FRAND access to app stores

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The Digital Markets Act requires gatekeepers to grant access on fair, reasonable and non-discriminatory (FRAND) terms. In this article, **Jorge Padilla, Kadambari Prasad,** and **Andrew Tuffin** present a conceptual framework for assessing whether app store commissions are FRAND, and use it to disentangle the sources of value exchanged between app developers and the gatekeepers of app stores. They argue that truly FRAND prices must: first, reflect only the value of the services offered, not the value of access to the market itself; and second, reflect the benefit to the gatekeeper of providing an app store. Therefore, the FRAND price should be no higher than the gatekeepers' costs, although it can be lower. This is because, fifteen years after app stores emerged and network effects "tipped the market", any rationale that gatekeepers must leverage network effects to reward "first mover" innovation no longer holds. Further, the services now offered by app stores likely provide no incremental value beyond the quality of service that rivals in a competitive market, not insulated by network effects would now provide. Finally, the price may be lower than gatekeepers' costs, even negative, to the extent that providing an app store enhances the value gatekeepers receive from their ecosystem of associated products and services.

Introduction

FRAND obligations arise in many sectors. They apply where negotiation alone cannot guarantee competitive prices, which may otherwise be unreasonably high – or, in some cases, too low. Classic examples are the licensing of standard-essential patents (SEPs) and access to telecoms infrastructure.[2]

FRAND has also become relevant in digital markets. It is a key feature of the DMA – and extends into other areas of antitrust regulation, as the recent decision by the ECJ on *Android Auto* demonstrates.[3] Although Article 6(12) of the DMA requires gatekeepers to grant access on FRAND terms, so far compliance assessments have been relatively formalistic in practice. That formalism, as our colleagues have argued, is understandable in this early stage of enforcement,[4] but it is not inherent to either the DMA or FRAND assessment. Substantive analysis of gatekeepers' prices will become necessary as, ultimately, the DMA seeks to make markets contestable. That will require gatekeepers to charge prices that are FRAND *in fact,* and require them to be able to *demonstrate* that fact.

Currently, Article 6(12) debates focus on the app store commissions that gatekeepers can charge their business users: app developers. Gatekeepers have historically charged up to 30% and – even after the changes made to comply with the DMA – these rates remain high. Some of the literature on the other hand suggests these fees should be much lower and can even be negative.[5]

The divergence is driven by a number of challenges that come up when assessing FRAND prices for app stores, and digital markets more generally.

- **Challenge 1: Disentangling the sources of value for *business users* of the app store.** App stores are in a position to set a single price that reflects two broad sources of value that their users receive, which must be disentangled:
  - the services that *the particular app store itself* contributes to the market – such as its search and billing services and security; and

– the benefit of accessing *the market itself* – i.e., the benefit of there being any route to market at all.

Generally, FRAND prices should reflect the competitive cost and benefits of the first source of value, but should not reflect the value of access to the market itself. The first problem is that these two sources of value often get conflated when considering the benefits that users are, or should be, paying a reasonable price *for*. The second problem is that, in specific contexts, it can be beneficial for consumers if gatekeepers are permitted to leverage their status as gatekeepers at least for a limited period. This occurs where the prospect of charging monopoly rates is necessary to incentivise a "first mover" or "market maker" to innovate – otherwise, companies may not develop the new markets that they later become the gatekeepers to as quickly, or at all.

- **Challenge 2: Accounting for the value *to gatekeepers* of providing an app store.** App stores are part of ecosystems of complementary products, such that it is not just the app store's users who benefit; the app store provider also benefits from running and operating the platform. It benefits because the quality and range of app developers' products enhances demand for its complementary products, earning it more revenue than it would earn if it did not run the app store itself. Crucially, the reasonable price that a gatekeeper can charge should reflect the *net effect* of that two-way exchange in value – essentially, because it already receives a payment in kind from app developers.

  That can mean there are three potentially FRAND outcomes: (a) the app store operator *charges* business users – essentially, a financial top-up that is analogous to the net royalties negotiated for cross-licences; (b) the app store *pays* (or subsidises) business users; or (c) there is no charge at all. This last outcome does not mean that app store services are worthless. Rather, it means the value that app store operators provide to app developers is roughly commensurate to the value that app developers provide to them. This is not uncommon in two-sided digital markets. Services such as search engines appear to be given away for "free", but they aren't; they are two-way exchanges between parties with services of equivalent value.[6]

- **Challenge 3: The methods for determining FRAND prices.** Even if we are clear *what* sources of value FRAND prices should reflect, it is still challenging to determine what the FRAND prices for those services are. Many of the traditional methods used in other sectors are difficult to apply in the context of app stores.

  In this article, we provide a methodology for assessing whether app store prices are FRAND, although it may apply more generally to digital markets. We present a conceptual framework that, in principle, helps to (a) separately identify the value propositions an app store and an app developer provide; (b) specify how fair and reasonable commissions would reflect the relative costs and benefits of each service; and (c) consider how the benefit of provision to the *provider* would affect those commissions in situations where value is exchanged in both directions.[7]

Below, we step through these three challenges to show that the FRAND price for gatekeepers' app store services should reflect their costs – though it may, in fact, be lower. Prices should be no higher than cost because, 15 years after app stores emerged and network effects "tipped the market", insulating gatekeepers from further competition (a) any rationale for rewarding that "first mover" innovation by leveraging the network effects no longer holds, and (b) the services now offered by app stores likely provide no incremental value beyond what would now be available from rivals in a competitive market – because a lack of competition does not only inflate prices, it

diminishes the incentive to enhance service quality. The price may be lower than gatekeepers' costs to the extent that they already benefit from providing app store services to app developers in the form of greater advertising revenue, extraction of usage data and other associated benefits of integration on all their ecosystems.

Challenge 1: The value a platform generates for business users – FRAND access prices should not reflect the value of network effects

FRAND is required to overcome the impact of market power

In the absence of market power there is no reason to place conditions on the terms that sellers and buyers freely negotiate – parties will agree terms that both agree to be reasonable for themselves.

