPhone Upgrade Program, which allows consumers to make monthly payments in exchange for AppleCare coverage<sup>20</sup> and a new iPhone every year.<sup>21</sup>

For more detail on the reasons consumers are unlikely to switch away from iPhones and the measures Apple has taken to make them very “sticky,” see the Appendix.

Empirical evidence further demonstrates that consumer switching in response to increases in the price of iPhones is low. An extrapolation of this evidence to increases in the all-in price—including all apps and in-app purchases—of iPhones shows that consumers are unlikely to switch devices in response to an increase in the App Store commission. This response can be measured by iPhones’ own-price elasticity of demand, which represents the percent change in quantity demanded for a good divided by the percent change in price of that good. The own-price elasticity of demand for iPhones has been estimated as -0.66 (Roberson, 2016). At an average iPhone price of \$760,<sup>22</sup> this implies that a \$76 increase (10% increase) in iPhone price results in only a 6.6% decrease in quantity of iPhones demanded.

The analysis of consumer switching can be extended to calculate the change in quantity of iPhones demanded given an increase in the App Store commission. This can be done by considering the all-in price of an iPhone (including app and in-app purchases), assuming that consumers consider the all-in price at the time of phone purchase. Passing through the full commission increase to consumers provides a conservative estimate of the extent to which Apple is price constrained by Android devices and Google Play. That is because, by maximizing the price increase that consumers experience in this scenario, it also maximizes the number of consumers who would switch away from iPhones. In this case, a 10% increase in the App Store commission results in an all-in price increase of approximately \$12,<sup>23</sup> or a 1.2% increase in the average all-in price for iPhones and app/in-app purchases. Using the same -0.66 price elasticity measure, such a price increase would result in only a 1.0% decrease in quantity of iPhones demanded. Thus, as depicted in Figure 2, relatively few consumers switch

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<sup>20</sup> AppleCare Products.” Apple. <https://www.apple.com/support/products/>.

<sup>21</sup> “iPhone Upgrade Program.” Apple. <https://www.apple.com/shop/iphone/iphone-upgrade-program>.

<sup>22</sup> Aaron Tilley. “Apple’s iPhone Prices Soar, but Not Profit Margins.” *The Information*. November 14, 2018. <https://www.theinformation.com/articles/apples-iphone-prices-soar-but-not-profit-margins>.

<sup>23</sup> The average consumer spend on iPhone premium apps and in-app purchases in 2019 was \$100. The average upgrade cycle for smartphones is 32 months. Assuming an individual’s monthly average spend on apps is roughly the same throughout his/her entire period of phone ownership, the average consumer spends \$267 on apps and faces an all-in price of an iPhone of \$1,027. With Apple’s 30% commission, developers receive \$187 from apps and in-app purchases from the average consumer. To maintain this same \$187 take if Apple were to charge a 33% commission, developers would have to charge \$279 for the same bundle of apps. See, e.g., Luke Dormehl. “Average iPhone user spending in App Store rockets to \$100 in 2019.” *Cult of Mac*, March 26, 2020. <https://www.cultofmac.com/696389/average-iphone-user-spending-in-app-store-rockets-to-100-in-2019/>. See also, e.g., NPD “The Average Upgrade Cycle of a Smartphone in the U.S. is 32 Months, according to NPD Connected Intelligence.” July 12, 2018. <https://www.npd.com/wps/portal/npd/us/news/press-releases/2018/the-average-upgrade-cycle-of-a-smartphone-in-the-u-s-is-32-months---according-to-npd-connected-intelligence/>.

from iPhone to Android in response to a 10% increase in price or a small degradation in quality.<sup>24</sup>

The conclusion from these results is that, from the consumer perspective, Google Play on Android and other app distribution channels provide little competitive pressure on Apple's policies and pricing in the App Store. This is not an inevitable outcome of mobile operating systems or app stores as technologies. Rather, it is due to the architecture of the iOS ecosystem that Apple has strategically designed. Mobile operating systems and app distribution markets (i.e., app stores) can be viewed as a foremarket and aftermarket, similar to, though vaster than, the simpler example cited earlier of Kodak's foremarket in printers and aftermarket in the servicing of those printers. In the case of Apple, it involves the upfront purchase of a durable good (iPhone) in a foremarket with switching costs and barriers to entry for competitors, and the distribution of native apps for the iPhone in an aftermarket in which Apple has chosen to foreclose competition and thereby tie the two markets.

As to why consumers purchasing a smartphone for the first time are not dissuaded from choosing an iPhone given the market power Apple would possess over them in app distribution and other aftermarket services, there are various possible explanations. "Information" costs (Carlton & Waldman, 2014) explain in some instances why consumers may unwittingly purchase a durable good that ties them to a monopolized aftermarket. The costly-information theory describes how consumers cannot identify—because the information is not easily available or is difficult to process, for example—the cost of the aftermarket services in their initial choice of the durable good they purchase. Consumers may not be aware of, or internalize in their assessment of cost of ownership, lock-in and associated harm when purchasing an iPhone. The existence of the 30% commission since the App Store's launch more than a decade ago may have also normalized such a rate, making it inconspicuous in practice to consumers (even if it would be expected by theory to fall considerably in the presence of competition).

The simpler explanation for why first-time smartphone buyers do not evade Apple's aftermarket dominance may be that the alternative option—and it is singular—faces limited competitive constraints as well. Two operating systems, iOS and Android, control nearly the entire market,<sup>25</sup> each with its own entrenched user base stuck to its operating system.

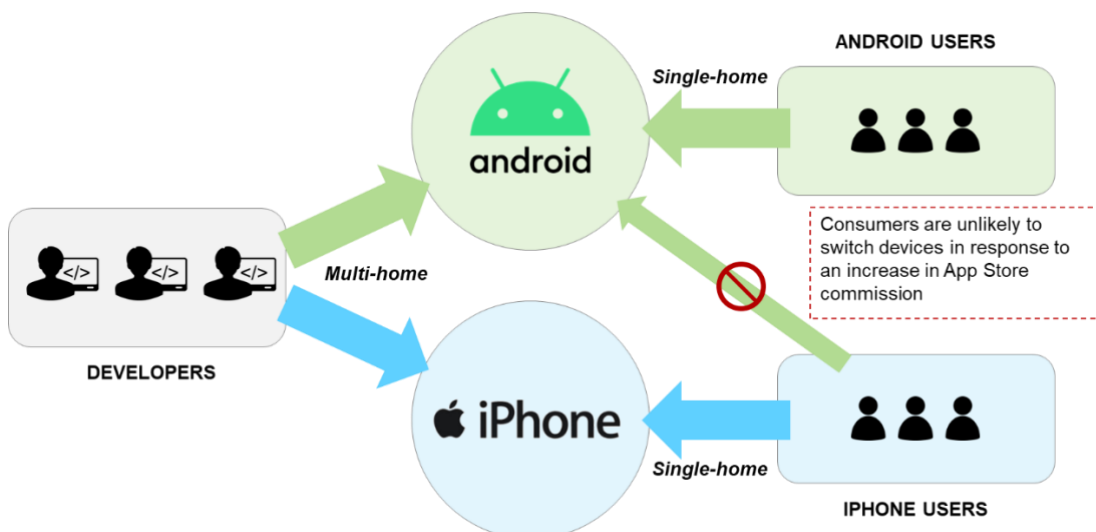
In short, Apple's market power in the aftermarket of app distribution (i.e., the App Store) originates from Apple's market power in the foremarket of iOS and Apple's tying of these two markets. As will be shown in the later section on other marketplaces, this feature of the iOS ecosystem—the tied foremarket and aftermarket—is not standard across digital ecosystems and explains the App Store's market power as much as any of Apple's restrictive policies within the App Store.

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<sup>24</sup> A small price increase has the same effect as a small degradation in quality, as both reduce the aggregate utility that a buyer receives from an iPhone.

<sup>25</sup> In the US, iOS and Android represent more than 99% of the mobile operating system market. (StatCounter. "Mobile Operating System Market Share United States of America." <https://gs.statcounter.com/os-market-share/mobile/united-states-of-america>)

**Figure 2: Consumers face significant frictions to substitute away from iPhone**



Because iPhone users are locked-in to iOS and the App Store, developers are likewise committed to accessing those consumers through the App Store. Developer behavior is further evidence that consumers do not easily switch between mobile operating systems. If consumers could easily switch between platforms to access specific applications, developers might choose to offer their apps on only one platform given the additional cost of developing for multiple platforms. However, the top revenue generating developers do not choose to offer their apps on only one platform. In fact, among the top 250 apps by revenue in Apple's App Store in the United States in 2019, 245 were available on Google Play. Among the top 250 apps by revenue on Google Play in the United States in 2019, 249 were available in Apple's App Store.<sup>26</sup>

### 3.1.3 Can sellers (apps) be replaced without substantial harm to the platform?

Many consumers substitute between apps and use multiple apps in the same category. For example, consumers of dating services use, on average, of 2.4 different dating services.<sup>27</sup> Due to app multihoming by consumers and the availability of substitutes, the departure of any given app from the App Store may result in a negligible change in the value consumers receive from the platform.<sup>28</sup> As such, Apple is not harmed by the prospect of an app's departure from iOS, as this departure would not result in consumers switching to Android to access the app. Notice the lack of symmetry, as users tend to have only one OS (either Android or iOS), meaning that

<sup>26</sup> AppMagic; data available upon request.

<sup>27</sup> "Online Dating Statistics: 60% of users look for long term relationships," *ReportLinker*, February 9, 2017. <https://www.reportlinker.com/insight/finding-love-online.html>.

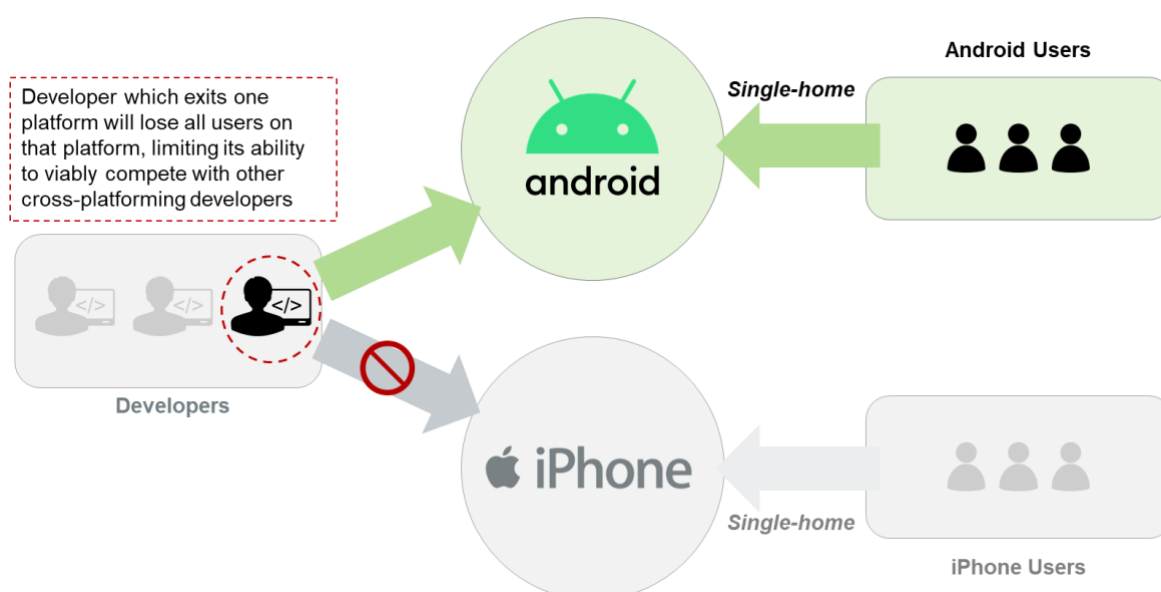
<sup>28</sup> However, the elimination of Google Maps from the iPhone suggests that consumers notice particular apps that are removed when the quality differential is big enough.

a developer that does not sell its application in the App Store could not sell to those same consumers through Google Play, whereas consumers have many apps of the same kind.

