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PLATFORM MERGERS AND ANTITRUST

GEOFFREY PARKER, GEORGIOS PETROPOULOS AND MARSHALL VAN ALSTYNE

Platform ecosystems rely on economies of scale, data-driven economies of scope, high-quality algorithmic systems and strong network effects that typically promote winner-take-most markets. Some platform firms have grown rapidly and their merger and acquisition strategies have been very important factors in their growth. Market dominance by big platforms has led to competition concerns that are difficult to assess with current merger policy tools. In this paper, we examine the acquisition strategies since their inception of the five major US firms – Google, Amazon, Facebook, Apple and Microsoft. We discuss the main merger and acquisition theories of harm that can restrict market competition and reduce consumer welfare. To address competition concerns arising from acquisitions in big platform ecosystems this paper sets out a four-step proposal that incorporates: (1) a new ex-ante regulatory framework, (2) an updating of the conditions under which the notification of mergers should be compulsory and the burden of proof should be reversed, (3) differential regulatory priorities in investigating horizontal versus vertical acquisitions, and (4) an updating of competition enforcement tools to increase visibility of market data and trends.

Geoffrey Parker: Dartmouth College
Georgios Petropoulos: Bruegel, Massachusetts Institute of Technology and Stanford University
Marshall Van Alstyne: Boston University

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1 Introduction

Merger activity can be anticompetitive. It can also enhance efficiency. We explore this simultaneous problem and opportunity for platform firms and their digital ecosystems. Such firms have become increasingly dominant in the global economy and, as a result, are attracting significant regulatory scrutiny. Our goal is to catalogue the magnitude of platform merger and acquisition (M&A) activity for the largest platforms, describe their varying motives, explore the potential for harm and make proposals that might mitigate such harm. These proposals are designed to: (1) improve the flow of information, (2) adjust the notification threshold and the burden of proof in merger cases, (3) better assess the dynamic effects of mergers, and (4) suggest updates to merger policy tools.

Consumers interact with third parties via platforms and use them to find relevant products and services that suit their needs and preferences[1]. Producers and service providers (eg manufacturers and retailers, content providers, app developers) can promote their goods, often without the constraints of geographical barriers, and can access large user bases that allow them to grow their businesses. It is the interactions between users of the same or different types that create value in digital ecosystems.

In many cases, platform intermediaries are present in digital ecosystems and provide services that promote value production and facilitate interactions between users. Platforms adopt open infrastructures in which they provide services that are attractive to external users. Users join these infrastructures to both consume a platform's services and to interact with other users. Platforms also adopt and enforce governance rules over the access and behaviour of the users on the infrastructure, as well as dispute resolution mechanisms when these rules are challenged by market participants.

The degree of openness is a critical choice that platforms must make (Eisenmann *et al*, 2009). Depending on a platform's choice, value creation can be primarily internal, primarily external, or some intermediate combination. Internal value creation is achieved through platforms' own production of output (products and services) that is directly valuable to their users. External value creation refers to external contributors such as app developers, service providers and other external producers who can increase a user's benefit from participation in the platform. The allocation of value creation between the platform and its ecosystem of value adders defines the so-called inverted-firm problem (Parker *et al*, 2017, 2018). Many platforms have followed the path of external production; they harness some of

[1] It is in fact this modularity of allowing *"a set of distinct yet interdependent organizations to coordinate without full hierarchical fiat"* that contributed to the emergence of platform ecosystems (Jacobides *et al*, 2018).

their users as producers representing an external labour force that is not captured by the traditional labour statistics.

One critical area of platform activity is their unprecedented ability to capture data from users who transact on the platform. Combined with this access, the technological progress related to artificial intelligence and machine learning has led to the development of revolutionary techniques that treat data as a valuable asset. Platforms collect data from their users and 'translate' this information into new or improved services, more tailored user offerings and better-matched interactions with other users of the ecosystem.

Such information is valuable at an individual level, as it leads to personalisation of services. But when platforms have a large number of users, additional efficiency benefits are realised through the aggregation of information. This is because of economies of scope in data aggregation (Martens, 2020): merging two complementary datasets can generate more insights and economic value compared to keeping them in separate data silos. Hence, when two datasets are complementary and not entirely separable, applying data analytics techniques to the merged set will yield more insights and be more productive than applying it to each set separately, especially when the marginal cost of applying analytics to a more complex dataset is relatively small.

Data-driven economies of scope can be very valuable to platform ecosystems because they also facilitate platform's expansion strategies both horizontally and vertically. Platforms can repurpose the insights from data and information they have collected to operate in closely (horizontal) adjacent markets where this information can be helpful. For example, by gaining unique insights into general online search and by understanding better the preferences of its users, a platform can more easily develop services in complementary business lines, such as comparison-shopping services, online job listings and online flight search. In addition, platforms are more inclined to explore vertical expansion and compete directly with upstream producers and service providers that operate via their infrastructure, exactly because of the information advantage they have and the efficiencies that such an advantage can bring in vertically integrated structures. For instance, mobile operating system platforms have increased incentives to also produce upstream applications including music streaming, mapping services and web-browsing.

Critical for a platform's prominence within its core business or its expansion in other vertical or horizontal markets are two other economic forces that are commonly seen in digital ecosystems. First, we observe significant economies of scale. Digital goods and services are typically produced at a

significant fixed cost but no or little variable cost (Varian *et al*, 2004). In other words, the cost of production is much less than proportional to the number of customers served. Hence, once established, digital firms can grow quickly by expanding their operations to new users or adjacent markets at minimum cost. Second, network effects are particularly important in many of these ecosystems. The benefits users gain from participating in the platform can increase with the participation of other users (on the same or another side of the platform) in the ecosystem.

These three forces – economies of scope, economies of scale and network effects – have contributed to the emergence of a few winner-take-most platforms that serve as gatekeepers for the digital ecosystems they operate: they orchestrate large numbers of interactions among their users, who depend on the gatekeeper to address scale economies and market failures that individuals cannot address themselves. In other words, gatekeepers exercise increased control over whole platform ecosystems that: i) is difficult to contest by existing or new market operators, irrespective of how innovative and efficient they may be; ii) make it difficult for users to find alternative paths, outside the gatekeeper.

This paper deals with platforms that are important enough to be characterisded as infrastructure gatekeepers because of the very large number of interactions they handle. It studies the M&A expansion strategies of these platforms and their impact on the competitive landscape. We analyse the potential anticompetitive harms of such acquisitions and argue that the new regulatory approach put forward by Parker, Petropoulos and Van Alstyne (2020, hereafter, PPVA), complemented with a proper update of merger policy analysis and tools, can help online ecosystems become more competitive and innovative, with platform M&As that primarily promote efficiency gains and are beneficial for consumers.

Further, M&As are important strategic decisions that allow platforms to: i) establish their presence in their core business and grow larger; ii) expand in related horizontal markets with the acquisition of relevant technologies and a workforce from the merged entities; and iii) expand in vertical markets benefitting both from the efficiencies of vertical integration and the information advantages relative to ecosystem partners.

The remainder of this paper is organised as follows: section 2 presents qualitative and quantitative evidence of the M&A activity since the start of their operations of Amazon, Apple, Facebook, Google and Microsoft (we refer to these firms collectively with the acronym GAFAM). We also discuss how mergers have contributed to the horizontal or vertical and conglomerate expansion of these platforms. Section

3 presents the main theories of harm as well as efficiencies associated with these mergers. Section 4 briefly describes our proposal, starting with the basic principles of the regulatory proposal of PPVA, and how it can address certain competition concerns related to M&As. We then discuss potential updates to merger policy analysis and competition tools so that they fit better the platform age. Section 5 concludes.

