

ECONOMICS DEPARTMENT

COMPETITION, REGULATION AND GROWTH IN A DIGITIZED WORLD - DEALING WITH EMERGING COMPETITION ISSUES IN DIGITAL MARKETS

ECONOMICS DEPARTMENT WORKING PAPERS No. 1752

By Giuseppe Nicoletti, Cristiana Vitale and Carolina Abate

OECD Working Papers should not be reported as representing the official views of the OECD or of its member countries. The opinions expressed and arguments employed are those of the author(s).

Authorised for publication by Luiz de Mello, Director, Policy Studies Branch, Economics Department.

All Economics Department Working Papers are available at www.oecd.org/eco/workingpapers.

JT03514282

OECD Working Papers should not be reported as representing the official views of the OECD or of its member countries. The opinions expressed and arguments employed are those of the author(s).

Working Papers describe preliminary results or research in progress by the author(s) and are published to stimulate discussion on a broad range of issues on which the OECD works.

Comments on Working Papers are welcomed and may be sent to the [Economics Department](#).

All Economics Department Working Papers are available at www.oecd.org/eco/workingpapers.

This document and any map included herein are without prejudice to the status of or sovereignty over any territory, to the delimitation of international frontiers and boundaries and to the name of any territory, city or area.

The statistical data for Israel are supplied by and under the responsibility of the relevant Israeli authorities. The use of such data by the OECD is without prejudice to the status of the Golan Heights, East Jerusalem, and Israeli settlements in the West Bank under the terms of international law.

© OECD (2023)

You can copy, download, or print OECD content for your own use, and you can include excerpts from OECD publications, databases and multimedia products in your own documents, presentations, blogs, websites, and teaching materials, provided that suitable acknowledgment of OECD as source and copyright owner is given. All requests for commercial use and translation rights should be submitted to PubRights@oecd.org.

ABSTRACT/RÉSUMÉ**Competition, regulation, and growth in a digitized world: Dealing with emerging competition issues in digital markets**

Digital markets have raised a number of new competition challenges. Ex-post competition policy appears not to be able to address them in their entirety and with the necessary speed. There is considerable consensus, among academics and policy-makers, that ex-ante regulatory policies are needed to avoid competition being stifled in these markets, with a negative impact on productivity and innovation. As a result, major OECD economies are discussing or have approved regulatory proposals with the aim to foster contestability and fair trade in digital markets.

JEL codes : D4, K3, L1, L2, L4, L5

Keywords: Regulation, Competition, Product Market Regulation, Productivity, Digital Economy, Digital Market Act, Digital Markets, Gatekeepers, Platforms

*** * * * ***

Concurrence, réglementation et croissance dans un monde numérisé : Faire face aux nouveaux problèmes de concurrence sur les marchés numériques

Les marchés numériques ont soulevé un certain nombre de nouveaux défis en matière de concurrence. La politique de concurrence ne semble pas en mesure de les aborder dans leur intégralité et avec la rapidité nécessaire. Les universitaires et les décideurs s'accordent largement à dire que des politiques réglementaires sont nécessaires pour éviter que la concurrence sur ces marchés ne soit étouffée, ce qui aurait un impact négatif sur la productivité et l'innovation. En conséquence, les principales économies de l'OCDE discutent ou ont approuvé des propositions réglementaires visant à favoriser la contestabilité et le commerce équitable sur les marchés numériques.

JEL codes : D4, K3, L1, L2, L4, L5

Mots clés: Réglementation, Concurrence, Réglementation du marché des produits, Productivité, Economie numérique, Marchés numériques, Digital Market Act, Contrôleurs d'accès, Plateformes

Table of contents

Competition, regulation, and growth in a digitized world. Dealing with emerging competition issues in digital markets.	5
Introduction	5
The digital transformation, competition, and growth	7
Competition issues in digital markets	11
Policies to promote competition and innovation in digital markets	18
References	30

FIGURES

Figure 1. The increase in the adoption of a wide range of digital technologies	8
Figure 2. The rising role of online platforms	8
Figure 3. Data are the largest component of intangible investments	9
Figure 4. Digitalisation contributes to productivity growth (growth accounting)	10
Figure 5. The data value chain	12
Figure 6. Digital markets ecosystem with a gatekeeper platform	14
Figure 7. Acquisition trends	16
Figure 8. Comparative architectures of the proposed UK and EU conduct regulations	25

TABLES

Table 1. Status of legislative proposals	22
Table 2. Activities covered by these regulatory frameworks	24
Table 3. Requirements concerning use and access to data that would apply to designated digital platforms	28

BOXES

Box 1. The data value chain	11
Box 2. How gatekeepers can leverage market-power in related markets	17
Box 3. The EU, UK, and US proposals to regulate digital markets: genesis and state of advancement	22
Box 4. Regulations focusing on transparency and fairness of terms and conditions in business-to-business interactions with large digital platforms	26
Box 5. Access to data in digital markets: the UK proposal	29

Competition, regulation, and growth in a digitized world. Dealing with emerging competition issues in digital markets.

Introduction

Digitalisation holds the promise to sustain growth during a period in which headwinds on productivity and labour utilisation, as well as rising global health and geopolitical uncertainties, have tended to slow it down. There is rising evidence that the development of digital markets, new digital business models and organization, and the accumulation of data capital for innovative purposes, which has dramatically accelerated during the COVID-19 pandemic, can lead to productivity gains and job opportunities in large swathes of OECD economies.¹ Indeed, the steep increase in computing power, the development of intelligent algorithms, the massive amount of data generated by the widespread take up of smart devices and the increased use of online products and services, as well as the availability of cloud data storage, have fostered major changes in the way economic activities are undertaken.

At the same time, concerns are also rising that, absent appropriate regulatory and competition policies, the potential benefits of digital transformation could be overshadowed by undesirable side effects. Increasing concentration in digital markets – see definition provided below - and the resulting decline in competitive pressures, rising performance gaps between firms, cybersecurity risks² and threats to the privacy of individuals could be affecting consumer welfare and growth, and may in the longer term outweigh the benefits of digitalisation.