The reason for this is that neither party is an unavoidable trading partner; both sides compare the terms of any potential agreement to the benefits and costs of their competitive alternatives – "outside options".[8] In that situation, the prices that would emerge from these negotiations would reflect (a) the costs of supply – as no company would freely accept a price below the incremental costs they incur to supply the product – and (b) the difference between the value of the benefits that the product provides and those provided by the next best alternative product – this is the incremental value that differentiates the best product from its rivals. This price mechanism generates the appropriate incentives for both parties to invest in creating value where it adds most value. In economic terms, this is why negotiations in competitive markets are *allocatively efficient* – firms agree on terms that are mutually advantageous and all gains from trade are exhausted.[9] In other words, in the absence of market power, competitive markets deliver FRAND terms.

However, when sellers (or buyers) hold market power, for example because they possess indispensable inputs or networks, the market may not deliver FRAND terms.[10] On the contrary, those with market power may, for example, set prices that fail to reflect the incremental value of their products. In particular, a seller that can act as a gatekeeper to the market may exploit its indispensability to extract prices that are too high – i.e., the price reflects the fact that there is no competitive alternative, not that the incremental value that a product provides over the competitive alternatives. Such high prices will lead to allocative distortions and may also create distortions in the competitive process to the ultimate detriment of consumers. The FRAND commitment has therefore been introduced to ensure markets achieve terms similar to those that would have been agreed in a market characterised by unfettered competition – i.e., a market without gatekeepers.[11]

The source of market power in app stores: network effects

The FRAND debate in app stores has been conflated and confused because there is one central problem: an app store delivers two distinct sources of value that are difficult to disentangle in principle, and are priced together in practice:

- the benefits of its specific services that an *app store itself* provides; and
- the benefits of access to its end user base – the value of the *market itself*.

The difficulty for competition, and for prices, is that the benefits of access to a user base in digital markets usually generate large indirect network effects – where the value of access to one group of users increases as the size of the other group of users increases. App stores are not worth much to consumers if they have few apps available, but they are worth a lot more if there are many high-quality apps to choose from. Similarly, app stores without consumers do not offer much value to app developers, but stores with many consumers are very valuable.

The problem occurs because the nature of the network effects makes it unlikely that multiple platforms will emerge and *remain viable* in open competition. Rather, there is a race to market to capture the network effects, and once that happens, the market "tips", consolidating around the early leader and entrenching its position, insulating it from further competition. For example, in 2008, Apple ignited a race between app stores (and their associated ecosystems). Google followed with Play Store, within the Android ecosystem. Microsoft launched its own store, available on the (now-discontinued) Windows Phone,[12] as did Nokia, while Ovi and others also developed rivals. Now, Apple's App Store and Google's Play Store remain as the exclusive or functionally dominant stores on iPhones and Android phones respectively.

Network effects create two difficulties. First, consumers and app developers lack a meaningful choice between alternative stores. Once network effects tipped the market, alternative app stores to App Store and Play Store were either not available at all, or not competitive. That reduces competitive pressure on the cost and quality of the services app developers receive, and on the prices they are charged for them.

Currently, the only viable app store available within the iOS ecosystem is Apple's App Store.[13] Regarding the Android ecosystem, the UK CMA states: "*alternative app stores place only a limited constraint on the Play Store within the Android ecosystem*".[14] Furthermore, as the UK CMA notes: *"[i]f other distribution channels were effective constraints on Apple's and Google's app stores, we would expect to see lower commissions and/or increased quality*".[15] The CMA finds that: (i) the usage of alternative app stores by app developers and end users is low – competing app stores tend to be specialised, offer only a limited number of apps and attract only a limited number of users[16]; (ii) app developers do not consider them a suitable alternative; (iii) alternative app stores face barriers to competition, due in part to network effects; and (iv) a range of practices by Google limit the threat from competing app stores and new entrants.[17]

The second difficulty, and more damaging one, for app developers is that alternative routes to market are unlikely to emerge in the future, even if the Commission is happy with the gatekeepers' compliance with Articles 6(4), 6(5) and 6(7). That is not because developing an app store with superior services is impossible. It is because new entrants must overcome the network effects that insulate incumbents. App developers do not want to distribute via alternatives that have very few end users, and end users do not engage with app stores that feature few high-quality apps. In that context, entrants and incumbents have limited incentive to, respectively, develop rival stores that offer better services and improve the quality of the existing service. Demand for its platform, and the prices it can charge, reflects only the existence of a route to market, not the quality of the particular route that a specific provider offers.

Importantly, these network effects are a feature of the market *itself*, not the quality of the services that the app store offers. For instance, if app developers could collectively decide to switch between rival app stores or tender an "industry standard" app store, then they could choose between alternatives that compete to offer the *best quality* route to market. In that case, the value of the network effects would not affect their choice or be reflected in prices – the network effects would form around whichever bid was best, they would not *determine* which bid was best. However, app developers and consumers have no mechanism to collectively choose the best store based on the quality of the services it offers – and there may be legal barriers to them creating one.

Generally, therefore, FRAND access to app stores must ensure that commissions do not reflect the value of network effects, nor leverage the mere existence of the market that the gatekeeper controls access to. Rather, their prices should reflect the value of

the specific services that determine *the quality* of that route to market, and the cost of providing it.

An important exception: providing an incentive for "first movers" to invent the market

There is an exception where it may be better to permit a gatekeeper to leverage network effects – for a **limited** period. In markets that tip, the most valuable contribution made by initial competitors is often that they *made the market* that the victors of that race to market became the gatekeepers to. The emergence of the digital platform may have only occurred, or occurred as early as it did, precisely because the "first mover" was incentivised by the prospect of leveraging network effects. If that incentive is removed entirely, then fewer digital platforms that generate network effects may emerge, or they may emerge much later. That could make everyone, including consumers, worse off.

The argument that a market must incentivise "first movers" to innovate is a legitimate one and, in some circumstances, it is a strong one. However, the argument is stronger shortly after a market has tipped. And it becomes weaker the longer that the victor persists as a gatekeeper. As time goes by, the network effects role as a barrier to entry and continuous innovation becomes more significant, compared with its role stimulating the initial "big bang" innovation.