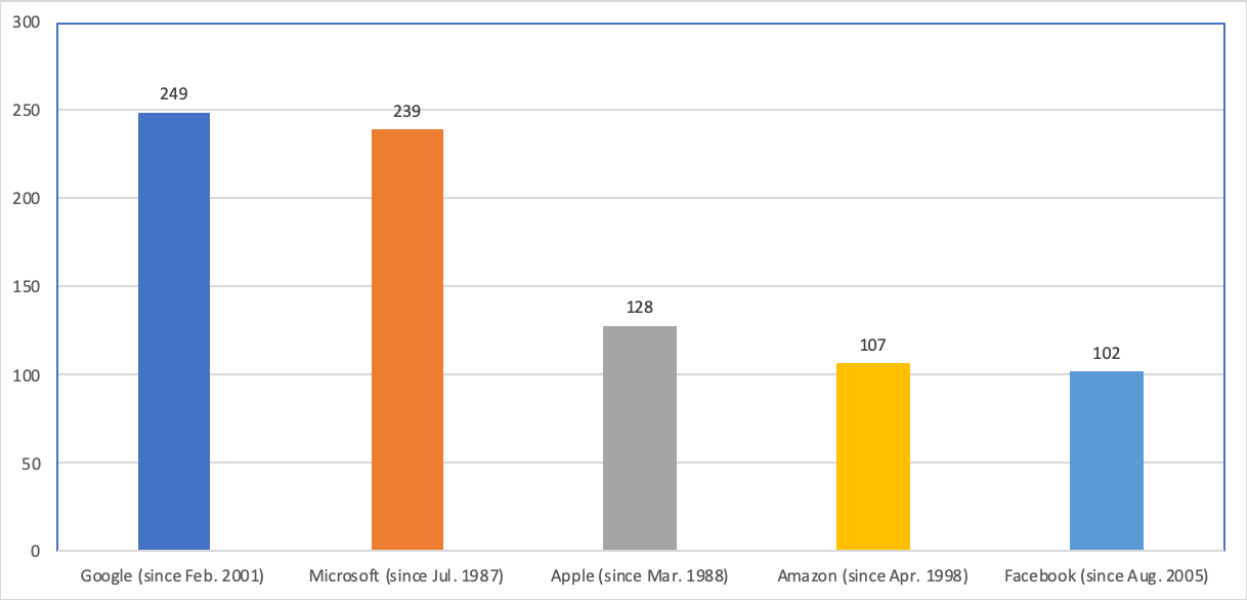
2 M&A strategies of big platforms

Platforms have developed distinct M&A strategies as their businesses have evolved. To understand these, we created a dataset of all public GAFAM M&As until August 2020[2]. The number of acquisitions for each firm is reported in Figure 1 together with the month and the year of their first recorded acquisition. The total number of acquisitions is 825. Google has the greatest average number of acquisitions per year (13.11) since its first recorded M&A in 2001. Microsoft (7.24) and Facebook (6.8) follow, with M&As since 1988 and 2005, respectively.

Figure 2 reports the cumulative increase in the number of M&As carried out by each of these firms from 2000 to 2020. GAFAMs collectively increased their M&A activity in 2010 (mainly because of the increased M&A activity of Google and Facebook) while in 2014 the number of acquisitions reached a record number of 73 (out of which 37 were Google acquisitions). In the last decade we have seen that GAFAMs have developed significant M&A activity with the acquisition of either complementary or substitutable units that have expanded their business activities.

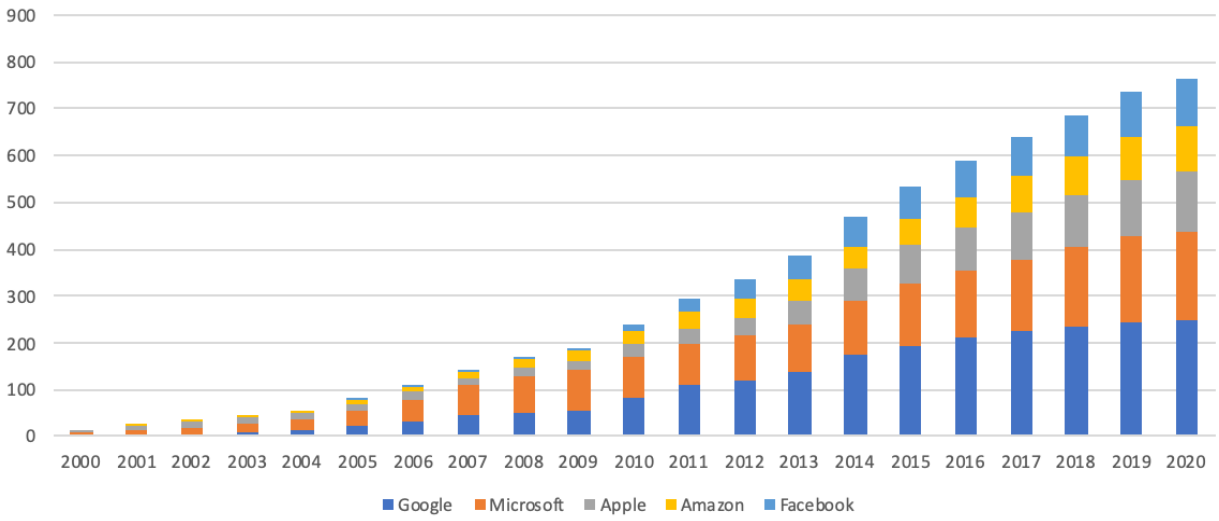
[2] For this dataset we relied on information on M&As provided by Crunchbase, Wikipedia, the Thurman Arnold Project at Yale University and Microsoft Investor Relations Acquisition History. For each merger observation, further research was performed by the authors and research assistants to identify the acquired firm, its specialisation and the industry it belongs to, how the acquired firm was integrated into the business model of the big tech company, whether the acquisition involved technology transfer, talent acquisition, or both (balanced).

Figure 1: 825 Mergers and acquisitions by GAFAM from 1987 - 2020: Google 30%, Microsoft 29%, Apple 16%, Amazon 13%, Facebook 12%



Source: Bruegel.

Figure 2: Cumulative number of GAFAM mergers and acquisitions, 2000-2020



Source: Bruegel.

It is worthwhile briefly describing the broad M&A plans of these firms. Starting with Amazon, we identify a phase of establishment first as an online retailer. Early acquisitions served as an opportunity for a geographic expansion. Amazon entered the United Kingdom, Germany and China as an online retailer. At the same time, Amazon acquired other online retailers, whose specialisations covered a

wide range of products, thus combining the acquired firms' functionality and their customers' data to improve Amazon services. That happened alongside the acquisition of specific tools that on the one hand can make the online retail experience more user-friendly and on the other hand can contribute to its more effective monetisation. For example, Amazon managed to outbid eBay to acquire LiveBid.com in 1999, the sole provider of live-event auctions on the internet at the time. Amazon implemented LiveBid.com's technology in its online retail activities. Moreover, the acquisition of Alexa Internet in the same year helped Amazon to better understand the online behaviour of users and closely monitor how consumers reacted to its products and services.

After 2006, Amazon expanded the range of its acquisitions beyond the establishment, improvement and expansion of its online retail activities. It started to acquire firms relevant to its web services (which primarily focus on business users). Amazon also became more active in acquisitions in the field of media entertainment following its entry into the film and television industry through the Prime Video unit. In the last decade, Amazon Web Services has become the most active unit of Amazon in acquisitions. At the same time, other acquisitions have increasingly targeted artificial intelligence firms and firms that specialise in robotic systems and drones.

Amazon's most expensive acquisitions are those that have added new capabilities or markets to its business model[3]:

- Zappos in 2009: Amazon initially tried to compete with Zappos in the online shoe retail market, through its subsidiary Endless.com, without much success. The acquisition of Zappos was an alternative way to increase its market prominence by eliminating one of its main competitors. Following the acquisition, Amazon closed Endless.com.
- Kiva Systems in 2012: The acquisition of the maker of service robots for warehouses allowed Amazon to improve the efficiency of operations in its fulfilment centres.
- Whole Foods Market in 2017: This allowed Amazon to integrate its digital infrastructure with a retail grocery distribution network and the types of products offered by grocers. This integration has proved to be particularly important during the COVID-19 pandemic.
- Ring in 2018: This acquisition of a network-connected video doorbell company signalled Amazon's ambition to develop smart home devices with the help of its artificial intelligence technology.
- Pillpack in 2018: Amazon's acquisition of this online pharmacy signals the company's intention to expand in retail markets for pharmaceutical products.

[3] The price of GAFAM acquisitions is often not reported. We refer here to the pool of acquisitions for which the price was disclosed.