### 3.1.4 Do users benefit from network effects, requiring sellers to multi-home across platforms?

Many apps are subject to strong network effects, which require these apps to serve users on different mobile platforms in order to maximize the value they provide to users on any given platform. That is, because users benefit from network effects, app developers are forced to engage with a platform. Dating apps are a prime example: a Tinder user on Android benefits from Tinder's availability to users on iPhones, as this availability expands the pool of potential matches. Such network effects are particularly strong for dating apps because they facilitate social, rather than economic, transactions in which individual preferences for a partner with whom to match are likely to be highly heterogeneous (based on social, economic, or physical attributes, among others). A 2016 study on dating apps in Brazil found empirical evidence of this effect. That study found that the merger of two rival apps, which increased the total population of users available to match with for users of each individual app, increased total revenue by 22% for the combined dating service, as compared to the revenues for the two services independently.<sup>29</sup> This makes the App Store an unavoidable trading partner, with the competitive implications this entails. Combined with the fact that apps are substitutable, the importance of network effects for apps indicates that apps have limited ability to opt-out of a major platforms, as depicted in Figure 3.

**Figure 3: Multi-homing developers are not able bargain with exiting the platform**



<sup>29</sup> Gordon Burtch and Jui Ramaprasad. "Assessing and Quantifying Local Network Effects in an Online Dating Market." *NET Institute Working Paper No. 16-05*. SSRN, September 30, 2016. <http://dx.doi.org/10.2139/ssrn.2848515>

### 3.1.5 Does the platform have an established network / ecosystem lock-ins, increasing barriers to entry?

While Apple may have faced pressure to attract sellers in the time immediately after the launch of the App Store in 2008, this pressure subsided once Apple established a critical mass of sellers. This critical mass of sellers attracted more consumers, which attracted more sellers, and so on. These network effects formed a competitive barrier around the App Store. This was noted, for example, in a Morningstar financial report: "Network effects may be forming around Apple's apps developers, as a more robust apps store is likely helping Apple attract new customers" (Morningstar, 2017). Today, after having been in existence and building its network for more than a decade, Apple has 1.85 million apps<sup>30</sup> on the App Store to serve approximately 900 million iPhones in circulation.<sup>31</sup> This volume of apps is a significant barrier to entry, as any potential competitors to the App Store must attract a sufficient number of apps to become a viable competitor.

Furthermore, Apple has created an ecosystem around its phone. It has done this by linking different services offered through the phone itself, making switching hard for all the reasons identified in the Furman and Stigler report. It has also done this by expanding its suite of devices (from Apple PCs and TV to iPad and watches), making switching away from the Apple iOS ever more pragmatically difficult and unlikely.

Even if a competitor were able to attract a sufficient number of apps, that competitor would still not be able to compete with the App Store for app distribution to iOS users for the simple reason that Apple does not allow alternative app stores on iOS devices.

In all, Apple emerges as a quintessential example of a dominant gatekeeper, with extraordinary power, which, enables Apple to restrict competition and charge such high fees. Yet, not all dominant platforms fulfill these criteria. The criteria that explain the power of the App Store can be applied to other digital marketplaces. Below, we consider platforms in PC gaming, live streaming, and ridesharing and find that they do not have gatekeeper power.

## 3.2 PC Gaming Platforms

In the PC gaming marketplace, platforms take a percentage of revenue from game sales and in-game purchases. PC gaming platforms connect consumers with video games played on personal computers. The marketplace includes a number of platforms, including market leader Steam (with 50-70% market share),<sup>32</sup> Epic Games Store, Good Old Games ("GOG"), and Origin.<sup>33</sup> (Apple and Microsoft both have app stores native to their operating systems, but they

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<sup>30</sup> J. Clement. "Number of apps available in leading app stores as of 1st quarter 2020." Statista. <https://www.statista.com/statistics/276623/number-of-apps-available-in-leading-app-stores/>.

<sup>31</sup> Mark Sullivan. "Fact: Apple reveals it has 900 million iPhones in the wild." *Fast Company*, January 29, 2019. <https://www.fastcompany.com/90298944/fact-apple-reveals-it-has-900-million-iphones-in-the-wild>.

<sup>32</sup> Arthur Zuckerman "75 Steam Statistics: 2019/2020 Facts, Market Share & Data Analysis." *CompareCamp*, May 15, 2020. <https://comparecamp.com/steam-statistics/>.

<sup>33</sup> See, for example, this list of gaming platforms from 2019: Scott Prescott. "The most popular desktop gaming clients, ranked." *PCGamer*, July 5, 2019. <https://www.pcgamer.com/the-most-popular-desktop-gaming-clients-ranked/>.

are minor players—with a limited number of users, games available, and platform features—and therefore not included among the platforms discussed in this section).<sup>34</sup> An examination of each of the platform power criteria listed above demonstrate the lack of power held by any given PC gaming platform.

### **3.2.1. Does the platform have exclusive access to a large body of consumers?**

No platform, including market leader Steam, has exclusive access over consumers in the PC gaming marketplace. Because PC operating systems do not restrict installation of platforms or games, the same user can be accessed through multiple PC gaming platforms. Furthermore, sideloading is sometimes possible in PC gaming: users can purchase a game through one platform and transfer it to their account with another platform. In short, no one platform possesses a chokepoint for controlling users or the distribution of games to those particular users.

### **3.2.2 Is it difficult for users to multi-home or switch platforms?**

Users can easily multi-home or switch platforms. Multi-homing is relatively seamless, as users can create accounts with multiple platforms on their PC. Furthermore, there are limited barriers for consumers to multi-home or switch platforms: purchasing new hardware, breaking existing contracts, or learning a new operating system are not required. Users can continue to play previously purchased games on their “old” platform while making any future purchases on their “new” platform.

### **3.2.3 Can sellers (game developers) be replaced without substantial harm to the platform?**

In PC gaming, highly differentiated games cannot be substituted easily by the platforms. Specialized third-party games, such as Grand Theft Auto and Troy Total War, have strong fan bases that will follow games regardless of the platform through which they are distributed. It is for this reason that platforms have negotiated exclusive contracts or other agreements with top games to attract users. An example of this is Epic’s deal with Troy Total War, which made the game exclusive to Epic for one year.<sup>35</sup> In a recent promotional event, Epic sponsored a 24-hour free giveaway of Troy Total War that attracted 7.5 million downloads, the cost of which was covered by Epic. The willingness of Epic to sponsor this marketing event for Troy Total War highlights Epic’s need to offer incentives to consumers and developers to attract them to its platform.

Another example is the competition, and ensuring competing down of rates, for game developers after the Epic Games Store launched in 2018 with a substantially lower commission

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<sup>34</sup> For a review of Apple’s PC app store, for example, see Tim Brookes. “How to Play Games on a Mac in 2019.” *How to Geek*, July 20, 2019. <https://www.howtogeek.com/428113/how-to-play-games-on-a-mac-in-2019/>.

<sup>35</sup> Nathan P. Gibson. “A Total War Saga: Troy Scores 7.5 Million Users from Epic Games Store.” *Screen Rant*, August 14, 2020. <https://screenrant.com/total-war-saga-troy-7-million-downloads-epic-games-store/>.

than Steam, at 12%. This lower price- point incentivized game developers to move to Epic and pressured Steam to respond with concessions to game developers, who would otherwise easily move to Epic's platform. Specifically, to better incentivize the top games to continue distributing on its platform, Steam began offering volume-adjusted commissions, providing discounts to top-grossing games.<sup>36</sup>

### **3.2.4 Do users benefit from network effects, requiring sellers to multi-home across platforms?**

Users experience limited benefits from network effects when sellers multi-home across platforms. For most games, users experience diminishing benefits from increases in the pool of players on their platform after a critical mass of players has been established. Unlike marketplaces for dating and employment, for example, in which consumers place a premium on having access to as many potential matches as possible given significant differences in preferences (i.e., the importance of finding an optimal match), most consumers in gaming marketplaces can be satisfied with the amount of users on a single platform as long as that user base is large enough to ensure availability of sufficient players of comparable skill.

### **3.2.5 Does the platform have an established network / ecosystem lock-ins, increasing barriers to entry?**

As with the market for iOS apps, the incumbent platforms have established networks, increasing barriers to entry for potential rivals. Steam had over 95 million monthly active users in 2019.<sup>37</sup> This large user base is attractive to developers and makes Steam a natural place for developers to promote and distribute games.<sup>38</sup> To successfully enter and appeal to sellers, a new platform needs to attract sufficient consumers and offer a compelling value proposition to rival Steam's significant user base. This challenge acts as a barrier to entry. However, the surging popularity of the upstart Epic Games Store, which, little more than a year after its launch, claimed to have surpassed Steam in its number of active users, suggests rivals can viably contest the incumbent.<sup>39</sup>

Overall, these criteria show that individual platforms in the PC gaming marketplace have limited power. While the final criterion suggests market leaders have a degree of platform power, the

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<sup>36</sup> Epic Games announced its 12% commission on the Epic Games Store on December 4, 2018. See: Tim Sweeney. "Announcing the Epic Games store The Unreal Engine." December 04, 2018. <https://www.unrealengine.com/en-US/blog/announcing-the-epic-games-store>. Less than a week earlier, Steam announced a new revenue share for its PC gaming platform. See: Nick Statt. "Valve's new Steam revenue agreement gives more money to game developers." *The Verge*, November 30, 2018. <https://www.theverge.com/2018/11/30/18120577/valve-steam-game-marketplace-revenue-split-new-rules-competition>.

<sup>37</sup> Derek Strickland. "Steam grew to nearly 95 million monthly active users in 2019." *Tweaktown*, February 8, 2020. <https://www.tweaktown.com/news/70495/steam-grew-to-nearly-95-million-monthly-active-users-in-2019/index.html>

<sup>38</sup> Samuel Horti. "Is it worth cutting out Steam to sell indie games direct?" *PCGamer*, March 07, 2018. <https://www.pcgamer.com/is-it-worth-cutting-out-steam-to-sell-indie-games-direct/>.

<sup>39</sup> "Epic Games Store Weekly Free Games in 2020!" *Epic Games*, January 14, 2020. <https://www.epicgames.com/store/en-US/news/epic-games-store-weekly-free-games-in-2020>.



lack of a chokepoint and the existence of greater competition in the other criteria mean that the platforms do not have inordinate power over their complementors.

Due to competition between PC gaming platforms, market leader Steam is constrained from engaging in exclusionary conduct to gain market power or exact an excessive commission: the marketplace's complementors have various distribution options and those distribution options have limited lock-in given that consumers can easily switch between platforms. And, as described, this competition has pushed down platform commissions.

### 3.3 Live Streaming Platforms

In live streaming marketplaces, platforms take a percentage of streamer revenue from in-platform donations and subscriptions.<sup>40</sup> Live streaming covers a range of content; gaming is the most prominent. The marketplace includes a number of platforms, such as market leader Twitch,<sup>41</sup> YouTube, and Facebook Gaming. An examination of each of the platform power criteria demonstrates the competitive constraints live streaming platforms face.

#### 3.3.1. Does the platform have exclusive access to a large body of consumers?

Platforms do not have exclusive access to consumers in the live streaming marketplace. The same user can be accessed through multiple platforms on the same or different types of devices.

#### 3.3.2 Is it difficult for users to multi-home or switch platforms?

In this case, it is straightforward for users to multi-home across platforms or switch platforms. Users can access a new platform in many cases by simply visiting a website or through an easy registration process—creating an account requires a few minutes of effort. Furthermore, switching or multi-homing imposes no monetary costs and limited frictions, as different platforms can be accessed through the browser on the same device. As a result, "Viewers can easily visit other live streaming sites if they prefer."<sup>42</sup>

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<sup>40</sup> Financial support from viewers is a main channel of revenue for streamers. On YouTube, Twitch, and Facebook Gaming, viewers can "subscribe" to a streamer, paying \$4.99 (on PC) monthly in exchange for select features such as emotes. (Twitch offers different levels of subscriptions, costing up to \$24.99). Facebook offers a comparable product, also charging viewers \$4.99 for subscriptions.

<sup>41</sup> Twitch has over 60% market share in the Americas and Europe. See: Amrita Khalid. "YouTube is now the biggest threat to Twitch." *Quartz*, January 28, 2020. <https://qz.com/1792011/twitch-is-losing-users-to-youtube-and-other-live-stream-platforms/>.

<sup>42</sup> Sean L. "Twitch.tv: Amazon's Billion-Dollar Bet on Network Effects in Streaming Video." *Digital HBS*, October 19, 2015. <https://digital.hbs.edu/platform-digit/submission/twitch-tv-amazons-billion-dollar-bet-on-network-effects-in-streaming-video/>.