Indeed, by their very nature, if left unchecked, digital technologies might tend to exacerbate some of the tendencies that have weighed on aggregate productivity growth and inequality developments over the past two decades. Moreover, the new market interactions that are developing among firms, and between firms and consumers via digital technologies deserve to be monitored to ensure that they support efficiency and consumer welfare. Previous OECD work has set out a range of public policies that could help make the most of digitalisation while closing gaps in performances and incomes across OECD economies (Pisu et al., 2021^[1]).

This paper focuses on policies that could ensure that competition continues to thrive in digital markets and that markets remain contestable, while spurring the take up of new technologies, and fostering innovation. Policymakers and scholars around the world have been heatedly debating how existing regulations should

¹ Measures to contain the COVID-19 pandemic have profoundly affected OECD countries' relationship with digital technologies. The longer-term effects of the pandemic on digital transformation are only beginning to emerge (see (OECD, 2020^[195])).

² Cyberthreats are an important issue, but they will not be discussed in this paper as the focus here is on competition issues.

be changed or adapted, and new regulations designed, to this end. In various jurisdictions, governments have commissioned expert panels to carry out comprehensive studies on how to ensure that the regulatory environment remains conducive to competition and innovation in digital markets, in order to inform policymaking and to propose recommendations.³ In several instances new legislations have been drafted and are in the process of being formally adopted, or have already been approved and are being enforced.⁴

After a brief reminder of the increasing importance of digitally enabled or enhanced activities and the ways in which widespread digitalisation can help sustain macroeconomic performance via its effects on productivity (Section 2), the paper examines what are the competition issues raised by digitalisation in two interlinked areas, data, and digital markets (Section 3):

- Data, and especially Big Data, are the lifeblood of the digital economy. They consist of vast amounts of stored information, whose collection and analysis are possible as a result of considerable advances in computing technology and artificial intelligence (AI), steep drops in storage costs and ubiquitous high-speed broadband access. Big Data are turned into valuable assets for firms via a supply chain going from collection to analytics and, finally, monetisation. Therefore, access to data, property rights over data and the functioning of data markets are crucial issues that affect the way in which competitive pressures unfold in digital markets, notably via the entry of new competitors and the contestability of incumbents. The collection, handling and use of data by digital businesses also raises consumer protection issues that have a bearing on welfare.
- Digital markets refer to a broad range of digitally enabled data intensive activities, such as online search engines, social networks, online advertising services, online marketplaces, app stores, web browsers, operating systems, and cloud computing services. Digital markets are the locus where interaction among data-enabled and data-enhanced businesses⁵ and consumers exchange of digital products and services. Therefore, access to these markets and the nature of the horizontal and vertical relationships between market participants are of relevance for ensuring effective competition and efficiency.

The paper then focuses on policy measures aimed at adapting product market regulations to the digital age (Section 4). These consists of laws and rules to prevent (ex-ante) that structural barriers to market access emerge and stifle competition, ultimately harming consumers. The paper discusses only briefly competition law and enforcement, i.e. those interventions to restore (ex-post) a level competition playing field by fighting abuse of market power and collusion.

Competition enforcement and regulatory policy interventions in data and digital markets need to find the right balance between, on the one hand, enabling strong competition and fostering consumer welfare and, on the other hand, leaving enough incentives for incumbent and new entrants alike to continue innovating and improving product quality and variety. For instance, ex-post competition enforcement measures redressing abuse via structural measures (e.g. break-up of firms to separate activities) or behavioural remedies (e.g. restricting a firm's ability to organise its lines of business) have to weigh benefits for competitors against possible costs for consumers in the short and the long term (e.g. due to losses in efficiency, quality, or variety). Conversely, the benefits of consumer privacy protection that restricts the

³ These include the Furman review in the United Kingdom (Digital Competition Expert Panel, 2019^[39]), the (Stigler Committee, 2019^[40]) report and the (House Judiciary Committee, 2020^[96]) report in the United States, the (BMW Commission 'Competition Law 4.0', 2019^[29]) report in Germany, and the Crémer report in the European Union (Crémer, 2019^[32]).

⁴ For instance, the EU Digital Markets Act has entered into force on 1 November 2022.

⁵ Data-enabled firms are those whose business models rely on the use of vast amount of data, and which could not exist without this data. Data-enhanced firms, instead, use data to improve and enrich their business models, but could operate even without them. Google and Facebook are examples of the former category, while car manufacturers and large retailers are examples of the latter.

uses of data assets have to be weighed against the possible slowdown in the pace of innovation due to the impact on the possibility to re-use data. Similarly, ex-ante regulatory requirements aimed at facilitating competition (such as data portability from one platform to another) can involuntarily also raise costs, thus stifling entry (e.g. by making business more costly for new platforms) and investments. These are just a few of the challenging trade-offs faced by policies in data and digital markets, which make consensus among experts and policy makers often difficult to reach.

The digital transformation, competition, and growth

Digital technologies

Enabled by the previous Information and communication technology (ICT) revolution and the related incredibly fast improvements in computing power, digital technologies have been spreading rapidly in this century. Diffusion of digital technologies is more difficult to measure than ICT, which is embedded in physical investments, because they consist of a multiplicity of ways to collect, codify, and use information (data), resulting in software, algorithms, smart devices, sensors, data storage facilities, etc.⁶ Hence, the extent of digital adoption can only be inferred from a range of different indicators including:

- *take-up of specific technologies* -- such as the diffusion of high-speed broadband, the use of fixed and mobile internet by firms and consumers, and the adoption of specific digital tools (e.g. business-related software, use of sensors for the IoT and take up of cloud storage) (Figure 1).
- *development of online platforms* -- assessing their rising role both within countries and globally across several key service sectors, such as commerce, business services and transport (Figure 2).⁷
- *investment in the data component of intangible assets* – which covers raw data, structured databases, and data analytics (see below).⁸

Across all these indicators, digital technologies show widespread diffusion in many sectors and countries, though with large gaps persisting, even within national boundaries.