- Zoox in 2020: Zoox's ground-up technology, which includes developing zero-emission vehicles built specifically for autonomous use, could significantly contribute to Amazon's future operations in the area of transportation.

The second firm in our sample, Apple, has throughout most of its history adopted a closed ecosystem for its products. Before the development of the iPhone and its associated App Store, a major objective of Apple's acquisition strategy was to introduce additional functionalities into its core business of personal computers. These acquisitions had to do with relevant software applications that can run on the Macintosh operating system or that aim at updating the operating system. Interestingly, in 1997 Apple acquired Power Computing Corporation, which developed clones that ran the Macintosh operating system. The objective of the acquisition was to replicate Microsoft's and Intel's success in fostering cheaper hardware in order to expand Apple's position in operating systems. However, Steve Jobs reversed the decision that same year because Power Computing was cannibalizing Apple hardware sales instead of expanding the market[4]. Without a license to use Apple's operating system software, Power Computing went out of business in 1998[5].

With the development of the internet, Apple targeted its acquisition strategies towards information technologies that provided particular services for Apple's online network. Examples include identification of suspicious websites that are engaged in illegal activities, development of educational content for teachers and students compatible with iPod, and web applications relevant to office work. Apple has also expanded in music applications with the acquisition of SoundJam MP, one of the most highly acclaimed MP3 players for the Macintosh.

The development of the iPhone and the associated App Store brought Apple into a new era that significantly changed its acquisition strategies. The focus shifted to human-machine interaction by acquiring online applications related to its mobile operating system, maps and navigation, online search, the voice control software Siri (acquired in 2010 and later evolved into Apple's personal assistant), music and books, semiconductor manufacturing, database analytics, facial and speech recognition, mobile photography, and so on. Since 2015, Apple has been targeting firms that are active in artificial intelligence and its applications (especially those related to Siri), as well as in online payment services, and has developed an interest in autonomous vehicles. The firm's secrecy over its merger deals makes it hard to develop clear insights into the price of its most expensive mergers.

[4] See https://www.nytimes.com/1997/09/03/business/apple-decides-cloning-isn-t-its-route-back-to-profitability.html.
[5] See https://archive.nytimes.com/www.nytimes.com/library/cyber/week/013098power.html.

Among the values that are disclosed, the acquisition of Intel's smartphone modem business and consumer audio products manufacturer Beats Electronics were the most expensive. Beats provided manufacturing capacity and also offered an online streaming service, which was discontinued when Apple moved its subscribers to Apple music. In the app space, navigator app HopStop.com was the costliest.

Facebook, the youngest of the five companies in our sample, started its M&A activity with a focus on creating a user-friendly social network experience. That motivated the acquisition of functionalities such as facilitating online conversations, enabling photo sharing, creating an environment for travellers to share their stories and providing updates for live events or an online instant messaging platform. At the same time, other acquisitions focused on the monetisation channel through targeted advertising techniques. Since 2014, Facebook has been particularly active in the acquisition of companies that specialise in computer vision, virtual and augmented reality, artificial intelligence and machine learning.

Facebook's three most expensive acquisitions were:

- Instagram (acquired in 2012): a video and photo social network sharing platform. Its services are considered substitutes for those on the Facebook platform (see Argentesi *et al*, 2019, for a critical review of this case).
- WhatsApp (acquired in 2014): a platform that allows its users to exchange text messages, make voice and video calls, and share images, documents, user locations and other media. This platform provides similar services to Facebook Messenger.
- Oculus (acquired in 2014): a producer of virtual reality headsets designed for video gaming. Oculus has been instrumental in the virtual reality unit of Facebook, leading to further acquisitions designed to augment and complement the virtual reality applications of the platform.

Facebook's M&A activity has been based to some extent on the platform's competitive concerns. Facebook CEO Mark Zuckerberg and CFO David Ebersman, in their email conversation on the acquisition of platforms like Instagram, published by *The Verge*[6], agreed that one of the objectives for such acquisitions is to neutralise competitors and to prevent them from growing and disrupting Facebook's market operations.

[6] See https://www.theverge.com/2020/7/29/21345723/facebook-instagram-documents-emails-mark-zuckerberg-kevin-systrom-hearing.

Similar concerns were raised in the acquisition of WhatsApp for $19 billion, the second most expensive acquisition by GAFAMs behind Microsoft's acquisition of LinkedIn (for $26 billion). Published Facebook conversations and charts[7] show that Facebook was monitoring WhatsApp and found that its user base was steadily increasing in such a way that it could evolve to become a competitor of Facebook[8].

Google's early M&A activity focused on establishing its presence in online search. The company pursued acquisitions relevant to the personalisation of search services, customer relationship management and the efficiency of its online advertising system. With the acquisition of Android in 2005, Google directed much of its M&A activity towards its mobile ecosystem. Another important acquisition was YouTube, which allowed Google to become dominant in video sharing. It augmented the YouTube system with the acquisition of extra functionalities for desktop and mobile video sharing. In the last decade, the firm has invested in firms in the cloud computing market while, since 2013, it has focused on acquisitions in the fields of home automation, artificial intelligence, image recognition, natural language processing and machine learning.

The most expensive Google acquisition was its 2011 acquisition of Motorola mobility for $12.5 billion. This allowed the company to become more active in the smartphone market. However, facing losses, in 2014 it sold the hardware business to Lenovo for $2.9 billion, while retaining Motorola's patent portfolio as a complement to the Android ecosystem[9]. Google's second most expensive acquisition was Nest Labs in 2014, which helped the firm to gain a footing in the growing market for web-connected household appliances. The third most costly acquisition was DoubleClick in 2007, which became a core unit in Google's advertising strategy. DoubleClick offers technology products intended to increase the purchasing efficiency of advertisers and to minimise unsold inventory for publishers. Another merger of significant value was the acquisition of Waze in 2013, a GPS navigation software system with real-time crowdsourced traffic conditions. Waze provided a close substitute to Google's maps and navigator unit.

Microsoft has the longest history of acquisitions in our sample, starting from 1987. Early acquisitions focused on software applications for personal computers and computer networks. The company targeted new functionalities that were developed further to provide better home, office and

[7] See https://www.buzzfeednews.com/article/charliewarzel/why-facebook-bought-whatsapp.
[8] Gautier and Lamesch (2020) assigned the potential killer acquisition motive to Facebook for the target firm Masquerade, a picture-sharing app that offers filters for selfies. Their classification test involved the following conditions: i) The core business of the acquired firm is in a market where the GAFAM has significant market power; ii) the acquired firm should have a sufficiently large user base; iii) the acquired firm should continue its business line after the acquisition.
[9] See https://www.theguardian.com/technology/2014/jan/29/google-motorola-lenovo-sale.

entertainment services. In 2000, Microsoft began to acquire computer gaming assets. For example, it purchased Bungie studios in 2000[10]. The purchase allowed Microsoft to launch its Xbox game console with the exclusive game Halo, developed by Bungie[11]. Other acquisition targets included developers of tools that facilitate information sharing among online users, and of web services that provide security and protection for online activities. Acquisitions shifted to mobile applications from 2007, while Microsoft also acquired the mobile phone business of manufacturer Nokia in 2013 to create the Microsoft Mobile unit.

Later acquisitions, apart from online gaming, also focused on the cloud computing market where Microsoft's Azure division is one of the main vendors (together with Amazon and Google). The acquisition of developers' platform GitHub in 2018 illustrates an acquisition strategy of purchasing assets that provide additional access to developer communities[12].

Significant and costly acquisitions include:

- aQuantive in 2007: The acquisition of this advertising network that provides digital marketing and technology solutions was integrated with Microsoft's online search engine Bing to better monetise users' search activities.
- Skype in 2011: The internet communications company supported Microsoft devices including Xbox and Kinect, Windows Phone and a wide array of Windows devices, allowing Microsoft to integrate Skype users with Lync, Outlook, Xbox Live and other communities.
- LinkedIn in 2016: The professional social networking site introduced Microsoft to a new business line with the possibility to combine its software suite with the network's structure. This is the largest recorded acquisition in GAFAM history.