Intellectual property is a useful parallel. Patents grant a *temporary* monopoly to incentivise innovation. The cost incurred developing the innovation is irrelevant. A monopoly is granted, and the patent owner can license access to its property based on the value of the benefits that accessing it provides to the user.

However, even patents expire. A temporary period is sufficient to incentivise innovation, without permitting perpetual monopoly profits. So, we might allow digital platforms, including app stores, to leverage network effects in the same way – temporarily. For instance, app stores emerged in 2008. In 2012, the case that reasonable prices should leverage network effects to reward "first mover" innovation may have been compelling. In 2025, many years after that market tipped and insulated gatekeepers from further competition, the case that reasonable prices should *still* reflect network effects is thinner to say the least.

Challenge 2: The value that a platform generates for the gatekeeper – FRAND access prices should also reflect the benefits received by the gatekeepers

If a gatekeeper provides a standalone service, the value those services provide to users is all that matters. FRAND commissions for a standalone app store would compensate the provider's costs and reward it for the value it provides over the best alternatives. However, in practice, the providers of app stores are *not* standalone providers. Apple and Google's app stores are part of a wider ecosystem of complementary products, such as devices, first-part apps and online advertising. The quality of the app store – including the range and quality of the apps that developers make available to it – affects the demand for those complementary products.

The significance, therefore, is that these gatekeepers do not only provide value to app developers; they also *receive* value from the app developers. The availability of attractive apps allows gatekeepers to monetise their products and services more effectively; for example, by selling a greater number of smartphone devices, upselling their own first-party apps or increasing the attractiveness of their ecosystems for advertisers.[18]

Of course, the additional value added by a single app may be small. Even for the most popular apps, it is unlikely that the loss of any single app developer would substantially

reduce the returns from a gatekeeper's ecosystem of products and services, let alone its viability as a whole. However, that is merely a feature of how network effects form around certain types of service. It is not an indication that the incremental value that apps provide is inherently and necessarily less than the incremental value of the services that an app store *itself* provides. Were it not for network effects insulating incumbents from competition, the incremental value of an app store's specific service may be similar to those of a popular app.

Were app developers able to consolidate the value they provide in order to negotiate commissions collectively, then they too would have significant bargaining power based on the value they contribute to the app store providers' complementary revenue streams. Previous research shows that non-discriminatory bilateral arm's length negotiations between gatekeepers and individual app developers would produce prices that reflect the additional value gatekeepers receive. In other words, under the Non-Discrimination limb of the FRAND requirement app developers would receive compensation for the value they bring, even if they negotiate separately.[19] Alternatively, they could negotiate collectively to extract their collective value. This collective value could then be apportioned across the various app developers, in accordance with their individual value contributions.[20]

In conclusion, an appropriate assessment of FRAND must take into account the two-way exchange of value between gatekeepers and app developers: access terms should reflect not the one-way (or *gross*) value that the app store provides to app developers, but rather the two-way (or *net*) value, reflecting the difference between the value offered by gatekeepers to app developers and *vice versa*.

This resulting access price could be positive, zero or even negative. Such netting off is standard practice in cross-licensing of SEPs, whereby parties that are both patent holders and implementers will quite often agree a single two-way licence contract where each party get a licence to the other party's patents, rather than two separate one-way contracts. The two-way contract, or cross-licence, typically involves a net payment which reflects the net exchange of value, and is paid to the party that offers a larger gross value.

Challenge 3: Standard methods to determining FRAND prices are difficult to apply to digital platforms

FRAND provisions have a long history in other sectors, and there are established methods for assessing whether prices are, in fact, FRAND. The problem is that the principal methodologies are all difficult to apply to digital markets.

Reference to the prices of comparable services

Courts and arbitrators often start with the "comparables" method and Recital 62 of the DMA suggests a number of benchmarks to assess whether terms are fair.[21] The central premise is an appealing one: a price is reasonable if it reflects the rates that parties agreed were reasonable for comparable services in comparable circumstances. Essentially, this is how real estate is valued, by reference to the prices paid for similar properties in similar locations, perhaps with some adjustment for relevant differences.

The approach is inappropriate for app stores for two reasons. First, once network effects have tipped the market there are usually few, if any, informative comparisons. Second, any comparator that *does* exist is likely to be subject to the same network effects, so its own prices are also likely to be distorted.

To illustrate the problem, consider the potential comparisons when assessing the commission charged by a large app store:

- **Other gatekeepers**. The provider of an app store with similar services and similar scale is clearly comparable, but it is not clearly reasonable. It enjoys similar network effects, that distort prices in the same way.

- **Fringe competitors**. The prices charged by small third-party stores seldom help either. Where a dominant firm sets the going rate, fringe rivals often shadow that price.[22] That is a consequence of the network effect enjoyed by the dominant incumbent. Cutting prices would still not attract enough users to offset the lost network effects; the fringe competitor price matches to maximise its earning from the small contestable section of the market.

- **Niche providers.** Apparent competitors to a dominant platform may exist only because they target a small end-user niche – i.e., consumer groups with specific interests who care little for the availability of other apps and, therefore, whose choice of app store is less affected by network effects.[23] Those platforms may nonetheless charge high access fees because the niche group of end consumers and app developers they attract exhibit a more inelastic demand.

Reference to the ex-ante prices, before the market tipped

Another approach is to refer to prices *before* the market tipped ("*ex ante*"), when rivalry constrained prices.

Where possible, comparing the *ex-ante* prices a company charged for the same service can be informative. To see why, consider a company's pricing incentives during a race to market that is likely to tip.