⁶ The OECD Going Digital project has provided a key contribution to the measurement of digitalisation in OECD economies (OECD, 2019^[6]; OECD, 2019^[194]).

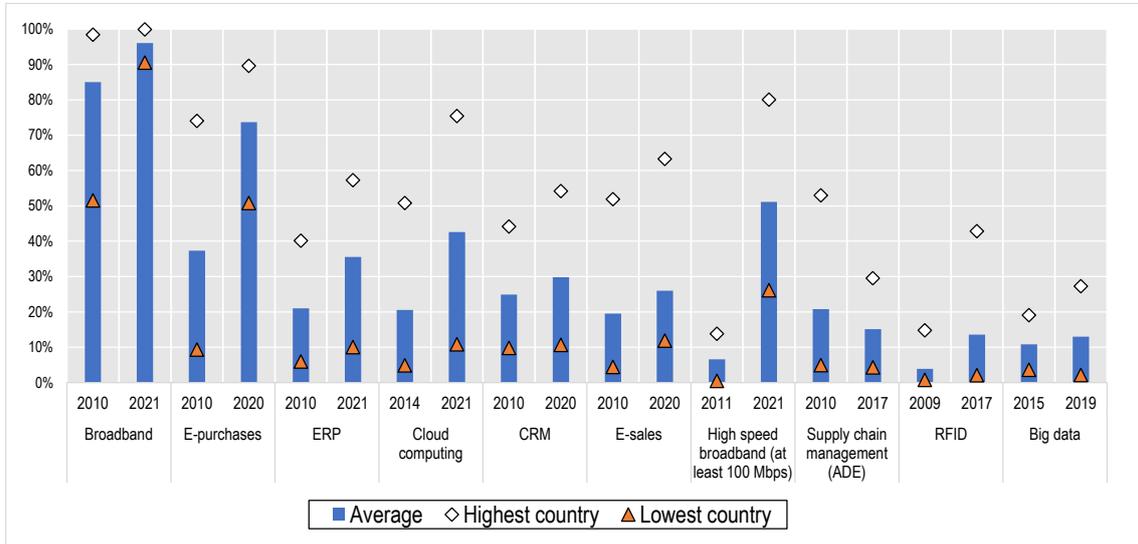
⁷ Data on platforms' activities are still poorly reflected in official statistics. The OECD has recently contributed to their measurement by leveraging private sector data (Costa et al., 2021^[165]),

⁸ Recently (Corrado et al., 2022^[5]) have extended the coverage of intangibles in several ways, including by measuring investments in data capital for a limited set of countries (Corrado et al., 2022^[4]), which were previously covered only partially by the SNA.

Figure 1. The increase in the adoption of a wide range of digital technologies

Diffusion of selected ICT tools and activities in enterprises, OECD, 2010 and 2020

Data shown as a percentage of enterprises with ten or more persons employed

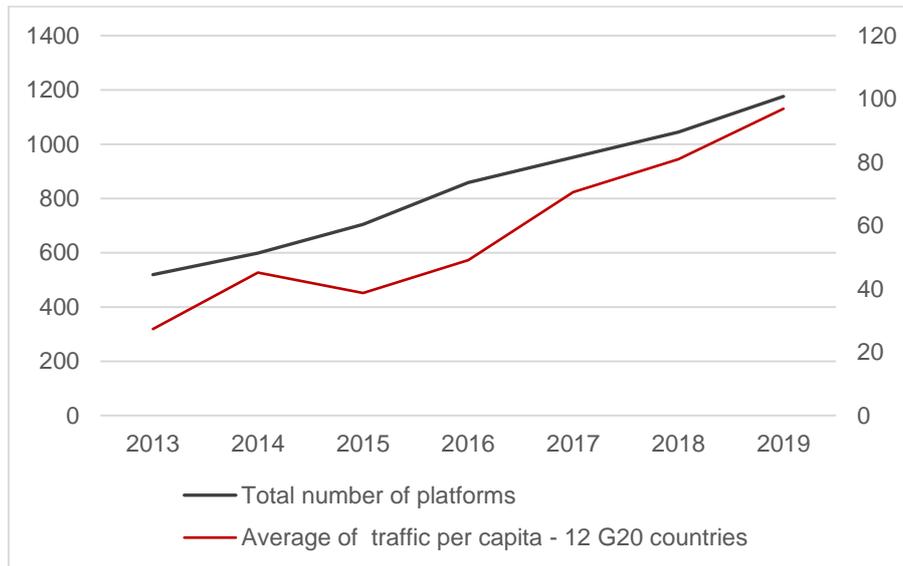


Note: The database contains all OECD countries, as well as Brazil, Bulgaria, Croatia and Romania. Data is not available for all countries in all categories, hence the values reflect all countries for which there is data. When data were not available for 2020, data from the closest year available have been used.

Source: OECD, ICT Access and Usage by Businesses Database, <http://oe.cd/bus>, January 2022.

Figure 2. The rising role of online platforms

Number of platforms (primary) and platform activity per capita (average 12 countries), 2013-2019



Note: the figure shows the total number of platforms in all G20 countries (primary axis) and the average platform activity per capita in 12 G20 countries for which data is available for the whole period (secondary axis).