Overall, the M&A strategies of these big firms serve a number of purposes that benefit these businesses. Firms can acquire:

- Additional complementary functionality that can help the acquirer provide more efficient services related to its core business;
- Functionalities in a closely adjacent or conglomerate markets to enable acquirers to expand their services to new markets;

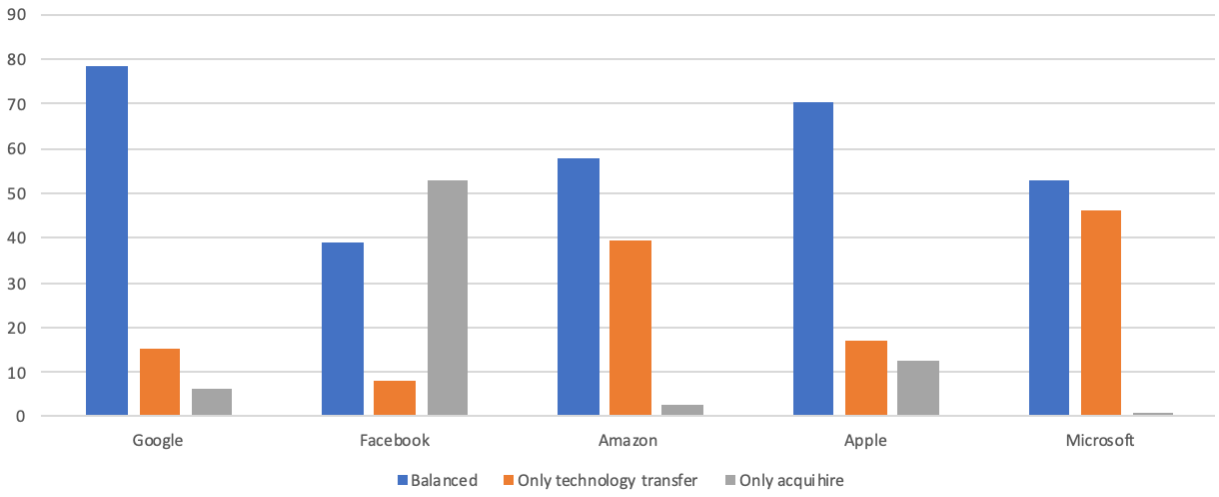
[10] See https://www.ign.com/articles/2000/06/20/microsoft-acquires-bungie.
[11] See https://www.sfgate.com/entertainment/article/Microsoft-puts-on-its-game-face-New-Xbox-isn-t-2856291.php.
[12] See https://hbr.org/2018/06/why-microsoft-is-willing-to-pay-so-much-for-github.

- Competitors or a potential competitors in order to protect or establish positions in specific service markets;
- Substitutable and competing services in order to enter new geographical markets;
- Human capital either as talent employed by the target firm or a large user base managed by that firm.

One relevant aspect of the acquisition strategies has to do with the type of asset that is acquired. The M&A deal can incorporate a complementary technology transfer, where the new technology is integrated into the core of the respective GAFAM's technologies, increasing the functionalities of its digital ecosystem. The M&A deal might also serve as a means of hiring specialised personnel who have proven their ability to build novel and profitable digital applications (often referred to as acquihires). In many cases, an M&A deal serves both purposes.

Figure 3 presents preliminary results for the percentage of GAFAM M&A deals that incorporated a talent acquisition (acquihire), and the share of M&A deals that incorporated technology transfer (assets and technology, where technology was either patented or not patented). The column 'balanced' refers to the percentage of acquisitions that incorporate both talent and technology. In addition, the percentage of technology-dominant acquisitions (only technology transfer is involved) and those where only acquihire took place are reported.

Figure 3: M&A goals: % balanced, % acquihire, % technology transfer



Source: Bruegel.

Google and Apple have a tendency to acquire both talent and technology, with shares that exceed 70 percent. Microsoft acquired technology in more than 99 percent of its acquisitions, but acquired talent

in only 53 percent of its M&A deals. On the other hand, Facebook tended to acquire talent through its acquisitions, at a rate of more than 92 percent, while technology transfer only occurred in about half of deals.

3 Theories of harm and value creation from M&As in platform ecosystems

We now turn to the question of the potential harm that might be done by mergers and acquisitions, especially when carried out by dominant platforms. We also discuss the goals of competition policy with respect to M&A deals and assess which regulations are likely to achieve their goals. Successful merger regulation should prohibit market consolidation that reduces consumer welfare through the restriction of competition. We begin by reviewing theories of harm[13].

The first theory of harm we consider is the so-called killer acquisition. Killer acquisitions refer to the situation in which incumbent firms acquire innovative targets solely to discontinue the target's innovation projects and pre-empt future competition. Consumer welfare can decrease because consumers lose the benefits of increased competition and the alternative consumption choices from new products and services that would have been developed if the acquisition had not taken place.

The term was introduced by Cunningham *et al* (2020) who, using pharmaceutical industry data, showed that drug projects acquired by incumbent firms are less likely to be developed when they overlap with the acquirer's existing product portfolio. This is especially the case when the incumbent's market power is substantial because of weak competition or patent protection. The authors concluded that about 6 percent of acquisitions in their sample were killer acquisitions. These acquisitions usually escape antitrust scrutiny as they are often below the revenue notification threshold that would make authorities likely to investigate.

When comparing the pharmaceutical and digital industries, it is important to note that pharmaceutical markets have a clearer structure and better information flow regarding who the potential competitor might be (Cabral, 2020). Therapeutic markets are reasonably well defined. In addition, heavy regulation of drug development provides information to authorities related to the products and the

[13] For additional theories of harm in specific environments see Motta and Peitz (2020). Here we keep the analysis of theories of harm in a general setting. Also see Caffarra and Scott Morton (2021) for a summary of the European Commission's proposed Digital Markets Act: https://voxeu.org/article/european-commission-digital-markets-act-translation.

agreements made across the production and distribution of drugs (eg the length and the validity of patent protection), and the relationships between generic and name-brand manufacturers.

In digital markets, information structures and the identification of potential competitors can be much more difficult to ascertain – but not impossible. The development of market analytic techniques allows observers to closely monitor market trends and identify firms that are growing relatively fast in the same or in closely adjacent markets to ones where big incumbent platforms operate. For example, a 2018 UK parliamentary inquiry[14] revealed that:

> *"Facebook used Onavo to conduct global surveys of the usage of mobile apps by customers, and apparently without their knowledge. They used this data to assess not just how many people had downloaded apps, but how often they used them. This knowledge helped them to decide which companies to acquire, and which to treat as a threat."*

Big platforms are more likely to have such insights than the authorities responsible for assessing the market impact of mergers. This information asymmetry has made it more difficult for competition authorities to assign a killer acquisition motive in M&A activities.

Acquisitions that only involve talent acquisition (acquihire) can also be relevant to this theory of harm. Big platforms can acquire talent from their competitors or potential competitors (with highly substitutable technologies) in order to protect their market position and eliminate the market competition threat.

A second theory of harm has to do with the impact of M&A on small firms operating in related markets. Empirical evidence from Koski *et al* (2020) and Kamepalli *et al* (2020) showed that big technology firm acquisitions can create a so-called *"kill zone"* effect. In other words technology giants' buyouts subsequently reduced market entry rates and decreased the supply of venture capital funding and investment available to start-ups that operate in the target product markets of tech giants' acquisitions. The intuition from this result is two-fold. First, once a big tech firm has acquired a start-up in a specific, closely adjacent, complementary or conglomerate market, it has a negative effect on other small firms in that market because they find it harder to compete with the technology giant. This occurs because of economic forces including network effects, economies of scale and data-driven economies of scope that are significant in big platform markets. When the technology giants enter, in

[14] See the note by Damian Collins, the Chairman of the UK Parliament Culture, Media and Sport committee: https://www.parliament.uk/globalassets/documents/commons-committees/culture-media-and-sport/Note-by-Chair-and-selected-documents-ordered-from-Six4Three.pdf.

this case through acquisitions, venture capitalists do not find it attractive to continue to invest in small firms in those markets (or potential entrants in those markets) as they feel it is less likely their investment will pay off. Small firms and potential entrants are subsequently more constrained in investing in product solutions that can help them to enter and efficiently compete in the market.