In the initial period, charging high prices that deter users is risky. Cheaper rivals may attract those users, increasing the chance the market tips in a rival's favour. Once the market tips, the network effects will make it very hard for the losers to compete, and easier for the winner to charge high prices. In this scenario, the commercial incentive is to adopt a "bait and switch" strategy: charging a low price – even offering subsidies – during the competitive phase and then increasing prices after the market tips. This is why Microsoft was willing to *pay* developers up to $600,000 per app to join its app store for Windows Phone, and why Huawei announced it would spend $1.5 billion to attract developers to its own platform, Harmony OS, after losing access to the Play Store.[24]

In contrast, if a platform maintains the same rates for the same service *after* the market tips, then it has retained prices that were formed under competitive pressure. However, the clear commercial and economic logic of the bait and switch strategy makes consistent access terms at best surprising, and therefore they require some scrutiny and explanation.

Even where ex-ante prices have been maintained, other complications can blur or undermine their relevance as reasonable benchmarks. We illustrate four of them:

- **Competition between bundles.** Before the market tipped, few if any app stores competed directly on the merits of their specific functionality. To various extents, they were part of competing bundles of products and services – including proprietary hardware or operating systems. For instance, an iPhone user could not choose Nokia's app store, installed on the Android operating system to run an app developed Microsoft. The interaction of those bundles, whether strictly tied together or not, complicates the assessment of prices and their impact on demand of app stores.

- **Sensitivity of network effects to fees.** The impact that fees have on demand is unclear. Most apps were free, paying no commission. If that free content attracted end users, the rates on paid apps may have had little effect on whether and

where network effects formed, even if the commissions on paid apps were excessive.

- **Evolving services.** The ex-ante period can be short, and the market can be entrenched for a long time. During that period services change and develop, making the relevance of ex-ante prices more challenging to assess. The functionality that app stores offer today may be the same or different to what it was in 2009. This can be problematic – if the service is unchanged, one might expect prices to *reduce* over time, as competition should have put pressure on product improvements. If the service has changed, then prices perhaps should differ but it will likely be unclear to what extent or in which direction.

- **Evolving monetisation policies and enforcement.** Both Apple and Google have evolved the policies that determine *how* they monetise their app stores – and how lucrative those revenue streams are. First, revenue streams can change formally, or in importance – for instance, the App Store launched with commissions and introduced in-app purchases and subscriptions a year later, which grew in importance over time. Second, policies affecting the use of those revenue streams have changed over time. For instance, in 2011 Apple required that its own in-app purchase system must be used, and that rates on its App Store could not be higher than those offered through other access channels – even if those channels had lower cost. Later, it introduced "anti-steering" provisions, which prevent an app developer from referring, within the app, to other ways that a user could pay for digital content, such as through a website. Google adopted the same approach, enforcing its charges for access more strictly over time, and preventing the emergence of "avoidance" mechanisms.[25]

The point here is not that ex-ante comparisons in digital sectors are irrelevant or uninformative; they can be. The point is simply that the continuation of genuinely reasonable prices after a market has tipped is unlikely in principle, and difficult to establish in practice.

The conceptual framework for assessing FRAND prices in principle

Here we present a conceptual framework that, in principle, helps one (a) identify the separate value propositions an app store and an app developer provide; (b) specify how fair and reasonable commissions would reflect the relative costs and benefits of each service; and (c) consider how the benefit of provision to the *provider* would affect those commissions in situation where value is exchanged in both directions.

The benefit of a conceptual framework

The major problem when assessing access prices for digital markets is that many factors interact in the formation of the price we observe in the real world, that are difficult to disentangle and assess. So, whatever practical methodologies one applies to assess prices, it helps to use a conceptual framework to unpack the different sources of value exchanged between the two parties that inform that net price.

The framework we adopt has the following structure. For a given app store, we imagine the app developers commission a tender to develop, run, and maintain the app store that they will collectively choose to use. Rival app store providers bid for the contract, which runs for a fixed period, after which another tender will be run. This approach, for example, is a standard competitive mechanism when pricing services that form natural monopolies, such as train lines or water networks.

We do not use this framework because we advocate for it as the ideal way for digital markets to commission and run services with large network effects – in practice, such an

approach would have substantial economic advantages and disadvantages, as well as legal implications, that would need careful consideration. Rather, we use the framework because it allows us to break down each of the value propositions (or services) that an app store provides separately and consider:

- **its relevance to reasonable prices**: based on whether the value proposition is something the app store developer *itself* contributes and differentiates from rivals, or is something that any and all providers can offer because it is merely a feature of there being an app store at all; and
- **the mechanism that would determine its price**: In a competitive tender, the price of the best bid will be determined by (a) the costs of providing services, which provide a floor for reasonable prices and (b) the incremental value provided by the specific service. We assess each in turn.

For clarity, where value flows between the provider and users in both directions, it helps to consider each separately. So, we first assess all bids as though they are presented by standalone app store developers. We then consider how an app store provider would adjust that bid, reflecting on the beneficial impact that running the app store would have of its complementary revenue streams.

A floor for reasonable prices: assessing the costs of providing services

For a given service that an app store provides, FRAND prices will not fall below the provider's costs. Otherwise, a gatekeeper would be worse off for providing access, which cannot be reasonable. This is clear in Recital 62 of the DMA, which states that the FRAND obligation should not create an access right.[26]

Relevant costs will fall into one of two groups:

- **The running costs of providing and maintaining access**. These represent the gatekeeper's ongoing incremental costs of providing a service, and set the lowest price that a submission to the competitive tender would accept. Relevant costs may include the necessary investments into improving the platforms in response to the changes in the market, the improvement in technology, and the needs of the end users and app developers. Traditionally, digital services' operating costs are characterised as low. For instance, an app store benefits from significant economies of scale, such that the cost of serving one additional app developer may be minimal. However, less strict metrics may be more appropriate, that recognise higher average costs including fixed and apportioned costs. The cost structure of services can also change: for instance, the marginal compute costs of AI functionality can be substantial.
- **The long-term investment costs of creating and launching the app store**. Technically, any costs incurred *before* the tender would be sunk, and not affect the competitive prices rivals would accept. Investment costs that have not yet been incurred would affect prices, typical on an amortised basis, spread over the life of the tender. Here, the framework need not be applied so strictly. It should inform an assessment, not constrain it. A gatekeeper's amortised costs of sunk investment cost may well provide an adequate floor for reasonable access prices. However, in the case of app stores the remaining amortised development costs may be relatively minor. These would have largely been incurred upfront, and some proportion of them would have already been recovered by the fees app developers have already paid to the gatekeepers over the past fifteen years.[27]

Both costs can be covered if the gatekeeper covers its long run average incremental cost ("LRAIC"), which is the commonly used measure for assessment under Article 102 TFEU and access price regulation. The LRAIC is the average of all the (variable and fixed) costs that a company incurs to produce a particular product. If the access price is below LRAIC, the gatekeeper would not be

recovering all the upfront investments and/or the costs of setting up and running the platform.