### 3.3.3 Can sellers (streamers) be replaced without substantial harm to the platform?

The top streamers are not easily substitutable for the platform. Top streamers are a critical attraction for consumers of live streaming, making it important for platforms to invest resources in attracting and retaining top streamers. This occurred, for example, when popular streamer Tyler Blevins, better known as “Ninja,” left Twitch for Mixer, a now-defunct rival platform that courted him with an exclusive contract worth \$20-30 million<sup>43</sup> and the prospect of personally shaping the nascent platform. Other top streamers, including Jack “Courage” Dunlop, Mike “Shroud” Grzesiek, Jeremy “Disguised Toast” Wang left Twitch as well, drawn by lucrative contracts and opportunities to influence the market and its ecosystem.<sup>44</sup> Although some star streamers, such as Blevins, returned to Twitch after the closure of Mixer, the continuous fight by live streaming platforms over streamer talent highlights the power held by the streamers. Commenting on his return to Twitch, Blevins highlighted his agency in the decision: “I really took my time to decide which platform was best and Twitch has been very supportive throughout this process and understanding my overall career goals.”<sup>45</sup> Beyond the special deals granted to such star streamers, a wider pool of popular streamers are solicited through reduced commissions (e.g., on Twitch, streamers generally keep 50% of subscription revenues, but top streamers keep 70%),<sup>46</sup> demonstrating their value to the platforms.

### 3.3.4 Do users benefit from network effects, requiring sellers to multi-home across platforms?

Direct network effects for users are weak in live streaming. The primary value consumers derive from live streaming platforms is from viewing or supporting their favorite streamers. Evidence suggests that many viewers do not use live streaming platforms to engage with other viewers, minimizing the value of any direct network effects.<sup>47</sup> Because of this, viewers do not benefit if their streamers are available on multiple platforms. Notably, several top streamers have chosen not to multi-home, signing exclusive contracts intended to strengthen the user base and brand of the platform sponsoring them.<sup>48</sup>

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<sup>43</sup> Paul Tassi. “A Post-Mixer Ninja Picks YouTube Gaming Over a Return to Twitch.” *Forbes*. July 8, 2020. <https://www.forbes.com/sites/paultassi/2020/07/08/a-post-mixer-ninja-picks-youtube-gaming-over-a-return-to-twitch/#6ebda5df74c3>.

<sup>44</sup> Austen Goslin. “The mass Twitch exodus: Why streamers are leaving.” *Polygon*, January 27, 2020. <https://www.polygon.com/2020/1/27/21043450/twitch-streamers-leaving-mixer-facebook-youtube-ninja-shroud-disguisedtoast>.

<sup>45</sup> Elise Favis. “Ninja is returning to Twitch.” *Washington Post*, September 10, 2020. <https://www.washingtonpost.com/video-games/2020/09/10/ninja-returns-to-twitch/>.

<sup>46</sup> Timothy J. Seppala “This is what success looks like on Twitch.” *Engadget*, October 17, 2015. <https://www.engadget.com/2015-10-17-this-is-what-success-looks-like-on-twitch.html>.

<sup>47</sup> SCU. “Why is Twitch.tv is an internet culture?” [https://webpages.scu.edu/ftp/adtran/cultural\\_text/definitional.html](https://webpages.scu.edu/ftp/adtran/cultural_text/definitional.html).

<sup>48</sup> Gene Park. “Twitch signs three major streamers to exclusive contracts.” *Washington Post*, December 10, 2019. <https://www.washingtonpost.com/video-games/2019/12/10/twitch-signs-three-major-streamers-exclusive-contracts/>.

### 3.3.5 Does the platform have an established network / ecosystem lock-ins, increasing barriers to entry?

As with the previous two cases, network effects create a barrier to entry in live streaming and new entrants must overcome the traditional chicken-and-egg problem in platform entry. In a recent estimate, Twitch has 37.5 million monthly active users in the U.S. and over two million streamers.<sup>49</sup> The challenge that potential platforms face in attracting streamers or viewers can act as a sizable barrier to entry, though new platforms have successfully emerged after Twitch.

Following the introduction of Twitch as a video game live streaming platform in 2011,<sup>50</sup> multiple rival platforms were launched: YouTube's live streaming platform in 2015, Mixer in 2016<sup>51</sup> (later acquired by Microsoft) and Facebook's launch of live streaming functionality in 2016.<sup>52</sup> These new entrants were able to attract big-name streamers, as Mixer did with Ninja and Shroud from Twitch.<sup>53</sup> Even after the closure of Mixer, other platforms, such as YouTube and Facebook Gaming, rivalling the incumbent remained "alive and well."<sup>54</sup> New entrants have competed by offering special features or compensation to top streamers in order to attract users. Twitch, the market leader, continues to offer multiyear contracts and other incentives to attract and retain top streamers, suggesting that no platform can idly depend on its existing roster of streamers. The use of multi-year contracts and Twitch's reductions in commissions for top streamers demonstrate that existing or potential rivals competitively constrain incumbents.

In all, the absence of a true gatekeeper position for any platform enables competition, which puts downward pressure on platform commissions and upward pressure on platform quality and innovation. This happens despite the clear impact of network effects

The most direct result of competition in this marketplace is the competitive pressure on platforms commissions already described. Twitch reduced its platform commission by 20 percentage points for top streamers. Facebook has gone further, reducing its commission on sales of subscriptions to streamers from 30% to 0% in August 2020.<sup>55</sup> This reduction is anticipated to last one year, in what seems to be an attempt by Facebook to attract new streamers and users.

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<sup>49</sup> See, e.g., Sarah Perez. "Twitch to top 40 million US viewers next year, forecast says." *TechCrunch*, February 20, 2020. <https://techcrunch.com/2020/02/20/twitch-to-top-40-million-u-s-viewers-next-year-forecast-says>, and Twitch. "Frequently Asked Questions." <https://www.twitch.tv/p/partners/faq/>.

<sup>50</sup> David M. Ewalt. "The ESPN of Video Games." *Forbes*, November 13, 2013. <https://www.forbes.com/sites/davidewalt/2013/11/13/the-espn-of-video-games/#1a2e5133dd79>.

<sup>51</sup> Darrell Etherington. "Microsoft acquires Beam interactive game live streaming service." *TechCrunch*, August 11, 2016. <https://techcrunch.com/2016/08/11/microsoft-acquires-beam-interactive-game-livestreaming-service/>

<sup>52</sup> Andrew Webster. "You can now stream any Blizzard game live on Facebook." *The Verge*, August 26, 2016. <https://www.theverge.com/2016/8/26/12661276/blizzard-facebook-live-streaming-launch>.

<sup>53</sup> Paul Tassi. "A Post-Mixer Ninja Picks YouTube Gaming Over a Return to Twitch." *Forbes*, July 08, 2020. <https://www.forbes.com/sites/paultassi/2020/07/08/a-post-mixer-ninja-picks-youtube-gaming-over-a-return-to-twitch/#6ebda5df74c3>.

<sup>54</sup> Kellen Browning. "Return of the King: Ninja, a Video Game Star, Goes Back to Twitch." *New York Times*, September 10, 2020. <https://www.nytimes.com/2020/09/10/business/ninja-stream-twitch.html>.

<sup>55</sup> "About Fan Subscription Payouts." Facebook Business Help Center. <https://www.facebook.com/business/help/646162679132229>.

Even so, the reduction is substantial in a market in which platforms bear substantial costs in the delivery of services to consumers. On the front end, the platforms typically manage the consumer interface, where users view videos, as well as various apps tailored to the different devices and operating systems of users. Most importantly, the platforms provide the critical infrastructure for the delivery of seller services to consumers, most notably the bandwidth that allows streamers to stream live content to massive audiences.<sup>56</sup>

In addition to creating downward pressure on commissions, competition has created upward pressure on innovation, which is manifested in the features and functionalities that platforms offer streamers and viewers. One notable innovation in live streaming is in payment systems. Many streamers accept from viewers direct donations, which they rely upon as a significant source of income. For a time, most donations went through PayPal. While PayPal allowed streamers to keep 100% of donations, donations through PayPal carried a risk of chargebacks, in which a donator could cancel a donation weeks after it was made, forcing the streamer to repay the money and pay an additional fee to PayPal.<sup>57</sup> Twitch provided an innovative payment solution to this issue by introducing Twitch Bits in 2016,<sup>58</sup> which provides streamers with greater payment protection by eliminating the risk of chargebacks. For this service, Twitch takes a commission on donations of between 20% and 30%.<sup>59</sup> Facebook followed Twitch's lead by offering a similar donation system, called "stars," in 2018.<sup>60</sup> The open playing field in this market allowed Twitch to introduce an innovation and Facebook to respond with one of its own, in a virtuous cycle that is impossible when alternative payment solutions are foreclosed in the first place.

### 3.4 Ride-Sharing Platforms

Ridesharing platforms such as Uber and Lyft match riders to drivers in real time, conduct quality control and safety services for drivers and riders, and provide other ancillary services (mostly to drivers, e.g., car financing). In return, these platforms take a percentage of the fare paid to drivers. An examination of each component of the platform power criteria demonstrates the competitive constraints faced by ridesharing platforms.

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<sup>56</sup> For a description of the infrastructure provided by platforms in livestreaming for the delivery of streams from streamers to audiences, see, for example: "Finding the Streaming Media Infrastructure That Fits You best." *Wowza Media Systems*, 2016. <https://www.wowza.com/uploads/images/Wowza-Deployments-OnPrem-Cloud-Hybrid.pdf>.

<sup>57</sup> Saira Mueller and Gökhan Çakır. "Twitch donations and PayPal: Everything You Need to Know About Chargebacks." *Dot Esports*, June 12, 2020. <https://dotesports.com/general/news/paypal-twitch-chargebacks-3739>.

<sup>58</sup> Aaron Souppouris. "Twitch introduces 'Cheering' Emotes for Tipping Streamers." *Engadget*, June 27, 2016. <https://www.engadget.com/2016-06-27-twitch-cheering-beta-bits-currency-tips.html>.

<sup>59</sup> Aaron Souppouris. "Twitch introduces 'Cheering' Emotes for Tipping Streamers." *Engadget*, June 27, 2016. <https://www.engadget.com/2016-06-27-twitch-cheering-beta-bits-currency-tips.html>.

<sup>60</sup> John Constine. "Facebook launches Fb.gg gaming video hub to compete with Twitch." *TechCrunch*, June 7, 2018. <https://techcrunch.com/2018/06/07/facebook-launches-fb-gg-gaming-video-hub-to-compete-with-twitch/>.

### **3.4.1 Does the platform have exclusive access to a large body of consumers?**

Ridesharing platforms do not have exclusive access to consumers. As with PC gaming and live streaming, the hardware and operating system that consumers use for ridesharing services are not controlled by any of the ridesharing apps.

### **3.4.2 Is it difficult for users to multi-home or switch platforms?**

Consumers can effortlessly install multiple ride-sharing apps on their phone, enabling consumers to switch platforms, and even continuously multi-home and compare wait times and prices between different platforms. To reduce multi-homing frictions even further, products have emerged to perform such price comparison on behalf of consumers.<sup>61</sup> Furthermore, consumers do not incur additional fees or face additional burdens in maintaining accounts on multiple platforms.

### **3.4.3 Can sellers (drivers) be replaced without substantial harm to the platform?**

When requesting a ride, passengers select a destination, but do not select a driver. Ridesharing apps will generally locate the closest driver. Thus, drivers have little ability to differentiate themselves or develop a “following” of riders and as such do not have bargaining power over platforms.

### **3.4.4 Do users benefit from network effects, requiring sellers to multi-home across platforms?**

A driver’s participation on additional platforms does not affect the value a rider receives from the driver on the platform through which they matched. That is to say, the rider does not suffer from being “cut off” from riders on the other platform vis-à-vis the driver.