Second, many of the small firms and start-ups have increased incentives to develop their businesses in order to be acquired by the big giants. Investors in these firms earn a high return on their investment when such an acquisition occurs. So, the potential of an acquisition generates incentives for new businesses to grow and be successful in the product market. But once a big technology firm acquires one of these firms, the probability of acquisition decreases for other small entrants operating in the market. There is a significant first-mover advantage, and when the 'winner' is selected by a big tech firm, it is harder for the remaining firms in the market to continue their business operations unaffected.

Let us now consider the case of a horizontal merger[15] between two platforms that serve consumers at a price of zero. Such pricing is often observed in two-sided networks where platforms can internalise network effects that cross different types of users (Rochet and Tirole, 2003; Parker and Van Alstyne, 2005). The merged entity may be able to extract a higher surplus from the side of the market that joins the platform to interact with consumers. Examples include advertisers, developers and third-party producers. Platforms typically adopt monetisation strategies that allow them to receive payments for the interactions they facilitate. An advertiser, for example, has to pay a per-interaction fee to the platform to interact with consumers. If the merged entity is able, through increased market power, to charge a higher fee to the advertiser, it is very likely that part of this fee will increase the price of the advertiser's product paid by consumers on the other side of the platform market. So, the ability of the platform to extract higher surplus at the production side can create a competitive bottleneck (Armstrong, 2006) that leads indirectly to higher prices on the consumption side, thus decreasing consumer welfare.

Vertical merger can also generate concern[16]. When a dominant platform merges with a supplier of services, it may offer this supplier preferential access to the demand side, restricting consumers' options as a result. At the same time, it may use the data and information it collects from external suppliers that participate in its ecosystem to the benefit of its own subsidiary when it designs its

[15] The insights from non-platform markets can also be relevant to the evaluation of horizontal mergers and can provide other potential theories of harm that should be properly assessed. See for example, the analysis by Farrell and Shapiro (1990, 2010), Barros and Cabral (1994) and Federico *et al* (2017, 2018).
[16] See for example Comanor (1967), Sallinger (1994), Chen (2001) and Rey and Tirole (2007) for antitrust analysis of vertical mergers in 'traditional' markets.

upstream selling strategies and products. In both cases, the playing field in the upstream market is distorted as the platform leverages its role as an intermediary to gain market power in the upstream market.

Dynamic effects may also be very important. However, they are hard to analyse. Counterfactual analysis can give rise to new theories of harm. For example, following Nocke and Whinston (2013), let Platform A acquire a firm. If, in the absence of this merger, Platform B would have acquired the same firm, then it is relevant to assess consumer welfare under the former and latter mergers rather than as a standalone firm. If, under alternate acquirer B, consumer welfare is greater, then the merger with platform A should not be allowed. This suggests that there may be a pre-emption game in which firms race to be the first to propose mergers. If the counterfactual analysis suggests that, if the merger is not approved, a welfare-enhancing merger deal will follow, then the first merger is harmful for welfare.

Bryan and Hovenkamp (2020) made a similar point. In a model with differentiated products, they showed that an acquisition by a stronger potential acquirer prevents its rival from obtaining access to a new technology developed by the target firm. Thus, its motivation for the acquisition may be to exclude a weaker rival from gaining access to the target's technology, which may endanger the long-term viability of the rival.

In the case of conglomerate mergers, Rhodes and Zhou (2019) investigated the implications of one-stop shops, where consumers do not have to visit alternative suppliers to shop for different products and services, but can find all of them at the conglomerate's shop. They show that, after a single conglomerate merger, there is an equilibrium in which consumers first search at the conglomerate firm because of consumption synergies. In that equilibrium, the conglomerate firm charges lower prices than its single-product competitors, but makes higher profits than the combined profits of its single-product competitors. For sufficiently low search costs (as in online commerce), Rhodes and Zhou (2019) showed that only a single conglomerate merger is profitable and consumers are worse off with the merger.

Theories of harm should be compared to the efficiency gains and value creation that are achieved through proposed mergers. In digital ecosystems, this value can be related to significant economies of scale, data driven economies of scope (eg economies of scope in data aggregation) and an increase in the value derived through network effects[17]. Increased market concentration can reduce market

[17] See relevant discussion in the introduction.

operation costs or improve the quality of products and services, increasing the value of participation in the ecosystem.

One theory of value is the efficiency gain from a merger or acquisition that stems from improved management of complexity in a platform system. In particular, the *"end-to-end"* principle (Saltzer *et al*, 1981) suggests that high use functions that most users need should reside in the core of a system where they are always available to all users, while lower use functions that appeal to only subsets of users should be at the periphery where they can be consumed only by those who require them. The reason is that the addition of each system function incurs an overhead cost in reduced execution efficiency. The implication for platforms is that ecosystem partners should provide the highly variable low use functions in order to provide customised solutions in particular industry verticals. By contrast, the platform should provide low-variety high use functions that span industry verticals. This principle is fundamental to the design of the internet and corresponds to the view of platforms as a core set of stable and slowly evolving functions under a layer of modular rapidly evolving functions (Baldwin and Woodard, 2009). For example, consultants from firms such as Infosys and Accenture create solutions on top of platforms such as SAP that are specialised for firms in industries such as automotive manufacturing, government services and energy production. Critically, when functions provided by ecosystem partners become widely demanded, the platform is likely to acquire or replicate those functions in order to include them in the core system, where they can be more efficiently provided to all users. This means that the platform reduces the negative externality where end users must integrate disparate technologies, thus potentially increasing consumer welfare.

There are also important dynamic aspects related to the social value of mergers. A flip side of the kill-zone theory of harm is that many small firms launch their businesses and innovate with the purpose of becoming acquired by bigger firms on terms that are profitable for their investors. This is particularly true in digital markets. Pay-outs from acquisition provide the initial impetus to invest. For small digital firms, it is a sign of great success to be bought by a big technology firm. So, keeping the 'acquisition dream' alive can have a significant impact on entrepreneurship and can be associated with more innovation and therefore with greater social value.

4 Regulation and merger policy in the digital age

To address the concerns that arise from platform M&A, we offer four complementary proposals, which we analyse in turn. First, it is important to rely on the regulation of big platforms in line with the PPVA proposal in order to improve information flow in digital ecosystems. Second, the merger notification threshold should be adjusted so that more big platform M&As fall under the scrutiny of antitrust authorities. Third, dynamic effects of mergers should be better assessed. Fourth, an update to the merger policy tools is needed in order to adopt a more forward-looking perspective in the evaluation of merger cases in digital markets.

Step 1: A new ex-ante regulation — *in situ* rights as a source of value and curb on M&A

Big tech platform ecosystems resemble a star network structure. The platform is at the centre of this structure and connects its different sides (consumers, producers, developers, and advertisers). Through the data they collect from other market participants, platforms have superior information over the ecosystem, which they can use to create ecosystem benefits by increasing the value of their intermediation services. As a platform facilitates a larger number of interactions, users can have greater challenges when switching to substitute intermediation services. Network effects favour match variety and match quality on larger platforms, as illustrated by search and e-commerce.

Platform gatekeepers enjoy information advantages – knowledge of market activity and individual preferences – that lead to market power. The PPVA regulatory proposal aims to distribute this value, often created by ecosystem partners, more evenly. They propose a user right of information access that obligates gatekeeper platforms to allow third-party access to a user's data on that user's request. The governance model and the infrastructure that stores the data remain separate. Raw data (which includes both data that is volunteered by the user and the data that is observed by the platform during the user's online activities) is always used at the location it is collected. Instead of transferring data to a competitor's online interface, where it is used as an input in its algorithmic exercises (as data portability dictates), it is the third party algorithms that are transferred to the platform's infrastructure where the data is located, in order to perform its data analysis. Individuals may choose to grant third party access to their data *in situ* rather than remove it and port it elsewhere.

An *in-situ* rights regime grants users all the benefits of data portability but confers several additional benefits. Context is preserved rather than lost, as in the case of friends' posts that do not belong to a user. Data does not grow stale but rather includes both stocks and flows of activity. And data remains

actionable such that one might reach a friend or make a purchase based on that data. Giving users control of data where it resides allows them to invite third parties to compete to create benefits with the host site, prompting greater sharing of value. Without access to the infrastructure, certain benefits cannot be created.