There are, however, a few practical considerations:

- First, the appropriate increment to estimate the LRAIC needs to be decided. It does not cost the gatekeeper much more to service another app developer, however this should not imply that the LRAIC is zero. The LRAIC must be calculated as an average over the services offered to all app developers over the lifecycle of the platform. This will of course require gatekeepers to assess the length of the lifecycle, which they may be able to do based on their own business models. Following that, the gatekeepers will need to be able to forecast the usage of the platform over its entire lifecycle, and use these two measures to estimate the average cost which would correspond to the LRAIC.
- Second, as described above, a material proportion of the upfront investments is likely already amortised and therefore should not be included in the LRAIC. However, the gatekeeper has a non-discrimination requirement to uphold, so charging the app developers in the earlier part of its lifecycle differently from the app developers in the later part of its lifecycle may also not be appropriate. Since the non-discrimination requirement has been put in place now with the DMA, an appropriate way to calculate LRAIC would be to consider non-amortised upfront investments along with the running costs.
- Third, even for investments that have not been amortised, it will be important to assess whether those investments could have been funded with out-of-market resources or by cross-subsidisation, and whether the investment decision of the gatekeeper critically depended on the access price, i.e., whether the investment would have been viable under the anticipated (higher) access fee but not under the proposed (lower) access fee. If most of the initial costs of setting up the app stores have been amortised, and the running costs are minor, the lower bound may be at or close to zero.

This focus on costs when assessing reasonable prices is echoed in the ECJ's *Android Auto* ruling which allows Google to charge for both incremental running costs and amortised upfront fixed costs.[28] The Court determined, first, that Google is a dominant provider of market access – in this case, access to the consumers of in-car apps – and that third parties can reasonably expect access to that market. Third parties are not necessarily *entitled* to access, but as the Commission has observed, most digital platforms are "inherently" designed to accommodate third-party participation rather than exclusive use, so a presumption in favour of access will normally apply in this context. The Court then concluded that Google must grant access, once a reasonable period has elapsed – allowing, for example, time to address safety and security concerns – and must do so on terms that are fair and reasonable, which should compensate Google for both its upfront fixed costs and incremental costs.

The incremental value provided by an app store provider to app developers.

Costs are an important consideration for reasonable prices, but they are not sufficient. FRAND prices should not merely compensate for costs. They should reward gatekeepers for offering services that provide business users with benefits they value.
In this stage, it is crucial to disentangle the various value propositions an app store can offer to its business users, and consider the reasonable price for each separately. We can separate these propositions into three groups:

- the benefits of app store services;
- the benefit of access to the market; and

- the benefit creating an app store in the first place.

The benefits of app store services

First, consider an app store's core services. These include, for example, the user interface and search functions that help consumers find the apps that meet their needs, payment processing services and support services.

The source of value for business users is determined by the benefits these services provide. Higher quality services, for example, reduce app developers' transaction costs through processing services, or increase their revenue by providing intermediary services that help more consumers find their app. These are differentiating factors between rival app store developers: users want better services for less, and so bids compete on the quality and price of these services. They are relevant for reasonable prices.

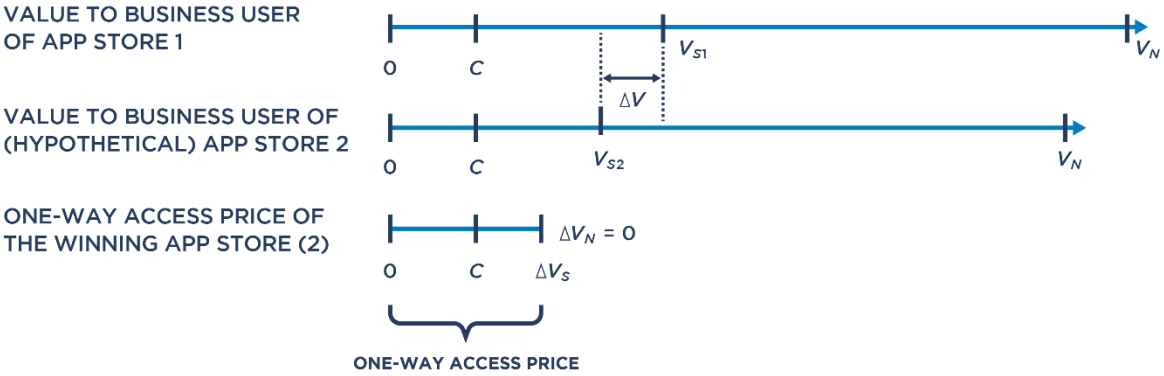
App developers will be willing to pay up to the value of the benefits they receive, but no more than that. Once the price exceeds the value of the benefits, they would be better off without that specific service at all. In **Figure 1**, we illustrate the value of the specific services that two rival app store providers, based on the quality of services they provide: V_{S1} and V_{S2}.

However, when two rivals compete in a tender, they ignite a bidding war based on the *relative* quality they can provide. If they offer the same quality, they will undercut each other until the price matches their costs. However, if one offers a better service, then it will also be able to charge up to the value of those incremental benefits. When the difference in quality is limited, then prices will be near cost. If the difference in quality is very high, then prices may substantially exceed costs. In **Figure 1**, we illustrate the incremental value of the specific services that the best app store (App Store 1) offers over the value that the specific services of the next best alternative bidder offers: ΔV_S.