### **3.4.5 Does the platform have an established network / ecosystem lock-ins, increasing barriers to entry?**

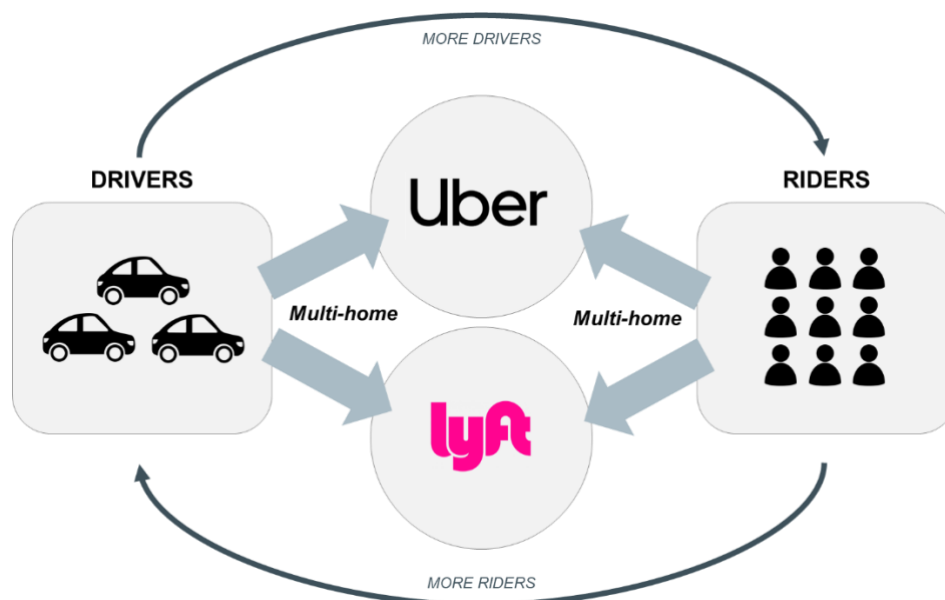
Ridesharing apps have established networks of drivers who have been approved by the platform, and riders who have installed the app. However, they form fragmented user bases due to the localized nature of ridesharing. This is offset in part by the brand power that gives an incumbent platform an advantage across geographies in a market in which trust matters (to enter a stranger’s car) and is conferred primarily by the platform. Furthermore, ridesharing apps are used by travelers, mitigating the localized nature of ridesharing networks to a degree. Ultimately, however, the entry of new competitor platforms in numerous local markets reflects

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<sup>61</sup> See, e.g., “4 Apps that Compare Rideshare (Uber, Lyft, Juno, etc.) Prices and Wait Times,” *Hello Tech*, September 10, 2018. <https://www.hellotech.com/blog/4-apps-that-compare-rideshare-uber-lyft-juno-etc-prices-and-wait-times>.

that, overall, the established networks of incumbents do not preclude ongoing entry. Due to the above factors, ridesharing is characterized by intense competition. As described above and depicted in Figure 4, both drivers and riders multi-home (i.e., use multiple platforms), which enables network effects to operate at the market level. That is to say, the virtuous feedback loop between new riders and new drivers—additional riders make the platform more valuable to drivers, and vice versa—draws more participants into the market but not necessarily onto a single platform. As a result, if one platform offers better prices or features, consumers will flock to that platform. The fact that both sides of the platform multi-home precludes one platform from gaining a competitive bottleneck and enables heated competition between platforms in the form of reduced commissions and greater platform quality.

**Figure 4: Competition in Ridesharing**



This healthy competitive dynamic is evidenced by frequent driver promotions and discounts. As an example, Uber has spent significant amounts on “excess driver incentives,” or payments to drivers that were greater than the revenue earned from driver trips.<sup>62</sup> The fact that Uber took effectively zero commission on these trips highlights the competitive pressure that ridesharing platforms face in attracting drivers. When competitive pressure weakens, platforms can increase their commission and withdraw promotions. For example, after Uber and Didi merged in China in 2016, the effective platform commission rose, with consumers paying more and drivers receiving fewer bonuses.<sup>63</sup> It was not long, however, before the introduction of new platforms reinvigorated competition and lowered platform commissions. As part of its initial push for market share in China in 2018, new entrant AutoNavi charged no commission to

<sup>62</sup> Alison Griswold. “Famously unprofitable Amazon has nothing on Uber.” *Quartz*, April 11, 2019. <https://qz.com/1592971/uber-ipo-filling-reveals-how-it-spends-its-money/>.

<sup>63</sup> Josh Horwitz. “One year after the Uber-Didi merger, it’s only getting harder to hail a ride in China.” *Quartz*, August 3, 2017. <https://qz.com/1045268/one-year-after-the-uber-didi-merger-its-only-getting-harder-to-hail-a-ride-in-china/>.

drivers.<sup>64</sup> Price-comparing riders could easily multi-home, and drivers shifted platforms according to incentives. “If Didi doesn’t match up in subsidy payments then people will go to Meituan,” a driver is quoted as saying, in reference to the ridesharing upstart Meituan.<sup>65</sup> Despite its dominant market share—around 80% of the market in China in 2019<sup>66</sup>—Didi is competitively constrained, as both riders and drivers are able to switch platforms according to the favorability of the terms offered by each platform. In addition to providing higher revenue to drivers and lower costs to riders directly, competition in ridesharing has also resulted in platforms delivering improvements in their quality of service. Most notably, the presence of rival platforms in ridesharing has reduced wait times for riders and idle time for drivers (Bryan and Gans, 2018).

## 4. From Platform Dominance to Anticompetitive Effects: Assessing a Platform’s Exclusionary Conduct, With an Application to the Apple-Tinder Relationship

The analysis above suggests that Apple—more specifically its iPhone, iOS, and App Store—has a dominant position. To understand the practical implications of this dominance, we should look at Apple’s behavior towards other players. To be conservative in looking at Apple’s conduct enabled by its dominant position, we will focus on its relationship with a particularly strong player, Tinder, which is among the top-grossing apps in the App Store.

Based on our analysis of the App Store and app developers for iOS, Tinder faces the dilemmas of any firm working under such restrictive conditions. It clearly cannot forgo such a sizeable and affluent demographic as iOS users or deliver less value to Android users expecting the full set of matching options. So, whether it likes it or not, Tinder has to deal with this gatekeeper and work within the bounds of what Apple offers.<sup>67</sup> This is amplified by the (unsurprising) fact that most users of Tinder do not choose to interact with its dating service through its web-based substitutes, despite cheaper prices on web browsers,<sup>68</sup> due to the behavioural stickiness

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<sup>64</sup> Yue Wang. “Didi Chuxing Faces Stiff Competition in Race to Dominate China’s Ride-Sharing Market.” *Forbes*, April 11, 2018 <https://www.forbes.com/sites/ywang/2018/04/11/didi-chuxing-faces-stiff-competition-in-race-to-dominate-chinas-ride-sharing-market/#dc93cf54a1e5>

<sup>65</sup> Yue Wang. “Didi Chuxing Faces Stiff Competition in Race to Dominate China’s Ride-Sharing Market.” *Forbes*, April 11, 2018. <https://www.forbes.com/sites/ywang/2018/04/11/didi-chuxing-faces-stiff-competition-in-race-to-dominate-chinas-ride-sharing-market/#dc93cf54a1e5>

<sup>66</sup> Sarwant Singh. “Give Way Uber, DiDi Signals Its Ambitions and They Encompass Wheels on Every Continent.” *Forbes*, January 30, 2018. <https://www.forbes.com/sites/sarwantsingh/2019/01/30/give-way-uber-didi-signals-its-ambitions-and-they-encompass-wheels-on-every-continent/#7933f896350f>

<sup>67</sup> As of July 31, 2020, 71% of Tinder’s outstanding subscriptions were from users ages 18-29, according to data from Tinder. A 2019 Pew Research survey found that for 58% of Americans in this age group, most of their online activity was through a smartphone. This number includes 22% of users who own a smartphone but do not have a high-speed internet connection at home. (Monica Anderson. “Mobile Technology and Home Broadband 2019.” June 13, 2019. <https://www.pewresearch.org/internet/2019/06/13/mobile-technology-and-home-broadband-2019/>.)

<sup>68</sup> The cost of a one-month subscription of Tinder Plus is \$13.49 through the web browser and \$14.99 through the iOS app and the cost of a one-month subscription of Tinder Gold is \$40.40 through the web browser and \$44.99 through the iOS app. (Prices are for a 35-year-old male located in New York City, collected in August 2020).

explained earlier. For Tinder users in the United States, fewer than 4% of outstanding Tinder subscriptions were purchased through a web browser.<sup>69</sup>

How, then, does Apple use its privileged position, which, according to the doctrine of responsibility, should require it to behave in a non-exclusionary fashion? To address this question, I consider the specific mechanisms through which Apple exerts the App Store's dominance and the potential resulting harm to sellers and consumers. As Apple has, for now, chosen not to compete in the dating service market—unlike music, in which Apple Music competes with Spotify, adding the extra dimension of self-preferencing—I focus here on the more straightforward question of how Apple's exclusionary conduct affects Tinder rather than the entire market for digital dating services.

#### 4.1 Welfare Considerations: Prices and Innovation

Apple excludes competing app distribution channels from iOS and payment processors on apps, and to charge a 30% commission on App Store sales (app and in-app purchases) - a commission that is excessive for certain developers. This 30% commission directly results in higher prices for consumers and leads to less innovative products, as developers are left with less revenue for R&D.

Apple claims that its commission is warranted in part due to the costs it bears in providing the App Store's services. "Apple's commission... reflects the value of the App Store as a channel for the distribution of developers' apps and the cost of many services – including app review, app development tools and marketing services – that make the App Store a safe and trusted marketplace for customers and a great business opportunity for developers..."<sup>70</sup> However, it has been more than a decade since the App Store launched, and it seems likely that Apple has more than recouped the initial startup costs associated with R&D and architectural development necessary for the launch of the App Store. Generally, competitive constraints result in price competition and the reduction of prices to levels that better reflect average costs.<sup>71</sup> There is no evidence that Apple's costs of distribution, which are limited to the downloading of apps and the processing of payments, have increased over the past decade. In fact, in most marketplaces, innovation—which Apple claims it has maintained despite not facing direct competition to spur it on—leads to a reduction in prices from efficiency gains as the technology improves and third parties provide services in which they specialize. The fact that Apple continues to charge the same 30% commission despite its marginal costs likely falling and a decreased need to cover fixed costs, taken in conjunction with Apple's market power with respect to the App Store, suggests that the 30% commission is excessive relative to the rate that would be expected in a competitive market. In addition to its 30% commission, Apple collects \$99 per year from all developers who join the Apple Developer Program, a requirement

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<sup>69</sup> Data from Tinder for August 2020.

<sup>70</sup> Letter of Kyle Andeer to Subcommittee on Antitrust, Commercial and Administrative Law of the Committee on the Judiciary. (February 17, 2020):2. <https://docs.house.gov/meetings/JU/JU05/20200117/110386/HHRG-116-JU05-20200117-SD004.pdf>.

<sup>71</sup> Competitive constraints may also result in quality competition and increased investments in innovation. There is no evidence that Apple has invested in App Store innovation commensurately with its App Store revenues.



for distributing apps on the App Store.<sup>72</sup> This annual fee helps cover the costs of running the App Store.

Furthermore, Apple's App Store does not provide individual developers the same value it may have provided in its early years following its 2008 launch. A former Apple executive noted that when Apple initially developed the App Store and implemented its 30% commission, "there was far less pushback from app developers, in part because the App Store was so nascent and the digital transactions were complicated without Apple's help."<sup>73</sup> Over time, however, digital marketplaces have proliferated, and the services the App Store provides have become more common. "[N]ow, those kinds of tools are a dime a dozen," the same executive added. Yet, the commission has remained the same, 30%.

One direct effect of the App Store's commission being unconstrained by competition is higher prices to consumers, as in some cases a portion or all of the commission that is charged by Apple to developers is passed on to consumers. Pricing data on digital goods provides evidence of this price pass-through. Tinder is an example of an app that allows consumers to make purchases through native apps on smartphones (such as its iOS app) as well as through web browsers. While the App Store charges Tinder 30% for end-user purchases of digital goods on the App Store (or 15% for subscriptions renewed past the first year), there is no such fee for purchases made through a web browser.<sup>74</sup> As a direct result of the 30% commission on App Store sales, Tinder charges higher prices on App Store sales than it does on sales made through web browsers. As shown in Figure 5, Tinder's prices are consistently 11-17% higher on iPhones than they are on web browsers.

**Figure 5: Prices of Tinder Products on Web Browser vs. iPhone<sup>75</sup>**

Tinder Product	Price on Web Browser	Price on iPhone	% Price Increase on iPhone
<b>Tinder Gold Subscriptions</b>			
1 month subscription of Tinder Gold	\$40.49	\$44.99	11%
3 month subscription of Tinder Gold (per month)	\$22.50	\$25.00	11%
6 month subscription of Tinder Gold (per month)	\$15.00	\$16.67	11%
<b>Tinder Plus Subscriptions</b>			
1 month subscription of Tinder Plus	\$13.49	\$14.99	11%
3 month subscription of Tinder Plus (per month)	\$9.25	\$10.33	12%
6 month subscription of Tinder Plus (per month)	\$6.37	\$7.08	11%
<b>Boosts</b>			
1 boost (per boost)	\$5.99	\$6.99	17%

<sup>72</sup> Apple. "Choosing a Membership." <https://developer.apple.com/support/compare-memberships/>.