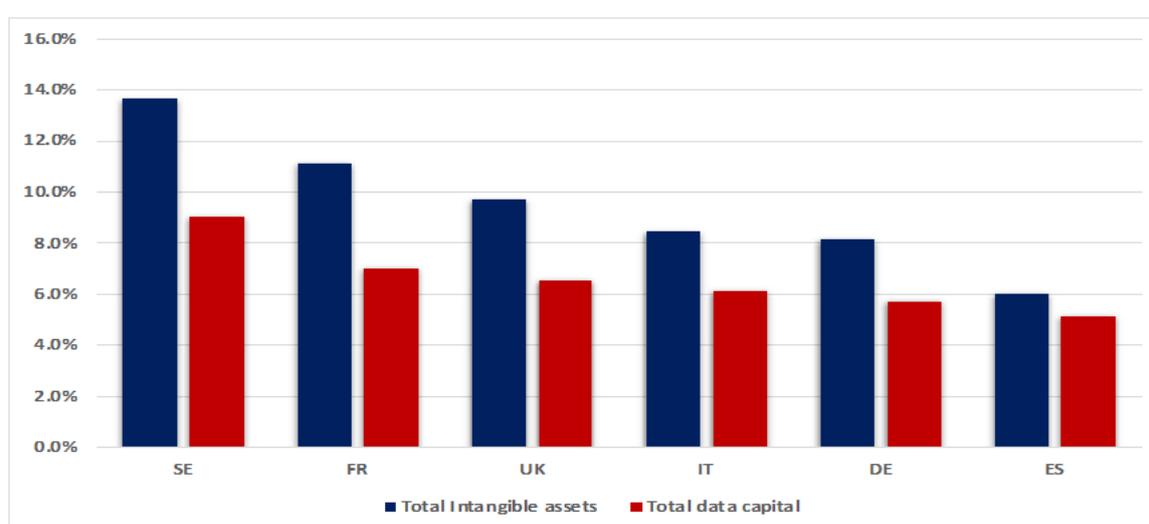
Source: Costa et al., (2021^[2])

Data

There is a virtuous loop between the rising role of digital technologies and the accumulation of data as a productive asset, as the increase in online activities and in the use of digital devices generate huge amounts of data (often referred to as Big Data (Marco, Greco and Grimaldi, 2016^[3])). These in turn are used with AI and machine learning tools to improve the performance of digital technologies themselves. In the process, the economic value of both data and digital technologies rises. For instance, according to recent research (Corrado et al., 2022^[4]) the share of data investment in GDP has been rising rapidly over the past two decades, approaching 4-5 per cent in most countries and even higher percentages (up to 15 per cent) in some digital-intensive sectors (Figure 3).

Figure 3. Data are the largest component of intangible investments

Market sector investment in data and total intangible assets, 2018



Source: (Corrado et al., 2022^[5])

Digitalisation and productivity

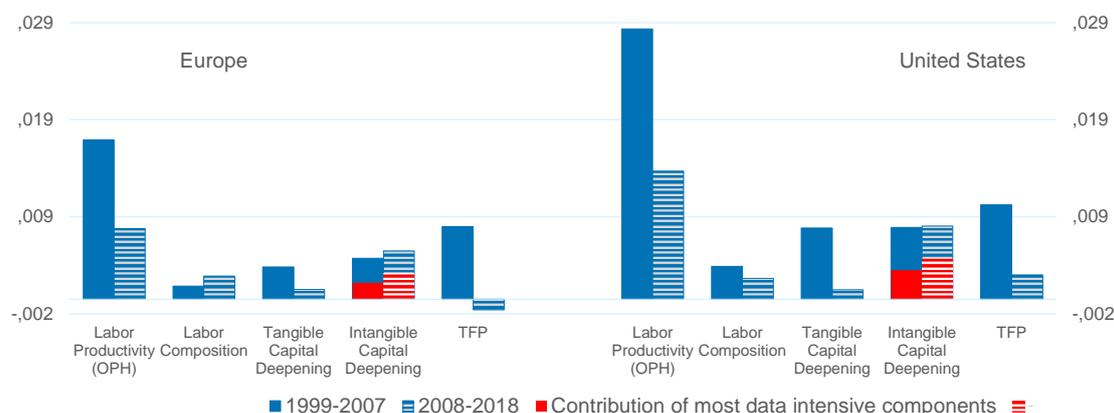
Given the protean nature of digital technologies and the related measurement complexities, it is also hard to evaluate their implications for aggregate productivity growth.⁹ Moreover, as other intangibles consisting of largely non-rival knowledge, data and digital tools generate productivity spillovers that are difficult to capture.

However, growth accounting made possible by new updated and refined measures of intangible investments (Corrado et al., 2022^[5]) and recent econometric estimates (see (OECD, 2019^[6]), for a summary) suggest that the spreading of digital technologies has substantial aggregate productivity effects. Over the past two decades, investments in intangible assets most closely related to digital technologies are estimated to have raised productivity around 0.3 percent per year in the EU and 0.5 percent per year in the US (Figure 4), with the data component alone contributing half a percentage point per year in some

⁹ As with all intangibles, which are only partially accounted for in the System of National Accounts (SNA), accounting for their impact on GDP requires non-standard approaches to measurement (such as combining various sources of available data, imputations, and estimation).

countries (Corrado et al., 2022^[5]).¹⁰ Econometric estimates suggest up to 2 percentage points productivity gains for the average firm in the year following the adoption of digital technologies (Gal et al., 2019^[7]).¹¹ This reflects their role in innovating or enhancing business models, optimising value chains, increasing product quality and variety and better matching consumer demand ((OECD, 2013^[8]) (CMA, 2015^[9])).

Figure 4. Digitalisation contributes to productivity growth (growth accounting)



Source: (Corrado et al., 2022^[5])

The role of competition in realising the benefits of digital technologies

To fully reap the benefits of digital technologies, it is key to create market conditions that provide incentives for the adoption of digital technologies by incumbents and that foster access by innovative new entrants (Pisu et al., 2021^[1]). In this context, the presence of competitive pressures and the possibility to have access to data play a very important role. For instance, (Nicoletti, von Rueden and Andrews, 2020^[10]) find that, in industries subject to stronger competition and easier entry, firms are also stronger digital technology adopters. (Gal et al., 2019^[7]) show that, through this channel, stronger competition translates into significant productivity gains for the average firm. Similarly, (Costa et al., 2021^[2]) find that where dominant platforms are subject to stronger competitive pressures the productivity spillovers of platform presence for other firms in the same industry are higher. Concerning data access, (Corrado et al., 2022^[5]) argue that the combination of rising investment in data and increasing proprietary use of them, which thwarts the inherent capacity of data to be shared in a non-rival way across firms, has reduced the positive spillovers of intangible investments on productivity.¹²

¹⁰ Overall, data-intensive assets have contributed more than half of the contribution of all intangible assets to productivity growth over the period, which in turn account for more than half of productivity growth since the Great Financial Crisis.