The *in-situ* mechanism works as follows: entrant platform B requests from its user i permission to access her raw personal data located in gatekeeper platform A. Once user i gives her consent, platform A grants access to its user i data to platform B. Then, platform B can access user i's raw data at its location on platform A and use that data as an input for running its algorithmic applications on that site. In other words, instead of bringing the data to the entrant, the entrant's algorithm can be brought to the data located at the infrastructure of platform A. Users i's data is not transferred outside the infrastructure of platform A at any point in this process. However, platform B, through algorithmic analysis on site, can gain unique insights over user i's preferences and thus provide better services to her. This enables efficient information sharing.

It is important to note that the newcomer platform gets access to the user's raw data collected by the incumbent before the incumbent has processed it through its algorithmic system. Hence, incumbent incentives to process that raw data are not negatively affected. Indeed, symmetric access to raw data among parties trying to create user benefits provides increased incentives to innovate and provide better services to users.

In other words, competition shifts from collecting data to analysing it. This is exactly the stage at which most innovative ideas are observed in digital markets. Competition facilitated by more symmetric access to information leads to extra incentives to create better algorithmic systems and improve market performance for the benefit both of users and successful innovators.

Information sharing will not only allow platform B to compete more effectively with platform A within its core markets, but should also increase competition for new unexplored markets, as platform A will no longer monopolise user i's data. Instead, platform A should intensify its efforts to develop novel value for the benefit of online users before its competitors do.

Expansion of platform A to an existing market will also be impacted, as will its incentives to engage in conglomerate merger activity. Incumbent firms in these markets can use the *in-situ* mechanism to gain new insights for their clients that are relevant to the quality of their offerings. Symmetric access to data and insights imply that platform A will find it harder to expand operations to new markets, relative to asymmetric access, unless expansion brings significant efficiency benefits. In other words, more

symmetric information access should lead to an endogenous contraction of platform boundaries. The opportunities for dominant platforms to expand to adjacent markets remain, but will require innovations that do not rely on information asymmetries stemming from data monopoly.

In-situ access will also impact horizontal mergers because it links the private value of these mergers with their social value. Such mergers can incorporate efficiencies that come from demand and supply economies of scale and scope. The *in-situ* mechanism enables the redistribution of these efficiencies across all market participants, including competitor intermediaries, third-party producers and consumers. The obligation of big platforms to open up their infrastructures to their competitors should also trigger sharing of the efficiency gains related to their M&As. This includes the extra value of network effects by facilitating interactions outside the big platform, and quality improvements related to data aggregation since the additional valuable information contained in the data of the merged entity will be distributed more evenly.

A potential challenge for newcomer platform B will be to gain the consent of many users for *in-situ* information sharing. It needs mass consent in order to reach a critical mass of information to run its services more effectively. A regulation that provides a clear and secure framework for *in-situ* exchanges can increase the scope of, and the economic incentives for, the formation of consumer data unions or pools. This is because it significantly expands the possibilities for individuals to both monetise and increase the value of the services they receive when they act as a team. As aggregation can improve the generated value in the platform ecosystem, new platforms and firms will be inclined to provide additional benefits to individuals in order to reach the critical mass necessary to provide high-quality services. So, individuals will receive either specific benefits or better services if they consent to supply their information as a team, with the derived value being proportional to the size of the team.

This is an additional benefit of *in-situ* access rights in comparison to portability rights. Data pools have typically not succeeded because of: i) the fact of friction in removing data from a source platform and either self-managing it or reuploading it to a destination platform; and ii) lack of actionability of data pools not tied to a platform. The rights provided by *in-situ* access address both issues, reducing friction and ensuring actionability. First, individuals need only provide their consent to access their data – consent that can be revoked at any time. They do not have to remove and upload data themselves. User costs are minimal. Second, the created pools only need to manage consents and not data, which significantly reduces management costs. Third, the actionability on the side of the platform is ensured by the obligation to open its infrastructure and provide *in-situ* access.

Under such a framework, the PPVA proposal also reduces incentives for M&As that intend to protect gatekeeper positions from competition. Gatekeepers lose information rents born of information asymmetry and new entrants can contribute to network effects that benefit pools of users. M&A activity, the purpose of which is to increase information asymmetry, decreases as gatekeeper incentives for killer acquisitions or the kill-zone effect also decrease. Market entrants can access the necessary market information that can help them design their products and services more efficiently and attract consumers. Such information can also help them diversify their services from those offered by the gatekeeper and experiment with new consumer services that can bring additional benefits to the ecosystem.

Additional rules should be imposed to address concerns related to the vertical structure and vertical mergers. Vertical mergers may lead to conflicts of interest at the intermediary level. When big platforms acquire an upstream supplier that uses the platform's infrastructure to interact with other users in the demand side, they may have increased incentives to actively promote the products of their upstream subsidiaries at the expense of third-party upstream market suppliers. In this way, competition upstream is distorted. The distortion can be quite significant as the platform is a necessary gatekeeper for the interaction of supply and demand. The PPVA proposal recommends additional vertical rules to combat distortion of upstream competition by the platform intermediary:

- Gatekeepers should be obliged to report the access and matching criteria of the third-party suppliers with the demand side. These criteria should ensure equal treatment of third parties with the platform's own upstream subsidiaries.
- Authorities should be able to assess if that report is truthful in practice. For that they need to ensure their access to the platform's infrastructure so that they can experiment with the platform's algorithmic system. This essentially requires the authority to act as an embedded regulator (see the discussion under step 4, below).
- If the gatekeepers are found to violate the principle of upstream equal treatment, sufficient punishment should be imposed. One possible punishment could be the full vertical separation of the platform from the upstream subsidiary. More generally, the punishment options *ex post* should be designed in a way that provides sufficient incentives for gatekeepers to avoid anti-competitive behaviour *ex ante*.

A crucial point is how to define the gatekeeper platforms for which the obligation to open their infrastructure for the *in-situ* mechanism would apply. The European Commission's December 2020

proposal for a Digital Markets Act (DMA) provides a useful definition (European Commission, 2020). Specifically, a platform is a gatekeeper if it:

- *"Has a strong economic position, significant impact on the internal market and is active in multiple EU countries,*
- *"Has a strong intermediation position, meaning that it links a large user base to a large number of businesses,*
- *"Has (or is about to have) an entrenched and durable position in the market, meaning that it is stable over time."*

That in practice means an annual European Economic Area turnover equal of or above €6.5 billion in the last three financial years, or a market capitalisation of at least €65 billion in the last financial year. In addition, the gatekeeper status requires more than 45 million monthly active end users and more than 10,000 yearly active business users in the last financial year. These thresholds are likely to fit GAFAMs as well as several other platforms.

We should note that the DMA proposal also includes a list of obligations (Article 5 and Article 6) for the operation of gatekeepers, many of which deal with how they treat consumers and business users. There are also specific obligations that point towards vertical integration, data portability and protocol interoperability.

While we feel that DMA proposal moves, in principle, in a better direction, we believe that first priority should be to establish a regulatory framework that enables in practical terms a more symmetric information flow in digital platform markets. PPVA's more structured solution includes proposals related to the platform's infrastructure, privacy protection through data encryption, and the imposition of minimum compatibility standards on how information should be shared, which may be helpful in this respect.

Step 2: Compulsory merger notification and the burden of proof

While there has been an increase in the M&A activity of big tech platforms in the last 10 years, the vast majority of deals have never been investigated, nor have competition authorities been notified. Kwoka and Valletti (2020) reported that more than 97% of M&As in these markets have never been investigated. There is therefore a clear enforcement and information gap.

Some scholars have argued that the burden of proof should be reversed in merger cases involving big platforms[18]. This reversal would imply that gatekeeper platforms should provide objective justifications over the efficiency defence for their acquisitions. However, such a policy could have potential negative impacts on entrepreneurship and start-ups. As discussed in section 3, many small firms launch their business in order to convince investors to support and help them to innovate, with the goal of being acquired by bigger firms.