<sup>73</sup> Jack Nicas. "How Apple's 30% App Store Cut Became a Boon and a Headache." *The New York Times*, August 15, 2020. <https://www.nytimes.com/2020/08/14/technology/apple-app-store-epic-games-fortnite.html>.

<sup>74</sup> Purchases through a web browser are subject to a payment processing fee. Payment processing fees for popular payment options such as credit cards and PayPal are typically 1-5% of the transaction value, plus a small, fixed fee, which is much less than the 30% commission charged by Apple.

<sup>75</sup> Prices shown are for a 35-year-old male located in New York City in August 2020.



5 boosts (per boost)	\$5.40	\$6.00	11%
10 boosts (per boost)	\$4.50	\$5.00	11%
<b>Super Likes</b>			
5 super like (per super like)	\$1.40	\$1.60	14%
25 super likes (per super like)	\$1.08	\$1.20	11%
60 super likes (per super like)	\$0.90	\$1.00	11%

Other examples of top grossing apps on the App Store that charge higher prices on App Store sales than on sales made through a web browser include Candy Crush, YouTube, YouTube Music, Amazon Music, Pandora, Twitch and Facebook,<sup>76</sup> indicating the increased price to consumers due to Apple's commission.

In addition to higher prices, Apple's market power also stifles developer innovation. Apple's 30% commission reduces developer's gross margin as: (i) developers may not pass on the entirety of Apple's 30% commission, and (ii) any price increases that are passed on to consumers result in fewer app and in-app purchases. The reduction in margins diminishes the amount that developers can invest in innovation, research and development, and other quality enhancing investments. A 2017 study found that an increase in corporate tax rates—functionally similar to Apple's excessive commission—reduces firm spending on R&D and results in fewer patents and product releases, both key measures of innovation.<sup>77</sup>

Furthermore, Apple's 30% commission reduces the scope of services that developers can offer. Specifically, it forecloses apps with digital service offerings that have high costs of goods sold. ClassPass's recent retraction of virtual workout classes is a prime example of this foreclosure. ClassPass has an app for consumers to book exercises classes at different gyms, a category of service involving a "physical good" for which Apple does not charge its 30% commission. However, when ClassPass attempted to innovate for consumers in response to the COVID-19 pandemic's restrictions on gyms by introducing virtual classes, Apple informed ClassPass that the 30% commission would be applied to this new offering.<sup>78</sup> ClassPass removed the virtual class option and stated that, "[honoring the commission] would require price increases that would dramatically reduce demand for these classes."<sup>79</sup> In this representative case, Apple's 30% commission deprived consumers of a class of digital goods that would have been able to exist but for Apple's anticompetitive behavior and unconstrained 30% commission.

<sup>76</sup> Prices from a 35-year-old male located in New York City in August 2020

<sup>77</sup> See, e.g., Abhiroop Mukherjee, Manpreet Singh, and Alminas Žaldokasa. "Do corporate taxes hinder innovation?" *Journal of Financial Economics* 124, no.1, (April 2017).

<sup>78</sup> Jack Nicas and David McCabe. "Their Businesses Went Virtual. Then Apple Wanted a Cut." *The New York Times*, July 28, 2020. <https://www.nytimes.com/2020/07/28/technology/apple-app-store-airbnb-classpass.html>.

<sup>79</sup> Jon Porter. "Airbnb shared antitrust concerns with lawmakers after App Store standoff." *The Verge*. July 28, 2020. <https://www.theverge.com/2020/7/28/21345134/airbnb-classpass-apple-app-store-30-percent-commission-policy-lawmakers-house-antitrust>.

## 4.2 From Price to Value Proposition: Bundled Services and Foreclosed Alternatives

Apple uses its platform power to exclude competition in iOS app distribution and mandates that developers use the distribution and payment processing functionality of its App Store. It is worth restating that Apple's tying of its App Store to iOS is not a technological necessity but rather a strategic and unilateral choice (Jacobides & Lianos, 2021). The foreclosure of competition for distribution and payment processing allows Apple to charge a 30% commission on app revenue to certain developers. Developers must accept this commission in order to distribute through the App Store, irrespective of the value they receive from Apple. This is demonstrated by the limited promotional value Tinder receives from the App Store, despite being compelled to share 30% of all sales through its app with Apple. The Foreclosure of competition and Apple's 30% commission prevent developers from offering lower prices and higher quality apps. The excluded competition is most impactful for larger apps such as Tinder that have developed their own payment systems and do not need the App Store's promotional services. The challenge here is that app developers like Tinder are being charged for, in essence, a bundle they do not require and for a fee to which they certainly would not agree if not for the foreclosure of alternatives. In this section, I focus on Apple's imposition of a bundle and foreclosure of alternatives in app distribution in general and payments in particular.

### 4.2.1 Lackluster Promotion

By way of background, it may be worth noting that, despite its status as a digital service, Tinder historically depended on offline advertising to develop consumer awareness and build its brand. Offline marketing was especially important to Tinder's rise in popularity in its early days. Examples of Tinder's early marketing variously included targeted visits to campus sororities and fraternities (having sorority members install the app first was effective in getting fraternity members to sign up as well);<sup>80</sup> campus parties which required a download of the Tinder app for entry;<sup>81</sup> and viral stunts that led to significant word of mouth advertising.<sup>82</sup> These offline marketing activities were responsible for much of Tinder's early user growth.<sup>83</sup> As late as 2015, 97% of Tinder's marketing spend was on offline channels.<sup>84</sup> And Tinder has continued to invest heavily in offline marketing: since 2015, Tinder's total offline marketing spend was more than 50% greater than its online marketing spend.

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<sup>80</sup> Morgan Brown and Everette Taylor. "What Ignited Tinder's Explosive Growth?" *Growth Hackers*. <https://growthhackers.com/growth-studies/what-ignited-tinders-explosive-growth>.

<sup>81</sup> Alyson Shontell. "Founder of \$3 billion Tinder reveals the clever marketing tricks he used to make the app go viral." *Business Insider*, February 15, 2017. <https://www.businessinsider.com/how-tinder-went-viral-sean-rad-reveals-app-marketing-tricks-in-podcast-2017-2>.

<sup>82</sup> Jesse Michels and Sunil Rayan. "How to grow your app." *TechCrunch*, December 26, 2016. <https://techcrunch.com/2016/12/26/how-to-grow-your-app/>.

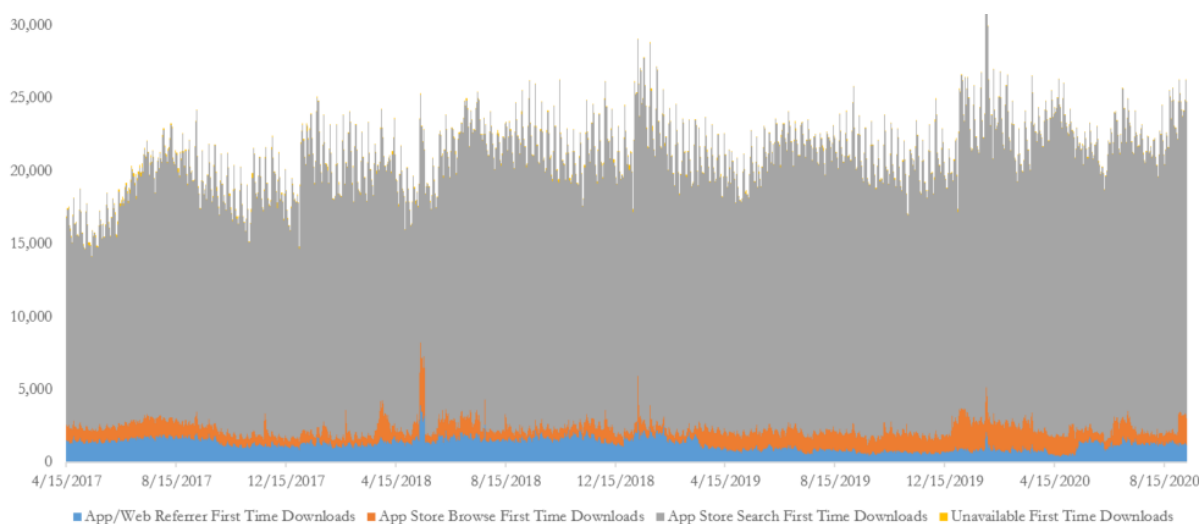
<sup>83</sup> See, e.g., Morgan Brown and Everette Taylor. "What Ignited Tinder's Explosive Growth?" *Growth Hackers*. <https://growthhackers.com/growth-studies/what-ignited-tinders-explosive-growth> and Alyson Shontell. "Founder of \$3 billion Tinder reveals the clever marketing tricks he used to make the app go viral." *Business Insider*, February 15, 2017. <https://www.businessinsider.com/how-tinder-went-viral-sean-rad-reveals-app-marketing-tricks-in-podcast-2017-2>.

<sup>84</sup> Tinder marketing data.

As part of the arrangement of the App Store, Apple offers marketing services to justify its App Store fees.<sup>85</sup> This is a bundled service, which is offered regardless of the appetite of companies to consume it or of their expected benefit. And while undoubtedly many developers benefit from the promotion and distribution offered by the App Store, which help consumers find their apps, the benefits are far from universal. As has been noted regarding typical search patterns in the App Store, “users find out about apps in a number of ways when using their smartphones, for instance through advertising on social media, watching a YouTube video, or through general search on their mobile device” (Voelcker and Baker: 91). This is why, “developers target app users (including iOS users) outside their OS environment, e.g., through marketing campaigns on social media, on the developer’s website, or through other advertising channels where the target audience can be reached” (Voelcker and Baker: 91).

The limited value of promotion and distribution by the App Store for major developers is highlighted by consumer navigation patterns to Tinder. More than 88% of attributable first-time downloads of Tinder between April 2017 and August 2020 came from App Store searches, while only 6% came from App Store browsing and the remaining 6% came from referrals from other apps or websites.<sup>86</sup> See Figure 6. During this time period, first-time downloads from App Store search have consistently been much higher than first-time downloads from App Store browsing.

**Figure 6: Tinder App Units by Referral Source<sup>87</sup>**



<sup>85</sup> Apple has stated its fees are for “app review, app-development tools, and marketing services.” Matt Smith. “There’s a Fight Raging Over Apple’s App Store. Why Some Regulators and Developers Are Calling It a Monopoly.” *Barron’s*, March 6, 2020. <https://www.barrons.com/articles/apple-app-store-developers-are-pushing-back-on-apples-power-51584700200>

<sup>86</sup> From App Store data for Tinder. Apple reports first time downloads as app units. Percentages exclude first time downloads for which the referral source was unavailable (less than 0.5% of app units were unattributable).

<sup>87</sup> Tinder data from the App Store. Note that Apple likely had a data issue in March 2019 which caused first time downloads to be reported incorrectly. Data from that week have been removed from the chart.

While Apple does not provide Tinder with data on search terms in the App Store, search terms used to find apps can demonstrate consumer intent and perceptions of Tinder.<sup>88</sup> In the absence of App Store search terms, data on organic search terms resulting in visits to the Tinder webpage demonstrate the importance and strength of Tinder's brand. Data from Google Analytics show that more than 97% of the visits to the Tinder webpage resulting from organic search between August 2018 and August 2020 were navigational searches involving the word "Tinder."<sup>89</sup> See Figure 7 for a list of the top ten search queries that resulted in visits to the Tinder webpage.

**Figure 7: Top 10 Search Queries resulting in Visit to Tinder Webpage<sup>90</sup>**

Search Query	Clicks ('000s)	Percent of Total Clicks
Tinder	135,662	86.4%
tinder login	1,577	1.0%
tinder.com	944	0.6%
tinder app	876	0.6%
tinder online	631	0.4%
tinder web	553	0.4%
Tender	542	0.3%
tinder entrar	370	0.2%
Timder	338	0.2%
tinder uk	239	0.2%

The data suggests that Tinder receives limited promotional value from the App Store despite the substantial share of each sale it is forced to share with the platform.