¹¹ Focusing on the impact of online platforms, (Costa et al., 2021^[2]) also find that productivity of the average firm operating in industries where platforms are active draws significant benefits from platform development.

¹² The decline in spillovers (as measured by declining MFP growth) has been pinpointed in growth accounting exercises as one of the drivers of the aggregate productivity slowdown.

Competition issues in digital markets

Access to data

From an economic point of view, data (i.e., digitised information) can be conceptualized as an intangible asset: a storable and nonrival, yet excludable, input to production.

Data assets are inherently nonrival. Like a blueprint or a generic drug formula, one firm can use a set of data without limiting the ability of other firms to use it and generate value from it. Thus, as all non-rival assets, data hold the potential to generate significant positive economic spillovers if they are shared, used repeatedly, and combined in different ways by market participants. This is currently the case, for instance, for data on credit or insurance worthiness, which are used widely by banks, businesses, and insurance companies; or open-source data, such as maps or official statistics, which are used in analytics and research. However, data often have a consumer privacy dimension. Therefore, their non-rival nature may be limited by the need to protect consumers, with privacy and consumer protection laws often restraining data sharing or mandating their exclusive use.

Many data are unique, because they are the outcome or the by-product of specific activities over which one or few firms have control. As a result, data are often excludable, as the firms that collect them choose whether to keep them or to share or sell them to other firms depending on the commercial benefits they can derive from the two alternative options.

Indeed, data generate private benefits for businesses through a complex value chain unfolding from data collection to data monetization, which involves use of costly resources at each stage (Box 1 and Figure 5).

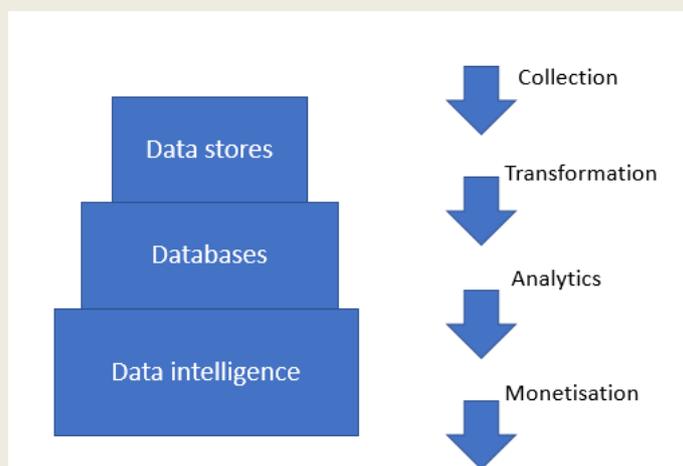
Box 1. The data value chain

Data contribute to production, but complementary investments are necessary to turn accumulated raw data into analytical insights and actionable business intelligence. These investments apply tools that transform data into knowledge through various stages to generate value along a “data value chain” (Figure 5). At each stage of the value chain, intangible assets are created (Corrado et al., 2022^[11]).

The data value chain involves four main stages:

- **Data stores** are records of raw observations that have been stored, but have not yet cleaned, formatted, or transformed for analysis. This includes data scraped from the web or collected through sensors, economic data captured from production or transactions activities, data obtained from experiments or statistical surveys.
- **Databases** consist of records that have been cleaned, formatted, and structured, to be suitable for data analytics or visualization.
- **Data intelligence** is a set of quantitative inputs that provide actionable guidance for decision-makers, including solutions to scientific problems. These inputs arise from the integration of databases with advanced analytic tools. These tools can range from simple statistical analysis to more sophisticated elaborations, which rely on complex algorithms, natural language processing, pattern recognition and machine learning.
- **Data monetisation** turns databases and data intelligence into products that are marketable – i.e., services for businesses (e.g., customer platforms, targeted advertising, logistics, etc.) or for consumers (mobility, communication, entertainment, information, health, etc.).

Figure 5. The data value chain



Source: OECD elaboration based on Corrado et al. (2022a)

Despite their increasing importance as a factor of production, data have inherent characteristics that render the emergence of data markets arduous to develop on a large scale (Koutroumpis, Leiponen and Thomas, 2020^[12]):

- Data are typically experience goods, if not credence ones, whose quality can hardly be judged before their use and sometimes cannot be judged even after their use. Thus, data transactions suffer from strong asymmetries of information between sellers and buyers, which can only partially be remedied by data sellers via the establishment of strong reputation and/or the complementary (and costly) provision of extensive metadata (i.e. certification of the data provenance).
- The value of data is difficult to appropriate. This is because the seller can hardly define standardised rules and enforcement mechanisms to avoid an improper use of the data by the buyer, such as their further dissemination, or their resale.
- Privacy and security concerns also make data property rights and data markets mechanisms subject to differences in national preferences and in legislation, which raise transaction costs and weaken appropriability. Further, such preferences and legislation can be subject to sudden changes that create considerable uncertainty.

Hence, the development of data markets has been limited so far. Commercial data transactions often occur on a one-to-one basis subject to lengthy and complex negotiations and customised contracts, or one-to-many following standardised contracts (such as those using Application Programming Interfaces, so-called APIs). Other types of transactions have either remained at the barter level, such as the provision of private data to social networks or online platforms by many users in exchange of services, or have failed altogether to take off, such as the creation of dedicated platforms that intermediate data exchanges between many sellers and many buyers. Policies, and greater international coordination over such policies, could be introduced to address or reduce some of the factors that, so far, have stifled the growth of data markets.