When considering the incremental value of a gatekeeper's specific services, there is an important consideration to bear in mind: after a market tips, viable competitors will find it difficult to emerge.

The first issue with this is practical. The "next best alternative" bidder may be hypothetical, which makes establishing an incremental value challenging. In the case of app stores, this problem may be relatively easy to

Figure 1: Determination of the one-way access price the app store can charge the business user



C — LRAIC of running the specific app stores
V_S — the value added the specific app store's services
V_N — the value added by the network effects that form around an app store

Source: Compass Lexecon illustration

overcome. For instance, it would be relatively straightforward to perform a hypothetical

tender to establish the price business users would pay for the quality of services that Apple's App Store and Google's Play Store provide, if they were in a head-to-head battle for an industry-wide app store – available on both iOS and Android.

The second issue is a matter of principle. In markets that have tipped, network effects insulate the gatekeeper from more intense competitive pressure, which does not simply inflate prices. It diminishes the incentive for them to improve the value proposition that their specific services provide. So, the main problem is not that we lack a comparison to the value of the services that the incumbent gatekeeper provides; the problem is that both the gatekeeper and the next best alternatives would offer more value in a competitive market. This is the negative consequence of the "first mover" incentive. A valuable market may emerge sooner in a flurry of competitive innovation, but after that it may stall. The incentive to innovate is lacking.

So, for markets where the gatekeeper has been insulated by network effects for a long time, we argue that the incremental value of the app store itself is nothing. The primary effect is that a lack of competitive pressure has deprived business users (and their customers) of app stores that would be even more valuable. The gatekeeper should not be punished for that: it is the nature of markets with network effects. But neither should they benefit from the lack of competition.

Finally, in the specific case of app stores, we find it unlikely that app store itself provides substantial incremental value – although, again, this could be tested with a simulated tender between Play Store and App Store.

The reason is that the services that app stores provide are not especially differentiated; they are largely substitutable with each other – in the absence of network effects. App stores mainly offer a marketplace where app developers and end users can interact. As such, their primary economic value is one of aggregation, which saves end users and app developers search costs, removes frictions from transactions, and helps clear the market efficiently. Other than the network effects, app stores' value propositions are largely commoditised, and so the naked incremental value of a given app store offers over the next best alternative is likely close to zero.

The benefits of access to the market

Second, now consider the value of access to the market. The source of value here that app developers are willing to pay for is access to the users of the app store – i.e., the indirect network effects that inhibit competition in the open market between app stores (or any other digital services insulated by network effects).

The advantage of this framework is that these network effects remain in the analysis. They are not, in any sense, abstracted away. That would neither be possible nor helpful – as they affect *other* factors that are relevant to the consideration of reasonable prices, such as economies of scale. Rather, this framework acknowledges that network effects create value but alters the pricing mechanism so that an incumbent cannot leverage that value when potential competitors cannot.

In essence, the price mechanism for these benefits is the same as above: rivals start undercutting each other based on how their costs and the value of the benefits they offer compare. The difference is that both parties can offer the same access to market. It does not matter *who* operates the market; the market itself will exist either way. As the value proposition is the same in each case, and is not a differentiating factor between rivals, the price for these benefits falls to zero. We illustrate this in **Figure 1** as "V_N": the value of the network effects. As they appear in both bids, the competitive price for them falls to zero: $\Delta V_N = 0$.

The benefit of creating an app store in the first place

The problem with the tender framework is that it takes for granted that app developers organise themselves to operate the tender. This does happen in some industries. For example, Standard Setting Organisations and Standard Development Organisations are industry bodies through which market participants coordinate to amplify network effects, benefiting all parties that use the standard. However, they can take years to arrange, and more problematically, they *presuppose* the existence of market participants.

However, in markets that tip, typically a single company or group of companies prompted the initial "race to market" from which the gatekeeper, or gatekeepers, emerged. Without the prospect of leveraging the network effect, it is possible that Apple and Google would have not developed app stores, or developed them later, to the detriment of app developers and consumers. So, reasonable prices should provide some incentive to innovate beyond the amortised development costs.

Conceptually, this problem is much easier to resolve than it may appear. Like patents, we might allow the value of access to affect prices for a fixed limited period. For instance, in our framework, the value of the network effects could be permissible for the first "period" of the tender, such as the first five or 10 years. But after that, the network effects are not something that an app store provider *itself* continues to contribute to and it should not be able to continue leveraging them. They are a feature of simply having an app store, that any provider could offer, were it not inhibited by the network effects.

The value provided *to* an app store provider *by* app developers

Having established the price that the provider of a standalone app store would agree in a competitive tender, we now consider the extent to which an integrated gatekeeper, such as Apple and Google, would undercut that price, based on the incremental benefits that running an app store add to their complementary revenue streams.

When considering FRAND prices, we must consider the value exchanged between parties in both directions. If app developers *provide* more value to the app store providers than they receive, then the reasonable payment may in fact go the other way: *from* Apple and Google *to* the app developers. Alternatively, if the value is roughly commensurate, then in practical terms it may net out as a "free" exchange.

The value provided by app developers to app store providers can be immense. However, it is the nature of **complementarity** between the number and quality of app developers on the one hand, and the impact on the product and service lines of the integrated provider on the other hand, that ultimately determines how much they will be willing to adjust their bids.