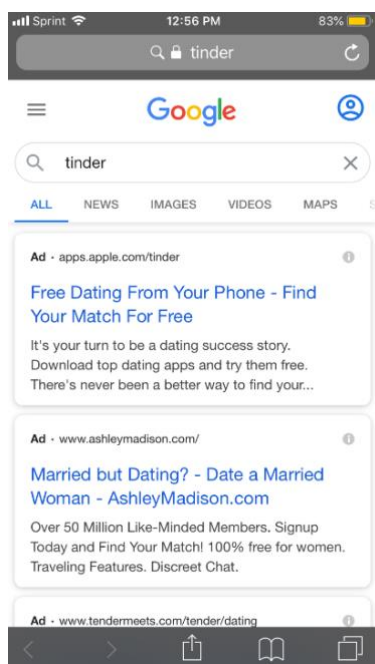
Apple's own behavior further proves that Tinder's brand is far more valuable for obtaining users than Apple's promotion within the App Store. To drive sales of apps through the App Store, Apple purchases search ads on Google for keywords associated with popular apps. For example, consumers who search on Google for "Tinder" within a browser application on their iPhones may intend to visit and sign up for Tinder through the Tinder webpage. However, Apple purchases search ads that appear at the top of the search results page. These ads direct consumers to the App Store page for Tinder, rather than to the Tinder webpage.

<sup>88</sup> The Voelcker and Baker report notes, "when users search for apps using App Store search, they are typically looking for a specific app to suit their purposes. This means that search terms will frequently include the name of the app (including the brand name) itself. Indeed, it is estimated that a significant majority of search queries are 'branded'" p. 89.

<sup>89</sup> From Google Analytics data for Tinder. Includes misspellings of "tinder," such as "tender" or "timder."

<sup>90</sup> From Google Analytics data for Tinder. Table includes only search terms in the Latin alphabet. Search terms with characters not in the Latin alphabet comprised 3% of total clicks. It is likely that some of these searches were navigational queries for tinder in a different language.

**Figure 8: Apple App Install Ad for Search Term “Tinder”**



Apple’s interception and redirection of the small share of consumers who search for the Tinder website has several impacts. Among these, it inflates the estimated promotional benefit Apple can report. Furthermore, this competes with Tinder’s (lower cost) distribution channel outside of the App Store, cementing Apple’s hold 37 over Tinder and other developers.

#### **4.2.2 Foreclosure of Rival Payment Processing Systems**

In addition to imposing steep charges irrespective of their return value, platforms with chokepoints on their ecosystems can extract value by excluding rival complementary services (Cusumano et al, 2019: 79). This exercise of market power is exhibited by Apple in payments.

Significant competition among payment providers has driven down transaction fees to 1-5% of the transaction value, plus a small, fixed fee.<sup>91</sup> These services are provided by firms such as PayPal and Stripe that specialize in payments processing and have a track record of providing payment services at large scales across industries and technologies. Yet, in an exercise of its market power, Apple prohibits such providers from servicing in-app payments for developers on apps distributed through the App Store and forbids developers from using their own payment systems as well.

Exposure to competition in payments would not only pressure Apple to reduce the App Store’s commission, but to also provide developers with improved quality and innovation and to share data (e.g., credit card information) from payments with developers. Currently, Apple collects data from consumers purchasing apps or making in-app payments but does not share this data with the developers of those apps. This prevents developers from engaging in basic consumer

<sup>91</sup> Based on a review of transaction fees charged by payment providers, including PayPal, Stripe, Square, Visa, and MasterCard.

service requests, including “refunds, credit card changes, discounts, trial extensions, hardship exceptions, comps, partial payments, non-profit discounts, educational discounts, downtime credits, tax exceptions, etc.”<sup>92</sup> If consumers have paid or subscribed through Apple’s In App Payment API (IAP), developers can only refer consumers back to Apple regarding issues with billing or refunds. This is detrimental to the consumer experience, as consumers may not immediately know who to contact to resolve billing issues. Apple’s conduct also prevents iOS developers from offering consumers additional services of value, such as allowing consumers to “carry-over credits to subsequent months” or targeting consumers whose subscriptions have expired with special offers (Autoriteit Consument & Markt, 2019: 94). Furthermore, by not providing iOS developers access to key analytics about their customers, Apple deprives developers of key insights for improving their offerings

Mandating itself as an intermediary for the sale of all digital purchases associated with an app distributed through the App Store is also part of what enables Apple to treat developers as disposable. By making itself the direct broker of the sale—both the “face” of the purchase and collector of the consumer’s purchasing information—Apple weakens the relationship developers have with customers.

Apple’s exclusionary conduct also affects competition downstream in apps. By mandating itself as the sole payment processor for in-app payments on apps distributed through the App Store and thus obtaining privileged access to consumer data, Apple has a competitive advantage as an app developer. Additionally, because it controls iOS, Apple can monitor how much time users spend on specific apps, information that regular developers lack. This additional information gives Apple an advantage in services in which Apple already competes (e.g., music, news, weather) as well as services in which it may compete in the future—such future services may include new apps designed or launched based on the insights Apple gains from its unique trove of consumer data. Apple’s competitive advantage as a result of its privileged access to consumer data is substantial before even considering other acts that disadvantage regular developers, such as Apple’s pre- installation of its own apps on iOS and preferencing of them in search results in the App Store.<sup>93</sup>

Apple’s in-app purchasing mandate also exacerbates consumer lock-in by making it more difficult for consumers to multi-home or switch operating systems. Consumers cannot use a subscription purchased through Apple’s In-App Purchases on their iOS device simultaneously on an Android device (e.g., a Samsung tablet). Furthermore, when transferring app subscriptions purchased on an iOS device, consumers have to cancel their subscriptions and wait for that subscription to expire before they can re-subscribe to the app on their new operating system.<sup>94</sup> This becomes especially onerous when consumers have multiple different subscriptions for different apps with different subscription end dates.

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<sup>92</sup> “Our CEO’s take on Apple’s App Store payment policies, and their impact on our relationship with our customers,” *Hey.com*, June 19, 2020. <https://hey.com/apple/iap/>.

<sup>93</sup> Apple’s apps ranked first in more than 60% of basic searches in the App Store, according to data from App Annie. Tripp Mickle. “Apple Dominates App Store Search Results, Thwarting Competitors.” *Wall Street Journal*, July 23, 2019. <https://www.wsj.com/articles/apple-dominates-app-store-search-results-thwarting-competitors-11563897221>.

<sup>94</sup> See, e.g. “Our CEO’s take on Apple’s App Store payment policies, and their impact on our relationship with our customers.” *Hey.com*, June 19, 2020. <https://hey.com/apple/iap/>. See also, e.g., Hulu. “Switch plans and manage add-ons.” August 24, 2020. [https://help.hulu.com/s/article/manage-subscription?language=en\\_US#itunes](https://help.hulu.com/s/article/manage-subscription?language=en_US#itunes).

While Apple may claim that the restriction of third-party payment systems is to provide users with better security, Apple does not mandate the use of its in-app purchasing system for transactions involving physical goods or services. The rationale for an Uber ride, Airbnb home booking, or Target delivery requiring less security than the purchase of a good Apple classifies as purely digital is unclear. Furthermore, on Mac computers, Apple does not restrict app distribution to one (Apple) store or payment option, nor does it limit ancillary services to one (Apple) provider. If we take Apple at its word, should consumers feel insecure when using a Mac?

#### 4.3 A Pattern of Growing Dominance: Tightening the Screws on Developers

To understand the forces behind Apple's platform power as well as the platform's instruments to abuse its power, it helps to trace the evolution. When the App Store launched in 2008, Apple had yet to foster the conditions and gain the control that would later give rise to a unique level of dominance. The App Store's power grew incrementally. In the years following 2008, we can observe a pattern in Apple's treatment of developers, consistent with that found in other research such as Rietveld et al. (2020), which shows how the App Store's governance changed from initially nurturing conditions that helped developers (e.g., to better monetize) to imposing rules with redistributive effects in favor of the platform (i.e., itself).

In 2010, for example, after achieving success with the App Store following its launch, Apple imposed restrictions on the programming languages and tools developers could use on iOS, limiting languages to those native to iOS and developer tools to a small set it sanctioned.<sup>95</sup> Concerned Apple's conduct could harm competition, the Federal Trade Commission opened an investigation. Apple, in turn, reversed course and removed the restrictions.<sup>96</sup> As its power grew, however, Apple embarked on bolder exclusions. In 2011, Apple restricted developers from directing consumers outside of an iOS app to make payments.<sup>97</sup>

In subsequent years, Apple's exercise of its dominance over developers expanded, and Apple launched its own downstream services, giving its apps advantages over existing offerings from non-Apple developers.<sup>98</sup> For example, before and after the release of Apple Music, in 2016, Apple introduced a series of rules and hardware limitations that hindered the incumbent Spotify. Among other impediments, Apple dismissed Spotify's efforts to integrate with the Apple Watch; it restricted Spotify from using terms such as "free" on its promotion page in the App Store, only to do so itself for Apple Music; and it gave Spotify second billing to Apple Music on Siri, defaulting to its own (less established) service when consumers requested a song without

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<sup>95</sup> "Regulators Mull Antitrust Look at Apple: source." *Reuters*, May 3, 2010. <https://in.reuters.com/article/us-apple-antitrust/regulators-mull-antitrust-look-at-apple-source-idUSTRE6425JE20100503>.

<sup>96</sup> "Regulators Mull Antitrust Look at Apple: source." *Reuters*, May 3, 2010. <https://in.reuters.com/article/us-apple-antitrust/regulators-mull-antitrust-look-at-apple-source-idUSTRE6425JE20100503>.

<sup>97</sup> "Apple on Sony Reader: 'We Have Not Changed Our Guidelines.'" *All Things Digital*, February 1, 2011. <http://digitaldaily.allthingsd.com/20110201/apple-on-sony-reader-we-have-not-changed-our-guidelines/> and Anthony Ha "Subscriptions put Apple in Antitrust Spotlight Again" *VentureBeat*, February 17, 2011. <https://venturebeat.com/2011/02/17/apple-subscriptions-antitrust-investigation/>.

<sup>98</sup> One key advantage was favorable placement in search rankings. See, e.g., Jack Nicas and Keith Collins. "How Apple's Apps Topped Rivals in the App Store It Controls." *The New York Times*, September 9, 2019. <https://www.nytimes.com/interactive/2019/09/09/technology/apple-app-store-competition.html>.



specifying the streaming service for its delivery.<sup>99</sup> More recently, in gaming, Apple introduced a number of restrictions starting in late 2017—affecting then-market leaders, such as Stadia and Steam Link—in the period prior to its launch of Apple Arcade. Among other anti-competitive conduct, Apple prevented developers from “executing” their apps through the cloud, blocking some of the most innovative new offerings (and, specifically, those diminishing the centrality of the iPhone hardware in the performance of games) ahead of Apple’s debut in the market.<sup>100</sup>

After walking back some of its initial attempts to exercise and strengthen its market power in 2010 in the face of regulatory opposition, Apple would soon be less inhibited in its exclusionary conduct and eventually play in markets with risks of favoritism of its own apps. Compared to leading platforms in other digital marketplaces, Apple stands out for its increasingly restrictive conduct, having implemented the most changes “specifically aimed at the platform’s value appropriation (e.g., giving preferential treatment to own apps; banning external apps that compete with iOS functionality)” (Rietveld et al., 2020). This conduct is explained by Apple’s incentive to use its platform power not only to extract additional surplus from developers but also to weaken competitive threats. Today, as some of the world’s most popular and otherwise powerful developers attempt to rebuke Apple’s dominance, the platform feels little competitive pressure to consider changing the terms of its relationship with these complementors.

The concessionary steps Apple has taken appear to only reinforce its power and ability to control the terms of its relationship with developers. In its most recent display of comity, Apple, as of January 2021, has committed to reducing its App Store commission to 15% for developers that earn \$1 million or less annually.<sup>101</sup> Apple hit the right notes, labelling its new policy the “App Store Small Business Program” and framing it as a boon to developers in the face of the economic challenges created by COVID-19.<sup>102</sup> However, when its impact and design are considered, Apple’s new pricing policy appears less as a response to competitive pressure and more as an internally-determined concession to gain public favor. The portion of App Store revenue touched by this policy is minor in relative terms: the developers who will qualify accounted for less than 5% of App Store revenue last year; specifically, around \$780 million of Apple’s total revenue of \$14.8 billion from the App Store.<sup>103</sup> Second, the policy’s design belies its non-market driven thrust. By setting a revenue cliff for developers at which their commissions increase—rather than different marginal rates—the new pricing policy effectively punishes developers whose earnings are just above the threshold. I.e., it will charge 30% to a developer earning \$1,000,001 annually and 15% to a developer earning \$1,000,000 annually. Furthermore, although seemingly magnanimous, a reduction for small developers is at odds with what would be expected in a competitive market, in which large sellers receive volumes discounts due to their greater bargaining power and generally lower cost to service

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<sup>99</sup> Time to Play Fair (Spotify). “A Timeline: How We Got Here.” <https://timetoplayfair.com/timeline/>.