The lack of data markets implies that firms face considerable barriers in gaining access to raw data, or data stores (Figure 5 above). The significant barriers in the access to data are fuelling concerns that new entry in digital markets, and the induced innovation incentives may be at risk in the absence of public policy intervention.¹³ These concerns are compounded by, and interrelated with, rising data privacy issues. As

¹³ See for example (Competition and Markets Authority, 2020^[95]), (CERRE, 2020^[130]), (BMW Commission 'Competition Law 4.0', 2019^[29]), (House Judiciary Committee, 2020^[96]), (Bourreau and de Stree, 2019^[117]), (Bajari et al., 2018^[131]), (He et al., 2017^[118]), (Cappai and Colangelo, 2020^[191]) (Cabral et al., 2021^[192])

highlighted for instance by (Corrado et al., 2022^[11]), surveys reveal widespread global concern among consumers regarding business use of their personal information, and therefore inattention to these concerns seems impossible, as reflected in the public policy debate and legislative initiatives across countries.

Absent an update of the current competition and regulatory policy framework, there is a risk that data could become a source of competitive advantage impossible to overcome for existing and potential competitors, precluding market contestability and the related social benefits from data use (Haucap, 2019^[13]). At the same time, data security and privacy protection that restricts the uses of data necessarily entails additional costs for data-intensive firms (e.g. by making the re-use of data more costly or impossible, and/or by limiting cross-border flows of data). This may negatively affect the pace of digital innovation and the ensuing benefits in terms of variety and quality of digital services.

Thus, policy makers are faced with a fundamental policy conundrum: how to unlock the potential offered by the use of data in conjunction with digital technologies, while minimising the costs that may arise from it? As summarised by (International Monetary Fund, 2019^[14]), “an integrated perspective to balance competing objectives [is required]: promoting growth and competition through data access, ensuring incentives exist for data to be collected and processed, promoting stability by adequate investment in cybersecurity, and ensuring that individual privacy preferences are respected”. In short, the emergence of data as a key asset has raised the complexity of the traditional policy trade-off between promoting innovation and maintaining competitive markets.

Special features of digital markets

The digital economy has augmented the variety of uses that can be made of data. Data can become a product in themselves, or can be used as an input in the creation of a variety of products and services. Digital products are traded in digital markets where producers meet their buyers and data exchanges between market participants occur. Generally, these markets are characterised by a multiplicity of product suppliers and intermediate or final customers whose activity generates data flows. Data flows are often intermediated by online platforms. These platforms can also operate as suppliers in the same markets.

Platforms capture enormous amounts of data (especially personal data¹⁴) from both final customers and third-party providers of digital products that rely on these platforms to reach final users. Platforms and business users are dependent on each other, as platforms need business users to offer products to their customers, while business users need platforms to reach consumers. The galaxy consisting of platforms and the business users revolving around them form so-called “digital ecosystems”.

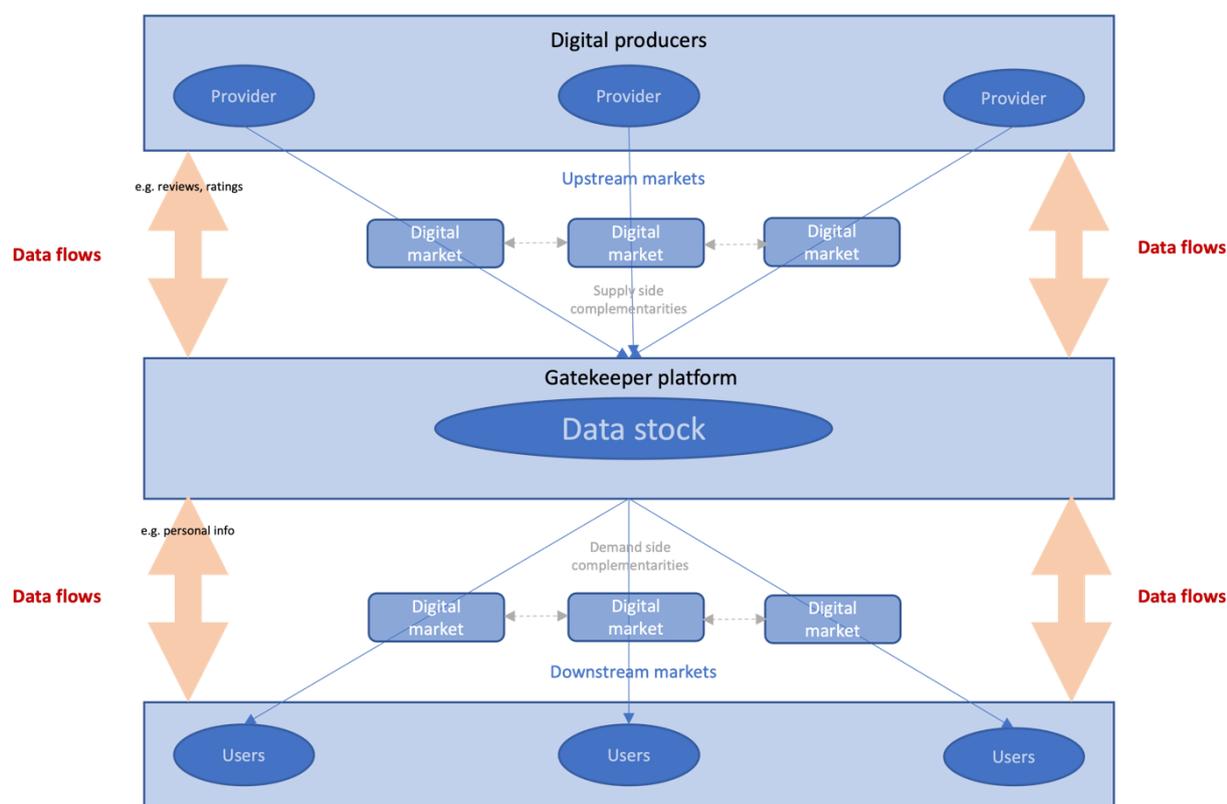
When platforms achieve a position of dominance over access to a large group of users they are referred to as “gatekeepers”.¹⁵ Due to the size of their user base, gatekeepers can collect many more data than their competitors, which gives them a considerable informational advantage. Gatekeepers control access by their users in two possible ways (Bourreau and de Streel, 2019^[15]). First, the gatekeeper controls access by third-party firms to its users. For example, if an online social network has unique access to a very large