Reversing the burden of proof would suggest that there is a pre-assumption that all mergers in the digital sector are anticompetitive. This is probably excessive and unnecessary, especially given the negative impact it could have on entrepreneurship. It is preferable to reverse the burden of proof for a limited number of cases that seem to be the most problematic with respect to their potential anticompetitive effects.

In vertical mergers, the *in-situ* access and the vertical rules discussed in Step 1 should be sufficient to ensure that the social value of mergers exceeds the potential competitive harm. As a result, under the proposed regulatory approach, reversing the burden of proof for vertical mergers is not recommended because it will mainly distort investments and innovation by small firms.

According to merger regulations in most jurisdictions, notification is obligatory if the acquisition exceeds specific turnover thresholds[19]. These thresholds imply that most big tech mergers are not notifiable[20]. Indeed, they often involve start-up firms whose revenues are modest.

The proposed DMA (Article 12) would oblige gatekeepers to notify all of their M&A activity (essentially bringing the notification threshold to zero for gatekeepers). We agree with this approach. It is important

[18] See for example, the 2019 Stigler report of the subcommittee on market structure and antitrust (p. 98 at https://www.chicagobooth.edu/-/media/research/stigler/pdfs/digital-platforms---committee-report---stigler-center.pdf), chaired by Fiona Scott Morton.

[19] In the EU there are two ways to reach the turnover thresholds for mergers. The first requires: (i) a combined worldwide turnover of all the merging firms over €5,000 million, and (ii) an EU-wide turnover for each of at least two of the firms over €250 million. The second alternative requires: (i) a worldwide turnover of all the merging firms over €2,500 million, (ii) a combined turnover of all the merging firms over €100 million in each of at least three EU countries, (iii) a turnover of over €25 million for each of at least two of the firms in each of the three EU countries included under (ii), and (iv) EU-wide turnover of each of at least two firms of more than €100 million. See https://ec.europa.eu/competition/mergers/procedures_en.html.

[20] In principle, even when a merger is not notifiable, the authority has the right to investigate it. But, in practice, this occurs very rarely. In the EU, in addition to the EU-level thresholds, there are also notification thresholds at the level of the member states. So, if a merger does not meet the EU thresholds, it does not mean that it will avoid merger control. Instead, it may face merger control in one or more of the 27 member states. In addition, there is a referral mechanism which allows the Commission to review a merger, at the request of the member states, if the acquisition is notifiable under the national competition law of at least three member states. For example, the referral mechanism applied in the mergers of Facebook/WhatsApp and Apple/Shazam, which were investigated by the European Commission despite both being below the EU threshold.

for the authorities to start investigating a larger number of gatekeeper M&As. This is also an opportunity to learn how these platform markets work and which theories of harm are relevant. Compulsory notification will also mean greater transparency of merger deals. Our efforts to put together a data sample of the acquisitions of GAFAMs made us realise that, in many cases, there was not adequate information publicly available over the terms of, and motives for, the deals. More transparency will help better assess the welfare impact of these mergers. The price of the merger and the number of users affected should also be disclosed, as these may explain the strategic motives behind the acquisition.

In addition, it is important to call for disclosure of the strategic intent of any proposed M&As. In particular, big platforms should report whether they intend to integrate the acquired firm into their infrastructures or have it operate as a vertical unit. Integration into the platform's infrastructure takes place in horizontal merger cases and implies that the data of the merged entity will be subject to the *in-situ* access obligation. In vertical mergers, the *in-situ* access obligation does not apply to the merged entity's data[21]. Still, the vertical rules presented above apply[22]. In order to prevent vertical mergers from being used strategically to prevent rivals from accessing the acquired firm's capabilities, we would suggest that acquiring firms that wish to pursue M&A deals under the vertical merger rules be required to allow users to multihome across different platforms (that offer similar services). This prevents gatekeeper firms from acquiring vertical targets in order to foreclose user access from other platforms.

For example, consider Google's 2013 acquisition of Waze and its 50 million users. The Waze system uses crowdsourced location information at two levels. The first is to give real-time updates, such as traffic accidents or police activity, and the second is to maintain and improve the core maps[23]. Google continues to run Waze as a standalone system that is available on the competing Apple iOS system as well as Google Android, so by our criteria, we would classify this as a vertical merger. Given this multihoming, the burden of proof to establish the harm from such a vertical merger would therefore fall on competition authorities. Interestingly, over time, a number of features from Waze have begun to make their way into the core Google mapping service[24]. This absorption of capability into the Google core is likely to generate user value under the end-to-end principle described in section 3. However, it

[21] Still, it is possible for the upstream third-party competitors to get *in-situ* access to the platform's infrastructure.
[22] Conglomerate mergers could potentially fall into both categories.
[23] See https://techcrunch.com/2013/06/11/its-official-google-buys-waze-giving-a-social-data-boost-to-its-location-and-mapping-business/.
[24] See https://techcrunch.com/2013/06/11/its-official-google-buys-waze-giving-a-social-data-boost-to-its-location-and-mapping-business/.

begins to raise the likelihood that this could be viewed as a horizontal merger if Google should begin to foreclose rivals' access to Waze functionality. In such a case, the burden of proof would shift to Google, which would then be required to demonstrate that the benefits of the merger outweigh the potential costs.

To summarise, reversing the burden of proof should only be an option in some cases of horizontal/conglomerate mergers. When the platform acquires a small competitor and merges it into its infrastructure, the concerns are again small and can be addressed through the regulatory framework that enables the *in-situ* access. However, the burden of proof should be put onto platforms in cases where the merged entity has a significant turnover and/or user base. Thus, a turnover and/or user bases threshold policy should be established, so that platforms that wish to merge should be required to provide a defence of the merger that shows that the likely efficiency benefits from data aggregation, economies of scale and internalisation of externalities exceed the potential harm of reduced competition. This is a narrower reversal of proof than the general one that has been proposed by some experts.

With such a change in notification regime, authorities' resource constraints might become binding. If so, budgets of the authorities should also be adjusted to allow antitrust authorities to investigate more mergers in the digital space. With disclosure, competing firms may be invited to submit comments on the proposed merger or their own market analyses, which may somewhat relax resource constraints.

The supporters of the general reversal of proof policy also considered this policy as a solution to the resource constraints of the authorities. However, note that any objective justification raised by big tech should be thoroughly investigated to assess its validity. There should not be a free lunch. That implies that resources would be consumed in any case for evaluating big platforms' claims. Moreover, there are other instruments that can be designed if the authorities face resource concerns (even after the budget increases we refer to above) without reversing the burden of proof. A promising solution to the resource constraint problem would be to design instead antitrust review fees that are proportional to the value of the proposed big digital platform merger. These fees can either help the authorities expand their workforces or rely on the external expertise of independent consultants and academics when they evaluate such cases. The fee should be such that it does not discourage the big platforms from acquiring smaller firms (and especially start-ups). Proportionality of the fee in relation to the value of the merger can balance both incentives and resource constraints that could hold up a thorough merger investigation.

Step 3: Merger analysis that captures the dynamic impact

Mergers in big digital platform markets require a more thorough investigation of the dynamic effects of a merger. From Step 1, the *in-situ* mechanism can reduce incentives for acquisitions that seek to leverage data and infrastructure for gatekeeper benefit. This is a first step towards a correction.

In addition, the dynamic efficiency gains should be compared carefully with the anticompetitive concerns of increased concentration, considering the presence of network effects and data synergies of the merged entity, as well as economies of scale both in the supply- (in the case of merged substitutable services) and demand-sides (in the case of a merger of complementary services).

When merged firms offer substitutable services there is a need to weigh the extra value that is generated in the ecosystem (whose fair distribution can be assisted through the *in-situ* mechanism) and the lack of competition by removing from the market one substitute service. Crucial questions to answer are:

- The degree of substitution and how is expected to evolve over time. Should the substitutability between the two services be expected to increase?

- If the proposed merger between the gatekeeper and the smaller firm is not allowed, is it likely that another platform will acquire the small target? Would that merger increase the competitive pressure exerted on the gatekeeper? Is society better off with the acquisition target as a standalone firm, a part of one platform or a part of that platform's competitor?

The expectation of an increase in the substitutability of services can indicate the potential for greater competition in the specific service market to the benefit of consumers. However, we should also weigh potential social gains from saving wasteful duplication of investment (in the space of making services more substitutable) which may offset certain gains from competition.