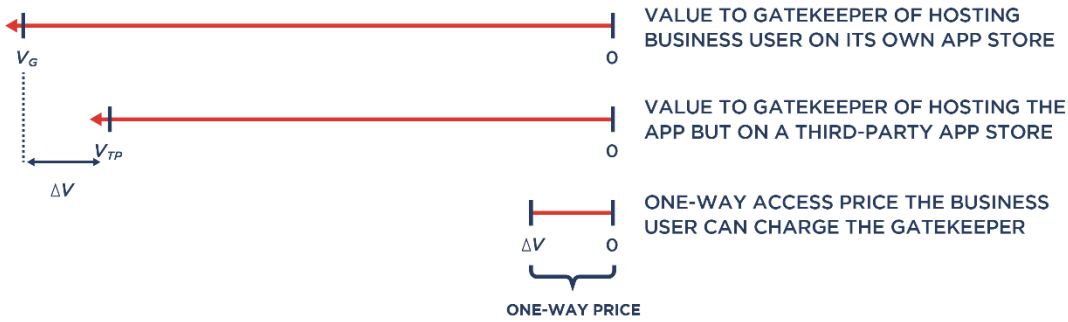
The presence of a rich ecosystem of apps is of great value to Apple and Google. It improves the quality of – and so increases consumer demand for – iPhones and phones with an Android Operating System respectively, and the associated products in each ecosystem. This is clear if we consider the extreme alternative: if no app developers provided apps, then demand for iPhones and Android phones would be very low. If Apple and Google had to develop all their own apps, demand would be higher, but less than it is with a wide and competitive market of app developers.

The crucial point to note is that if a standalone app store wins the competitive tender, and then hosts all the apps the gatekeeper would host, the gatekeepers would *still avail this benefit*. Availing this benefit does not require them to host the apps on their own app stores. They would therefore not reduce their bid by the total value of the benefits of having any app store at all. That would simply shift the ability to leverage the benefit of access to

the market itself from the provider of the app store to its users: app developers.

However, if this was the case, we might expect Apple and Google to welcome standalone app stores. That they don't, and its other products – say, the operating system – producing a better user experience and fewer bugs, there may be marginal quality gains that developers value.

Figure 2: Determination of the one-way price that the business users could charge the app store provider



Source: Compass Lexecon illustration

that they spend resources on reducing interoperability with them,[29] suggests that there are benefits to hosting the apps on their own app stores. These can be the following:

- There are advertising revenues to be earned in app stores. While platform providers do not disclose specific figures for these revenues, the existence and expansion of services such as Apple Search Ads and sponsored listings on Google Play indicate that app store advertising has become a strategically valuable source of income.
- Hosting the apps on their own app stores allows them to gather data on usage and maintain a monopoly over access to the end user[30]. Data on usage is particularly valuable if it allows them to monetise their ecosystem better. While platform providers do not disclose specific figures for these revenues, the existence and expansion of services such as Apple Search Ads and sponsored listings on Google Play indicate that app store advertising has become a strategically valuable source of income.

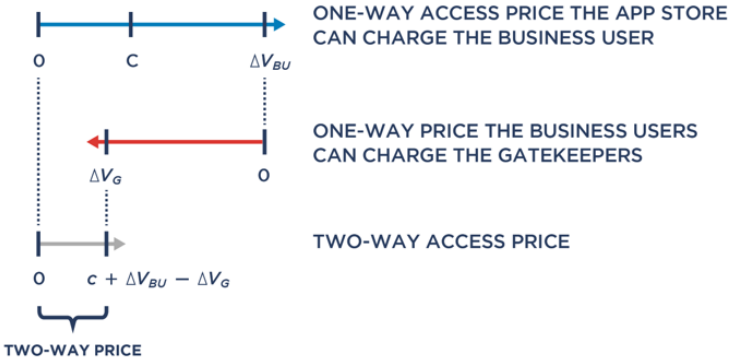
There may be technical benefits from integration. If the gatekeeper can deliver a smoother interaction between the store and

Figure 2 illustrates this. Both arrows show the value that hosting the business user on *any app store at all* provides to the gatekeeper. In both cases, the beneficial impact is large. That overlap does not affect the price a gatekeeper would accept to run an app store itself, as it gains those benefits either way. The difference between $\boldsymbol{V_G}$ (the total value it gets when running the store itself) and $\boldsymbol{V_{TP}}$ (the total value it gets when a third party runs the app store) is the benefit received from integration: $\boldsymbol{\Delta V}$**.** That incremental benefit is the amount it would reduce its bid by in order to win the tender.

A FRAND price reflecting the net value exchanged

Figure 3 illustrates how these considerations come together to form the competitive price that a gatekeeper may charge for its services, during a temporary period to incentivise the first mover, and after.

Figure 3: A FRAND price with two-way exchanges of value



Source: Compass Lexecon illustration

The resulting FRAND price for services with two-way exchanges of value therefore might be positive, negative or zero. It could even be 30%.

Practical considerations for FRAND access to app stores

However, while the methodology could produce a FRAND price that could justify any outcome, that does not mean that in *a specific context*, any outcome can be justified. It cannot.

In the case of app stores, our starting point – or rebuttable presumption – when considering the facts are that the FRAND price:

- **Would reflect the gatekeeper's LRAIC**: This could be uncontentious. No reasonable price for a service can fail to cover the costs of providing it. Some have argued that these costs are minimal or even negligible, and others that they are relatively large, but ultimately it is an empirical question that would be assessed on the facts of the particular case.
- **Would not reflect the value of network effects:** There is a plausible case that prices should temporarily reflect the value of the market itself in order to incentivise first movers, but over the 15 years since the market for app stores tipped we do not find that argument is compelling in this circumstance.
- **The incremental value of the app store over the next best hypothetical alternative is negligible:** Our starting point is that the incremental value that either App Store or Play Store provide over each other, were they to be in head-to-head competition, is slight – although that could be tested and potentially rebutted in practice. Moreover, the significance of network effects is that both app stores have been insulated from more intensive competitive pressure which reduces their incentive to increase the value of the services they offer. The value offered by the next best alternative in a competitive market would likely be higher, not lower, than the services business users currently receive from gatekeepers. They should not be punished for that. But neither should their prices benefit from the lack of competition.
- **Would reduce to the extent the gatekeeper benefits from providing an app store itself.** The benefits associated with hosting the app on their own app store may be significant, depending on the size of advertising revenue and the impact that extraction of usage data has on monetisation of other service lines. Ultimately, the direction that impact would reduce app store commissions in proportion to those benefits is an empirical question.

Ultimately this means that a good starting point is that the FRAND price for gatekeepers' app store services should **be no higher than their costs**, given they likely provide no incremental value beyond what would now be available from rivals in a competitive market. Moreover, the price may be *lower* than their costs, to the extent that they already benefit from providing app store services to app developers.