¹⁴ (OECD, 2013^[51]) defines personal data as “any information relating to an identified or identifiable individual (data subject)”. These data relate to the identity or behaviour of natural persons, whom can be either directly identified or indirectly identified (e.g., via IP address or cookies) from that information in combination with other information. Examples are most data generated by smart devices, such as connected cars or smart energy meters, as well as data generated by individuals when browsing the web, buying online products, or posting on social networks. Their collection and use raise a number of privacy and security issues, which is not the case for non-personal data.

¹⁵ The term was first introduced by (Lynskey, 2017^[209]) to indicate “market makers that play a ‘pivotal role in the digital ecosystem’ as a result of factors such as their size, business model and connection capacity”. It has then been adopted by the EU Digital Market Act to indicate specific platforms to which this Act applies, thus creating some confusion between the more general term and the specific legal one.

user base, then advertisers can only reach such a large audience through that online social network. Second, when a wide range of users rely on a single platform (a practice called “single-homing”), any firm wishing to sell its products online may have no other valid alternatives than to have its products intermediated by this platform. In this second case, the gatekeeper not only controls access by third-party firms to its users, but also its users’ access to content, products and/or services offered by third parties (Figure 6). For instance, since online search engines decide the ranking of search results, the ranking determines the range of products the engine’s users are more likely to have visibility of. If users relied also on other search engines, they would have access to different rankings and, hence, to a wider range of options. However, since they single-home on a single search engine, the latter becomes the only route for users to find out what is on offer and for providers to reach these users.

Figure 6. Digital markets ecosystem with a gatekeeper platform



The data advantage enjoyed by gatekeepers is therefore massive, and, when users single-home, this advantage becomes almost irreplicable. While users can choose to single-home due to the innovative nature and/or higher quality of the products the platform offers, it can also be endogenously fostered by the gatekeeper by artificially increasing the costs of multi-homing through the imposition of technical constraints, or the use of tying practices and exclusive contracts. Single-homing can also be promoted through a strong personalisation of the products, which increases the switching costs for users to move on another platform. Such strong personalisation is easier to achieve when the gatekeeper has access to a large set of data about its users, their behaviour, and their preferences.¹⁶

¹⁶ One good example are reputations, which require a considerable investment on the part of the users to obtain good ratings. A firm can design its platform in order to foster such investment on the part of its users, and in this way lock them in by raising their switching costs.

Even though the choice to single-home could benefit consumers, when the products offered by gatekeepers benefit from direct or indirect network effects (OECD, 2017_[16]), its advantage over competitors is considerably reinforced and becomes quickly entrenched. Indeed, once a platform has managed to gain access to a large number of users, the network effects increase its attractiveness, magnifying its ability to capture even more users and increasing the switching costs faced by existing users.¹⁷ Platforms operating in online marketplaces, app stores or social networks are a clear example of this phenomenon.

The gatekeeper's advantage can be further strengthened by exploiting the economies of scope from which data benefit (OECD, 2020_[17]), (OECD, 2019_[18]), (OECD, 2018_[19]). The data generated by consumers when using the core product, i.e. the one where the firm is dominant, can be used to develop new products in related and unrelated markets. The gatekeeper can then market these products to their existing customer base obtaining even more data from them. By seamlessly connecting all these products, while discouraging the use of competing products by imposing technical constraints, these firms can lock-in consumers in a single-brand ecosystem. These constraints are usually justified by gatekeepers on the ground that they protect consumers' data and ensure the seamless operation of the ecosystem, however they may also be introduced to raise switching costs.

When the enveloped services are complementary for users or benefit from indirect network effects between users in the various markets, this "envelopment" strategy generates additional benefits for users and further induces them to single-home. Even when there are no such complementarities, the gatekeeper still benefits from collecting data on its users from a wider variety of markets since this further enhances its informational advantage.¹⁸ Google, Apple and Amazon are clear example of firms that apply such a strategy.

All this may have benefits for consumers in the short-term, but not necessarily in the longer term if the gatekeepers' dominant position curbs their incentives to innovate and limits entry by innovative potential competitors.

A variety of potential competition challenges

The importance data hold as an input for participating in digital markets and the specific features of these markets raise a number of challenges that require an appropriate policy response to avoid that consumer are deprived of the long-term benefits of competition.

Platform dominance becomes entrenched

The combination of single-homing, network and scope effects may be sufficiently strong to lead to market tipping, i.e. a situation characterised by the market being supplied entirely, or almost entirely, by a single dominant platform. Once such a position is attained, the advantage of the incumbent in terms of data and network effects becomes difficult to challenge and entrenchment prevails, as users find the platform increasingly attractive and switching costs become prohibitive.

In markets that tend to tip, the dominant player can only be kept "on its toes" by the risk of being displaced by a better competitor, capable of taking over the whole market. However, in digital markets, the economies of scale, the network effects and the data feedback loops just described make it especially difficult for a

¹⁷ This self-reinforcing circle that strengthens the gatekeeper advantage is sometimes referred to as "data feedback loop". For example, the algorithm behind a search engine needs to be trained and it improves with the number of queries it is fed. This means that, all else being equal, the higher is the number of within-user and across-user search enquiries, the better becomes the quality of the search matches. This improvement in the algorithm's predictive power makes the search engine more attractive for other users, thus generating a feedback loop that makes it ever more difficult for smaller rivals to catch up.