<sup>100</sup> “Apple Just Created Insane Rules for Cloud Gaming on iPhone.” *ExtremeTech*, September 11, 2020. <https://www.extremetech.com/gaming/314918-apple-just-created-insane-rules-for-cloud-gaming-on-iphone> and “Cloud gaming service Shadow has been removed from the App Store for violating guidelines.” *iMore*, February 27, 2020. <https://www.imore.com/cloud-gaming-service-shadow-has-been-removed-app-store-violating-guidelines>.

<sup>101</sup> The qualifying threshold is determined by earnings in the previous calendar year and is applied to earnings after Apple’s take is applied – i.e., a developer that earned \$1.15 million in 2020 would qualify for the lower commission.

<sup>102</sup> “Apple announces App Store Small Business Program.” Apple Newsroom, November 18, 2020. <https://www.apple.com/newsroom/2020/11/apple-announces-app-store-small-business-program/>.

<sup>103</sup> Estimates based on data from Sensor Tower.



due to economies of scale. Lastly, and most fundamentally, the reduced commission does not address the absence of competition imposed by Apple and its exclusionary conduct that harm developers and consumers in myriad ways.

#### **4.4 Controlling the Future: As Smartphones Become Less Differentiated, Apple's Business Model is Shifting Towards Services**

The competitive landscape in mobile hardware is changing. In prior years, Apple's supply chain and the design, functionality, and features of its devices were highly differentiated. However, the supply chains of device makers, largely centered in Asia, are increasingly replicable. Furthermore, after years of continually releasing new features and functionalities (e.g., screen resolution and connectivity), there may be a ceiling to what premium smartphones can offer above and beyond the lower- and mid-tier devices nipping at their heels.<sup>104</sup> And the performance of premium and more modest devices could converge further as an increasing share of the workload behind applications is managed on the cloud, diminishing the role of mobile devices in the delivery of the service.

Consistent, if subtly, with this trend, iPhone unit sales have been declining since 2015<sup>105</sup> and profit margins have declined from around 75% to 60% in the past ten years.<sup>106</sup> Although the iPhone still stands as the centerpiece of the tech giant's business, with sales and margins that remain enviable, revenue for Apple appears to be shifting towards services. As a percentage of Apple's total revenue, hardware revenue decreased from 63% to 44% percent from Q3 2015 to Q3 2020<sup>107</sup> and software and services revenue increased from 10% to 22% percent in the same time frame.<sup>108</sup>

Apple has likely recognized the trend toward the commoditization of smartphone hardware as well as the previously described growing prominence of ecosystems and the product-service bundles they foster. At least Apple's behavior suggests as much, as Apple has positioned itself not just to be the centerpiece of product- service bundles, but to control the ecosystem and the structure of the bundle.

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<sup>104</sup> As recently noted, "We may have reached 'peak screen' for the general population, such that bolstering the current resolution, color accuracy, brightness, and refresh rates beyond current levels won't matter to most people." (Jeremy Horwitz. "Specs are Android's biggest advantage over iPhones, but do users care?" *VentureBeat*, February 17, 2020. <https://venturebeat.com/2020/02/17/specs-are-androids-biggest-advantage-over-iphones-but-do-users-care/>.)

<sup>105</sup> David Gewirtz. "iPhone Unit Sales Have Been Declining Steadily for 5 years." *ZDNet*, September 2, 2020. <https://www.zdnet.com/article/heres-an-interesting-chart-iphone-unit-sales-have-been-declining-steadily-for-five-years/>.

<sup>106</sup> Omar Sohail. "Apple's iPhone Profits Have Actually Been Declining Despite the Era of \$1,000+ Devices, According to the Latest Chart." *Wccftech*, Nov 15, 2018. <https://wccftech.com/apple-iphone-profits-declining/>.

<sup>107</sup> "iPhone Revenue as a Share of Apple's Total Revenue." Statista. <https://www.statista.com/statistics/253649/iphone-revenue-as-share-of-apples-total-revenue/>.

<sup>108</sup> "Services Revenue as a Share of Apple's Total Revenue." Statista. <https://www.statista.com/statistics/1101212/services-revenue-as-share-of-apples-total-revenue/>.

#### 4.5 Bottom Line: The Need to Apply the “Special Responsibility” Doctrine to Gatekeepers (or, Why Apple’s Successful Strategy Needs to Stop Resting on Anticompetitive Behavior)

Our analysis demonstrates that Apple has the unique privilege of platform power over developers in the iOS ecosystem. Possessing the special position, Apple employs hard-ball tactics that are likely to restrict competition and reduce welfare.

Apple’s general defense is that it operates a closed ecosystem to control the customer experience. Foreclosure of rival payment systems is part and parcel of both the customer experience and the stability of the system, it contends. Yet the most recent debate is not about whether in-app payments should be allowed (they are now structured as modular components that do not undermine the iOS integrity) but whether a tax should be applied. So, Apple’s defense of yesteryear, that it is safeguarding the user experience, does not seem to apply. Rather, Apple appears to be cultivating a position of strength, from having built an (ever-expanding) ecosystem with significant lock-ins and abusing this position of power. The specific case of how Apple is able to treat one of the most successful apps in both its ecosystem and the Android ecosystem should remind us that gatekeepers have extraordinary power—and should carry commensurate responsibility. We should also not expect that self-interest alone will check Apple’s anti-competitive behavior. Unfortunately, the very aspects that make Apple a strategically powerful firm—its intimate customer knowledge, its ability to create lock-in, its scale and own network effects—are also those which give rise to its anticompetitive impacts.

Much of Apple’s success, to be sure, is based on its merits: from the ingenuity of its designers and software engineers, to its successful ecosystem management and product design. There is little doubt that a regulatory intervention may risk undermining some of the benefits that consumers enjoy, as some options would no longer be available (Dolmans and Pesch, 2019 or Crémer, de Montjoye, and Schweitzer, 2019). But this is a price that may well be worth paying in the short run, as Apple is now using its position without regard to the obligations it entails. Regulators should be swift and decisive. Exclusionary conduct such as mandating the use of its own payment system on iOS apps is hard to justify, and for many developers the 30% commission is unjustified. The difficulty of finding an effective regulatory regime does not imply that solutions do not exist. In the world of patenting, the practice of obligatory licensing of “Standard Essential Patents” under FRAND rules has, within a few years, become standard practice; and in the world of telecommunications regulation, there is a well-established regime for dealing with settings whereby network externalities are paramount.<sup>109</sup> Regulators and society have reacted in the past to new challenges; with changes in either production economics or inter-organizational relations, new approaches have been devised.

We are currently witnessing a transformation of the way economies are structured and of how sectoral architectures are set. The ability of firms to shape the rules, roles, and relationships, including those that operate within platforms and ecosystems, are becoming paramount for their success (Jacobides et al, 2006; Jacobides, 2019). But this also leads to new regulatory concerns. Those who have spent years studying the underpinnings of Big Tech’s success for

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<sup>109</sup> See, e.g., “FRAND, RAND, and SEP: Why These Acronyms Are Important.” *Technology | Academics | Policy*. February 12, 2013. <https://www.techpolicy.com/Blog/February-2013/FRAND,-RAND,-and-SEP-Why-These-Acronyms-Are-Import.aspx>

valuable lessons have in recent years taken to exhorting gatekeepers to realize their immense power and exercise self-restraint before their powers reach a tipping point (Iansiti & Lakhani, 2018). With that message largely unheeded, once we identify firms with bottleneck power and do not see behavior consistent with the “special responsibility not to exploit,” we need to act, and swiftly.

## 5. Concluding Thoughts

One of the greatest challenges of the platform economy is that the complexity of its economics and underlying technology may lead to confusion and regulatory inaction, for fear of interfering with innovation. This is especially challenging because it can be hard to disentangle competition on merits from a dominant position. Yet, given the asymmetrical power structures that digital platforms entail, regulatory inaction can have a very heavy price. We need to identify some simple, collectively agreed upon principles for establishing platform power and then consider what are the anti-competitive conducts and outcomes that require recourse. This paper offers such a framework—simplified—to assess platform power and to raise questions that regulators should consider.

In the case of Apple’s market power, the scale and variety of apps on the App Store can distract from Apple’s restrictive conduct towards these apps and their developers. For many app developers, the 30% commission is a steep charge relative to the value of services delivered by Apple. As demonstrated, opting out of iOS is not a commercially viable option for many developers. Apple’s excessive commission on iOS apps results in higher prices and can stifle service quality, diversity, and innovation for consumers. An examination of other digital marketplaces highlights the benefits of competition among platforms. Rival platforms in PC gaming and live streaming push each other to price competitively and maximize innovation. They also remind us not to take for granted the architectural decisions that Apple has made strategically and unilaterally (Jacobides & Lianos, 2021)—the tying of an operating system with the distribution of services optimized for that operating system is not a necessity of the underlying technologies.

The precise regulatory measures for addressing the market power of platforms like the App Store and iOS and enabling competition are beyond the scope of this paper. However, it is worth noting two common themes of reform, beyond those related to the issue of pricing (the 30% commission) and the need to justify it when a firm is a gatekeeper. These are i) restricting exclusionary conduct and self-preferencing, and ii) increasing data access and mobility.

### **Limiting exclusionary conduct and self-preferencing.**

Earlier regulatory responses to the abuse of market power by platforms tended to focus on exclusionary conduct in complementary services. For example, Apple’s platform role falls into two scenarios that the German government described as requiring greater regulatory oversight

and intervention: first, its exclusionary conduct in payments services; second, offering its own apps in competition with apps from rivals (Schallbruch, Schweitzer & Wambach, 2019, pg. 50-51). These conducts are difficult to undo given the dynamics of platform marketplaces: demand for the service, initially contrived, becomes perpetuated by a captive user base and their data. The Digital Markets Act, in a strict interpretation and implementation of its interventions, would go further, proscribing the tying-in of ancillary services in general (i.e., potentially more than just payment processing) and exclusive app distribution<sup>110</sup> (i.e., third-party app stores).

### **Data access, portability, and interoperability.**

As data is a key asset that can tip marketplaces into the hands of a leading platform, data access and portability have been at the center of some proposals for promoting competition, such as those discussed in Schallbruch, Schweitzer, and Wambach (2019), Dolmans and Pesch (2019), Crémer, de Montjoye, and Schweitzer (2019), Kimmelman (2020), and the DMA. These solutions include requiring platforms to share data with their business users (e.g., developers) and competitors or to submit data to a third-party serving as a data “trust.” Here, the DMA obligates gatekeepers not just to share data but to do so without obstructions: gatekeepers would be required to grant developers access to data about developers’ sales, customers, and other commercial activity “free of charge” and in a manner that is “high in quality, continuous and realtime.” These solutions also call for platforms to ensure data portability by capturing and storing user data in interoperable formats that enable consumers to transfer their user information to other platforms with minimal friction.<sup>111</sup> These requirements facilitate consumer switching and multi-homing in support of consumer choice. These proposals stipulate the need for accompanying measures to ensure privacy and security safeguards. Although powerful platforms tend to raise the specter of privacy breaches in defense of their closed systems and refusal to deal—look no further than Apple’s newest marketing campaign<sup>112</sup>—rules requiring platforms to share data and make it more transferable need not undermine privacy protections (Kimmelman, 2020).

Although less widely adopted, another intervention is to resolve the fragmentation that weakens the bargaining power of businesses that have come to depend on platforms. The Australian competition authority, for example has intervened to address the disparity between platforms

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<sup>110</sup> Is it important to note, given that this proscription would disarm the foundation of the App Store’s platform power, that this obligation falls under the DMA’s Article 6, which, as currently proposed, would not be automatically imposed but rather subject to negotiations with the gatekeeper. Furthermore, the relevant clause includes the potentially defanging caveat that gatekeepers would be allowed to take measures to prevent third party app stores from taking actions that “endanger the integrity of the hardware or operating system provided by the gatekeeper.”