When antitrust authorities analyse mergers of complementary services that involve a gatekeeper, they need to assess whether the efficiencies from the demand economies of scale and data synergies overcome the anticompetitive effects. In this analysis, it is important to consider the potential market strategies that may be employed:

- Tying, bundling and any other market strategy that is designed to leverage market power from one market to a complementary one. A careful welfare analysis is needed to examine whether such strategies are welcome. But, a dynamic perspective also requires consideration of whether the big

platform could develop that complementary functionality by itself if the merger should be prevented. The replication may be of inferior quality as compared to that offered by the small firm. In such a case, the small complementary firm may find it hard to compete with the big tech giant because of the platform's bundling of its complementary services and/or the presence of network effects. Consumers may end up consuming an inferior product in the complementary market in this case.

- Data synergies can also be an important factor that can help the merged entities to provide more efficient services which their competitors in the complementary market may not be able to offer.

Specific attention should also be paid on the quality of products and services[25]. It is possible for the gatekeeper to win a new market with an inferior product. By acquiring a low-quality firm it creates a kill zone that puts high-quality firms out of business. The implication of the M&A in that case is an inferior product that is consumed in the complementary market.

The potential impact of the proposed merger on innovation efficiency defence should be examined more thoroughly. Veugelers (2012) found that in EU merger control, the assessments of the innovation effects of mergers are very limited[26].

Last but not least, particular attention should be paid to the details of the merger deal, including the price of the takeover and whether the acquisition only involves an acquihire or also technology transfer, as it may signal strategic motives. If the price is disproportionally high for a specific acquisition, it may be because the acquired firm could pose a threat to the big platform.

Step 4: Updating and combining merger enforcement tools

Authorities should develop a more forward-looking perspective when they evaluate merger cases, especially those that raise the suspicion of a killer acquisition, namely, an acquisition that seeks to eliminate a potential future competitor. To do that, authorities need to assess what the potential competition effect is if the merger is not allowed. Would WhatsApp become a direct competitor to Facebook in its core business if the merger was not allowed? If the answer is likely to be yes, then the merger may decrease consumer welfare because it restricts potential competition that could lead to

[25] In the Coty case (see Press Release No. 132/17, Luxembourg, 6 December 2017, Judgment in Case C-230/16 Coty Germany GmbH v. Parfumerie Akzente GmbH), the EU Court of Justice concluded that market competition in online commerce is multidimensional and apart from the price component there are other relevant dimensions such as product quality and brand image.

[26] Veugelers and Petropoulos looked again at this issue in 2018 with the objective to update this study, but did not observe any significant shift in merger analysis in terms of its impact on innovation that would justify an updated study.

lower prices and higher quality, and should therefore be prevented. But, in practice, it is very challenging to assess potential competition.

One avenue that could be helpful in this respect would be to measure the substitutability of platforms' services during the merger evaluation and how this evolves over time. The methodology of Brynjolfsson and Collis (2019) can be helpful in that respect. They used digital survey techniques to run massive online choice experiments examining the preferences of hundreds of thousands of consumers. They estimated the consumer surplus for a great variety of goods, including those that are offered at zero price, and they found that the median compensation Facebook users were willing to accept to give up the service for one month was $48. On this basis they estimated that US consumers have derived $231 billion in value from Facebook since 2004 (Brynjolfsson *et al*, 2019).

Such an experiment can be easily extended by assessing what would have been the choice of a user if one of the services a platform provides were not available. Users' choices in such cases can assess the degree of substitutability between services offered by different digital firms. If such an approach is combined with an assessment of the substitutability on the other side of the market (eg advertising), which typically exhibits positive prices, and where it is therefore easier to apply standard antitrust methodology, we can get a more comprehensive picture of the competitive pressure for the provision of a particular service and its underlying interaction.

Authorities should rely more on the online channel to understand zero-price markets for which traditional market definition tools can be problematic. With the employment of surveys, online questionnaires and experiments, they can ask users (through a design that satisfies incentive compatibility) about what platforms would attract their attention if a specific platform was no longer available.

For the impact of a merger on concentration on the other side of the market (eg advertisers, external suppliers) where positive prices are used to clear the market, traditional tools in merger simulation can be applied.

Closely substitutable platform services can potentially lead to a future competitive equilibrium with direct welfare implications for the merger case. Besides, as already discussed, specific platforms have developed marketing strategies to monitor the development of firms that may be a future threat to their market position.

At the same time, authorities should strengthen the *ex-post* evaluation of merger analysis for big platforms to better understand the validity of analysis at the time of the merger and whether the proposed remedies are appropriate. Mistakes in this analysis should receive particular attention and have a didactic function when the same big platform comes forward with the notification of its next merger.

Authorities should be ready to impose remedies that are contingent on specific future outcomes. If it becomes clear that the remedies attached to the past approval of a merger do not have the desired effects, there should be flexibility such that remedies could be modified accordingly. It would be helpful if remedies are periodically reviewed to assess whether they have the desired effect and are then revised or updated. The specific targets in terms of the welfare impact of a merger, as well as authorities' concerns, should be clearly communicated at the time of the approval of the merger. It should be possible to alter remedies in order to ensure that the specific targets are reached, if needed.

The EU DMA proposal in its current form would increase the investigative powers of the EU competition authorities, which will be able to access data and the algorithmic codes of the gatekeepers. The EU competition agency would basically be transformed into an embedded regulator with direct access to information related to the gatekeeper's business model and infrastructure. Without any doubt, these provisions can help the authorities to better understand digital ecosystems and assess more accurately the impacts of mergers and their potential anticompetitive effects. Specific attention should be paid to the implementation of these proposals, so that the EU authorities will be able to extract useful and up to date information for their analyses.

5 Conclusions

The merger and acquisition strategies of big tech companies have substantially contributed to their development and growth. They are a vital part of business activities. Acquisitions provide opportunities for big platforms to expand their business models horizontally and vertically, and to establish their presence in the core markets of operation.

The emergence of some very big platforms which act as gatekeepers in digital ecosystems has generated concerns over their acquisition strategies and their potential anticompetitive effects. These concerns have as a basis not market competition *per se*, but are related instead to potential consumer harm.

As platforms are typically multi-sided markets, it is important to not only to study the direct impact of mergers on consumers but also to assess the impact of the merger on the other sides of the ecosystem. This is because the different sides of the platform market are interlinked and therefore consumers can be affected indirectly when the producer side is impacted by the platform merger.

Competition concerns in digital ecosystems have not been addressed at a satisfactory level by the current enforcement framework. There are a number of reasons for this. Broadly, competition policy can in principle deal with specific cases for problems that probably need more general principles and solutions. At the same time, there is significant information asymmetry between the competition authorities and big platforms which makes it more challenging to assess the potential impact of mergers within the strict time framework of the merger regulation. In addition, while we have seen a large number of big platform acquisitions in the last 20 years, only a very small number of them have been investigated. This suggests under-enforcement and a lost opportunity to get to know better through merger analysis the market forces in these ecosystems.

If the current framework is not adequate, then how should it be reformed to make it more effective? This paper suggests four steps that deal both with merger policy and its enforcement. An effective combination of *ex-ante* regulation and merger control is needed to address competition concerns in digital platform ecosystems. The priority should be to reduce the information asymmetries in digital markets. The aim should be to enable the smaller players in the ecosystem to access valuable information that can help them to compete more efficiently in the platform market. More symmetric information across the participants in the ecosystem will make it more difficult for the platforms to leverage their market power and will reduce their incentives to engage in anticompetitive acquisitions. At the same time, authorities should be more proactive in studying these acquisitions and should update their approach by considering new online tools and methodologies for assessing the potential impacts of merger cases.

Creating more competitive and innovative digital ecosystems can have significant benefits for all market participants. To do that, it is first necessary to ensure that the value created in these ecosystems is not negatively affected by the necessary policy changes. The primary objective of the policy recommendations should be to redistribute this value in a fairer way with an emphasis on improving consumer and small business welfare.

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Bruegel, Rue de la Charité 33, B-1210 Brussels
(+32) 2 227 4210
info@bruegel.org
www.bruegel.org