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2 What are Fair and Reasonable prices? Making a flexible concept tractable. Available at https://www.compasslexecon.com/insights/publications/what-are-fair-and-reasonable-prices-making-a-flexible-concept-tractable

3 See *Case C-233/23, Alphabet and Others [2025]*

4 Implementation of EU digital regulations: What is the role for economics? Available at : https://www.compasslexecon.com/insights/publications/implementation-of-eu-digital-regulations-what-is-the-role-for-economics

5 See for example, Geradin, D. (2025). *Why the Apple App Store and the Google Play Store fees should be low or even zero.* SSRN. https://doi.org/10.2139/ssrn.5272037, Mantzari, D. (2024). *Fairness in platform-to-business relationships: The case of regulating access to app stores on FRAND terms under Article 6(12) DMA* (CLES Research Paper No. 9/2024). Centre for Law, Economics and Society, University College London. https://www.ucl.ac.uk/cles/sites/cles/files/cles-9-2024.pdf, Scott-Morton, F. (2025), Yale School of Management. (n.d.). *Digital platform regulation*. Thurman Arnold Project at Yale. Retrieved June 4, 2025, from https://som.yale.edu/centers/thurman-arnold-project-at-yale/digital-platform-regulation and Bisceglia, M., & Tirole, J. (2024). *Fair gatekeeping in digital ecosystems* (TSE Working Paper No. 1452, revised December 30, 2024). Toulouse School of Economics. https://www.tse-fr.eu/sites/default/files/TSE/documents/doc/by/tirole/fair_gatekeeping_in_digital_ecosystems_revision_231224.pdf

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13 UK Competition and Markets Authority ("CMA"), Mobile Ecosystems, Market study final report ("CMA Mobile Ecosystems Market Study"), Key Findings, June 2022, available at https://assets.publishing.service.gov.uk/media/63f61bc0d3bf7f62e8c34a02/Mobile_Ecosystems_Final_Report_amended_2.pdf, paragraph 4.65.

14 CMA Mobile Ecosystems Market Study in *op. cit,* paragraph 4.69 and ff.

15 CMA Mobile Ecosystems Market Study in *op. cit*., paragraph 4.210.

16 For example in 2022, Apple's App Store offered 1.9 million apps and had 650 million users while no alternatives were available. Similarly, Google's Play Store offers 3.7 million apps and has 2.5 billion users, while its alternatives are more limited: (i) Aptoide only offers 1 million apps and has 430 million users, (ii) Amazon Appstore only offers 480,000 apps (iii) the Microsoft App Store has only 800,000 apps, (iv) the Huawei AppGallery has 580 million users and (v) Samsung Galaxy Store 24.3 million users. See https://www.apple.com/newsroom/2023/05/developers-generated-one-point-one-trillion-in-the-app-store-ecosystem-in-2022/, and https://42matters.com/ios-apple-app-store-statistics-and-trends#available-apps-count, https://en.aptoide.com/company/about-us, https://mobiloud.webflow.io/blog/mobile-app-statistics, chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://images.samsung.com/is/content/samsung/assets/cz/homepage/February-2024-Digital-Services-Act.pdf.

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21 Recital 62 of the DMA states that*: "Pricing or other general access conditions should be considered unfair if they lead to an imbalance of rights and obligations imposed on business users or confer an advantage on the gatekeeper which is disproportionate to the service provided by the gatekeeper to business users or lead to a disadvantage for business users in providing the same or similar services as the gatekeeper. The following benchmarks can serve as a yardstick to determine the fairness of general access conditions: prices charged or conditions imposed for the same or similar services by other providers of software application stores; prices charged or conditions imposed by the provider of the software application store for different related or similar services or to different types of end users; prices charged or conditions imposed by the provider of the software application store for the same service in different geographic regions; prices charged or conditions imposed by the provider of the software application store for the same service the gatekeeper provides to itself. "*

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25 However, in response to developer backlash, Google paused the enforcement of this billing requirement. Hern, A. (2023, April 19). Google allows app developers to break away from Play billing system. The Guardian. Retrieved from https://www.theguardian.com/technology/2023/apr/19/google-allows-app-developers-to-break-away-from-play-billing-system.

[26] Recital 62 of the DMA states that *"This obligation should not establish an access right and it should be without prejudice to the ability of providers of software application stores, online search engines and online social networking services to take the required responsibility in the fight against illegal and unwanted content as set out in a Regulation on a single market for digital services*"

[27] In 2024 alone, the App Store generated $104 billion on sales of digital goods and services through the App Store, on which Apple collects its commissions. See Caminade, J., & Borck, J. (2023). "The Continued Growth and Resilience of Apple's App Store Ecosystem. Analysis Group", available at https://www.apple.com/newsroom/pdfs/the-continued-growth-and-resilience-of-apples-app-store-ecosystem.pdf, accessed on 7 February 2025.

[28] See *Case C-233/23, Alphabet and Others [2025]*

[29] For example, Apple has recently appealed the DMA's mandated measures that Apple has to take to comply with its interoperability obligations: See https://www.axios.com/2025/06/02/apple-eu-dma-appeal-antitrust-penalties (accessed 9 June 2025). Apple also imposes strict requirements to app store developers, such as mandating a minimum amount of capital to operate and levying a Core Technology Fee on each first annual install on their market place: https://developer.apple.com/support/core-technology-fee/ (accessed 9 June 2025). Similarly, Google is appealing the ruling in Epic Games v. Google, which requires the company to allow third-party app stores to be distributed as apps in the Play Store: see https://www.eff.org/cases/epic-games-v-google#:~:text=Judge%20James%20Donato%20of%20the,stores%2C%20and%20to%20allow%20alternative. (accessed 9 June 2025)

[30] See *CASE AT.40437 – Apple – App Store Practices*, para. 131. The judgement found that *"IAP also enables Apple to collect certain data… Apple controls the billing relationship with the respective customer and becomes the "merchant of record" for those transactions whereas developers are cut off from payment-related information on and communication with their customers*."