<sup>111</sup> See, for example: Jacques Crémer, Yves-Alexandre de Montjoye, and Heike Schweitzer. “Competition Policy for the Digital Era.” European Commission Directorate-General for Competition. (2019):6; “A New Competition Framework for the Digital Economy.” Federal Ministry for Economic Affairs and Energy, Germany. September 2019 and “Unlocking Digital Competition.” Report of the Digital Competition Expert Panel, United Kingdom. March 2019

<sup>112</sup> Rishi Iyengar. “Apple’s New iPhone Ad Puts Privacy Front and Center Again.” *CNN*, September 3, 2020. <https://www.cnn.com/2020/09/03/tech/apple-iphone-privacy-ad/index.html>

and media companies and is developing a code of conduct that would allow media companies to engage in collective bargaining to counter the stronger bargaining position of platforms.<sup>113</sup>

Developers faced with Apple's market power and consumers experiencing the downstream harm may experience some relief if Apple were prevented from tying complementary services like payments to platforms like the App Store (or app distribution from iOS) and from preferencing its own apps. Data portability would increase competitive pressure on Apple by loosening its lock on consumers, although only slightly given the myriad other barriers to switching mobile devices. However, more work is required to determine the effects of these potential solutions and identify a broader set of reforms to foster competitive pressures against the App Store and dominant platforms in other marketplaces to ensure competitive prices, high quality service, and innovation for consumers.

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<sup>113</sup> The latest draft was released on July 31, 2020 and is available here: <https://www.accc.gov.au/focus-areas/digital-platforms/draft-news-media-bargaining-code>.

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## Appendix: How often do Consumers Switch Away from iPhones?

Section 3.1.2 demonstrates that consumers do not easily switch their iPhone “bundle” of the hardware and apps. This section details why iOS users are locked-in, for a number of reasons, explained in detail below:

1. Consumers prefer features on their existing mobile operating systems.
2. The high price of smartphones makes it costly for consumers to switch from iPhones to Android devices.
3. Transferring data and accounts across operating systems can be time-consuming and result in lost purchases.
4. Apple has created a hardware ecosystem around the iPhone that further increases switching—or, more specifically, “mixing and matching” costs.
5. Apple has introduced consumer programs—warranty, financing, and upgrade—that strengthen consumer lock-in.
6. The replacement cycle for smartphones is long (and increasing).

### 1. Consumers prefer features on their existing mobile operating systems.

A 2019 Consumer Intelligence Research Partners (CIRP) study of consumers in the U.S. found that 91% of iOS users upgraded to another iPhone,<sup>114</sup> and other surveys show similarly low rates of OS switching.<sup>115</sup>

### 2. The high price of smartphones makes it costly for consumers to switch from iPhones to Android devices.

The high price of smartphones makes it cost prohibitive for consumers to easily switch smartphone operating systems. The average price of a consumer smartphone in the U.S. in 2019 was \$528.<sup>116</sup>

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<sup>114</sup> Ben Lovejoy. “iOS and Android loyalty levels higher than ever; Android just ahead for now.” January 28, 2019. <https://9to5mac.com/2019/01/28/ios-android-loyalty/>; “iPhone Scores 92% Loyalty Rate in Recent Survey Ahead of iPhone 8.” Mac Rumors, 2017, May 17. <https://www.macrumors.com/2017/05/17/iphone-92-percent-loyalty-rate-survey/>.

<sup>115</sup> A 2017 Morgan Stanley survey of adults in the U.S. found that 92% of iPhone owners that are likely to upgrade their phone in the next 12 months plan to purchase another iPhone (“iPhone Scores 92% Loyalty Rate in Recent Survey Ahead of iPhone 8.” Mac Rumors, May 17, 2017. <https://www.macrumors.com/2017/05/17/iphone-92-percent-loyalty-rate-survey/>; “92% of iPhone users likely to upgrade in the next 12 months,” AppleWorld Today, May 17, 2017). A 2019 SellCell survey of adults in the U.S. showed that 91% of iPhone users intend to buy another iPhone when they upgrade. (“iPhone vs. Android – Cell Phone Brand Loyalty Survey 2019.” Sell Cell, August 20, 2017).

<sup>116</sup> “Average price of smartphones in the United States from 2014 to 2023 (in U.S. dollars), by segment.” Statista, February 28, 2020. <https://www.statista.com/statistics/619830/smartphone-average-price-in-the-us/>. Top end iPhones and Samsung phones (iPhone and Samsung are the most popular smartphone brands in the U.S.; Samsung phones operate an Android operating system) can cost as much as \$1,449 for the iPhone 11 Pro and \$1,449 for the Samsung



### 3. Transferring data and accounts across operating systems can be time-consuming and result in lost purchases.

Many consumers develop a certain level of familiarity with the functionality of their existing operating system and may find that learning how to use a new operating system poses a barrier to switching.<sup>117</sup> In addition, it can often be difficult to transfer data and accounts from iPhone to Android, especially for iPhone specific accounts such as iMessage.<sup>118</sup> In other instances, consumers are not able to transfer in-app purchases from Apple to Android. For example, movies, TV shows and eBooks purchased through iTunes cannot legally be copied from an Apple device to an Android device.<sup>119</sup> In contrast, Apple has made switching from one iPhone to another iPhone relatively seamless. Apple offers a migration feature in which consumers can simply hold their two iPhones (old and new) together and “all [their] personal information [will be] moved to the new phone, while the apps that [they] had installed [will be] downloaded directly from the App Store.”<sup>120</sup>

### 4. Apple has created a hardware ecosystem around the iPhone that further increases switching costs.

Individuals may prefer the convenience of having an ecosystem that allows them to easily share data across their Macs, iPads and iPhones.<sup>121</sup> Apple offers “Continuity” features, which “make it seamless to move between your devices.”<sup>122</sup> There are 12 “Continuity” features listed, including (i) handoff, which allows consumers to start work on one device and pick up on another device, (ii) universal clipboard, which allows users to copy content on one device and paste it on another device, (iii) iPhone cellular calls, which allows users to make and receive calls from Macs, iPads or iPod touches, and (iv) text message forwarding, which allows users to send and receive SMS and MMS messages on Macs, iPads and iPod touches.<sup>123</sup> A 2017 CNBC survey showed that the average American household owns 2.6 Apple products.<sup>124</sup>

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Galaxy Z Flip 5G. See: Samsung. “New Arrival Galaxy Z Flip 5G.” <https://www.samsung.com/us/mobile/galaxy-z-flip/buy/?modelCode=SM-F707UZAATT>.

<sup>117</sup> Susan Athey. “White Paper – Apple Pay in Australia.” 2016. Yuri Park and Yoonmo Koo. “An empirical analysis of switching costs in the smartphone market in South Korea.” *Telecommunications Policy* 40 no.4 (April 2016):307-318

<sup>118</sup> Jesse Simms. “How to transfer messages from iPhone to Android?” *Ting*, June 10, 2019. <https://ting.com/blog/you-asked-transferring-texts-from-iphone-to-android/>.

<sup>119</sup> Simon Hill and Mark Jansen. “How to switch from iPhone to Android: The ultimate guide. Digital Conversion.” May 27, 2020. <https://www.digitaltrends.com/mobile/how-to-switch-from-iphone-to-android/>.

<sup>120</sup> Chris Smith. “Upgrading to iPhone 11 Will Be Easier than Ever With the New Data Migration Feature in iOS 12.4.” *BGR*, July 23, 2019. <https://bgr.com/2019/07/23/iphone-11-upgrade-transfer-data-from-old-iphone-via-wi-fi-or-cable/>.

<sup>121</sup> Lukasz Grzybowski and Ambre Nicolle. “Estimating Consumer Inertia in Repeated Choices of Smartphones.” CESifo Working Paper No. 7434. SSRN, 2018. <https://ssrn.com/abstract=3338788>.

<sup>122</sup> “Use Continuity to connect your Mac, iPhone, iPad, iPod touch, and Apple Watch.” Apple, July 24, 2020. <https://support.apple.com/en-us/HT204681>.

<sup>123</sup> “Use Continuity to connect your Mac, iPhone, iPad, iPod touch, and Apple Watch.” Apple, July 24, 2020. <https://support.apple.com/en-us/HT204681>.

<sup>124</sup> Steve Liesman. “America Loves its Apple. Poll Finds that the Average Household Owns More than Two Apple Products.” *CNBC*, October 10, 2017. <https://www.cnbc.com/2017/10/09/the-average-american-household-owns-more-than-two-apple-products.html>.

Consumers are less likely to switch away from iPhones if they continue to use other Apple products due to the stickiness of those Apple products.

#### **5. Apple has introduced consumer programs—warranty, financing, and upgrade—that strengthen consumer lock-in.**

Apple offers the iPhone Upgrade Program, in which consumers can make recurring monthly payments for AppleCare coverage (which includes technical support)<sup>125</sup> and a new iPhone every year.<sup>126</sup> Taken in conjunction with Apple's easy-to-use migration feature, it is much easier for iPhone owners to continue to use iPhone devices rather than Android devices.

#### **6. The replacement cycle for smartphones is long and getting longer.**

A 2019 Deloitte survey shows that 62% of smartphone owners do not intend to get or buy a new smartphone within the next year.<sup>127</sup>

Due to the factors listed above, few consumers would be induced to switch mobile operating systems because of the availability (or lack thereof) of an individual application.

Furthermore, iPhones and Android devices are imperfect substitutes for each other. There are many demographic differences between iPhone and Android users. A 2018 survey of smartphone users in the U.S. shows that iPhone owners have an average salary of \$53,000, over 40% higher than the average salary of Android owners.<sup>128</sup> iPhone owners also typically have “higher education levels, more engagement, and more spend on apps.”<sup>129</sup> iPhones and Androids are further differentiated, which reduces competition. Apple emphasizes privacy, security and user experience while Google generally offers lower prices.

Developer behavior is further evidence that consumers do not easily switch between mobile operating systems. If consumers could easily switch between platforms to access specific applications, developers might choose to offer their apps on only one platform given the additional cost of developing for multiple platforms. While there is some debate over whether developers multi-home, this is not the case with the top apps.<sup>130</sup> A review of top revenue generating apps shows that the vast majority multi-home. The top revenue generating apps is appropriate because App Store revenue in the U.S. is heavily concentrated amongst the top

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<sup>125</sup> “AppleCare Products.” Apple. <https://www.apple.com/support/products/>.

<sup>126</sup> “iPhone Upgrade Program.” Apple. <https://www.apple.com/shop/iphone/iphone-upgrade-program>.

<sup>127</sup> Kevin Westcot, Jeff Loucks, Dan Littman, et al. “Build it and they will embrace it.” Deloitte, 2019 [https://www2.deloitte.com/content/dam/insights/us/articles/6457\\_Mobile-trends-survey/DI\\_Build-it-and-they-will-embrace-it.pdf](https://www2.deloitte.com/content/dam/insights/us/articles/6457_Mobile-trends-survey/DI_Build-it-and-they-will-embrace-it.pdf).

<sup>128</sup> Chris Burns. “Android vs iPhone user poll shows two very different groups of people.” *SlashGear*, October 25, 2018. <https://www.slashgear.com/android-vs-iphone-user-poll-shows-two-very-different-groups-of-people-25551392/>.

<sup>129</sup> Ken Yarmosh. “Android vs iOS: Which platform to build for first?” *Savvy*, April 20, 2020. <https://savvyapps.com/blog/android-vs-ios-which-platform-to-build-for-first>.

<sup>130</sup> Voelcker and Baker (2020) claim that developers typically do not multi-home.

developers: the top 1% of monetizing developers were responsible for 94% of total U.S. App Store revenue in 2016.<sup>131</sup>

Among the top 250 apps by revenue in Apple's App Store in the United States in 2019, 245 were available on Google Play. Among the top 250 apps by revenue on Google Play in the United States in 2019, 249 were available in Apple's App Store.<sup>132</sup> Voelcker and Baker's claim that "multi-homing appears to be the exception rather than the rule" (2020) is misleading as that conclusion was due, in large part, to a focus on the long-tail of applications, giving equal weight to popular apps like Facebook and small and unestablished apps.<sup>133</sup> It is clearly not the case for the top revenue-generating apps, as shown above.

The fact that application developers choose to publish applications for both the Apple App Store and Google Play despite the additional development time, complexity, and costs<sup>135</sup> indicates that developers value the captive set of consumers available on both Android and iOS.

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<sup>131</sup> Randy Nelson. "94% of U.S. App Store Revenue Comes From the Top 1% of Monetizing Publishers. Sensor Tower." May 10, 2016. <https://sensortower.com/blog/app-store-one-percent>.

<sup>132</sup> AppMagic data and Keystone analysis.

<sup>133</sup> Sami Hyrynsalmi, Arho Suominen and Matti Mäntymäki. "The influence of developer multi-homing on competition between software ecosystems." *Journal of Systems and Software*, 111, (January 2016) 119-127. <https://www.sciencedirect.com/science/article/pii/S0164121215002010>.

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