¹⁸ All these factors explain the expansion of large digital platforms in many, sometimes apparently unrelated, markets (see Condorelli and Padilla (2019_[21]) and Bourreau and de Streel (2019_[117])).

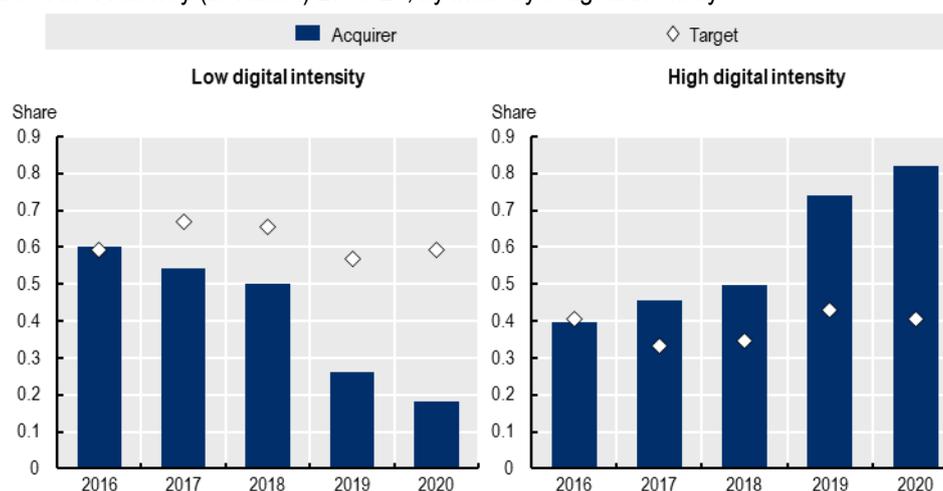
rival, even a more innovative and/or more efficient one, to overcome the barriers to entry and challenge the incumbent (Parker, Petropoulos and Alstynne, 2020^[20]).¹⁹ Hence, over time, the gatekeeper may come to enjoy a position of market power that cannot easily be challenged and it can exploit at the detriment of consumers. When gatekeepers provide services to business users, they can also use their dominant position to impose exploitative conditions on them such as tying and bundling (OECD, 2020^[17]; Condorelli and Padilla, 2019^[21]) or across platform parity clauses (European Commission, 2016^[22]; Ministère de l'Économie et des Finances, Direction générale du Trésor, 2019^[23]).^{20,21}

Killer acquisitions prevent disruptive new entry

Platform dominance can also be preserved via pre-emptive acquisitions of potentially disruptive innovators. In recent years, faced with a steep increase in mergers and acquisitions (M&A) activity especially in digital markets (Figure 7), concerns have risen over the threat to innovation and competition posed by so-called “killer acquisitions” (OECD, 2020^[24]) (Holmström et al., 2019^[25]). These are acquisitions in which “incumbent firms may buy innovative targets solely to discontinue the target’s innovation projects and pre-empt future competition” (Cunningham, Ederer and Ma, 2018^[26]).

Figure 7. Acquisition trends

Trends in share of M&A activity (in values) 2016-20, by industry’s digital intensity



Source: Criscuolo (2021^[27])

¹⁹ In the past, start-ups have been successful because they could persuade users to provide the data they needed to develop their products through innovative and disruptive offerings. However, currently this is becoming more complex, because of the advantage incumbent platforms have now accumulated, and keep accumulating.

²⁰ An Across Platform Parity Clause or Agreement requires a seller to treat a buyer on terms no less advantageous than the terms on which it deals with other buyers. As a result, a seller that agree to such a clause on a platform has to charge the customers that buy its products on that platform the same price they charge to customers that acquire the same products on different platforms. Hence, any discount offered to one set of customers must automatically apply also to the other set of customers. For more details see <http://www.oecd.org/daf/competition/competition-cross-platform-parity.htm#:~:text=Across%20Platform%20Parity%20Agreements%20are,type%20of%20price%20relationship%20agreements>.

²¹ According to a study published by European Commission, (European Parliamentary Research Service, 2019^[75]), around half of the business users interacting with online platforms have experienced problems linked to unfair trading practices in their business relationship. The impact on the EU economy of these practices has been estimated in the range of €2 to €19.5 billion a year.

Killer acquisitions aim at preserving platform dominance in two ways: by impeding competition from firms that develop potentially disruptive innovations, and by eliminating their innovative products from the market altogether, in order to eliminate the risk of cannibalising the platform's own sales. This strategy has detrimental effects not only for competition but also for innovation, as it eliminates not only competitors but the innovation itself, thus curbing efficiency and reducing consumers' choices.

Vertical relationships

Gatekeepers can use their market power to obtain a dominant position in other markets, either in vertically related markets or in neighbouring (horizontal) markets. This is especially a risk in the case of vertically-integrated companies, which perform a dual role both as data gatekeeper and as user of the data as a product provider ((Graef, 2019^[28]), (BMW Commission 'Competition Law 4.0'^[29])). A vertically-integrated gatekeeper may have an interest to favour its products over those of its competitors, a practice referred to as "self-preferencing".²² For instance, when a platform is dominant in an upstream market and competes on a downstream market with third parties (e.g. an online marketplace that sells its own products as well as those of competitors), self-preferencing may permit the leveraging of its market power on the downstream market, where the firm might not be dominant.

Gatekeepers' market power in vertically-related markets can be leveraged in several ways, including by setting conditions for business interactions on and with the platform. Some of these practices can be legitimate and improve overall efficiency, by ensuring privacy, data security, technical compatibility, and quality to the benefit of final users. However, they can also result in the exclusion of competitors, which can reduce competitive pressures on vertically-related markets, stifling innovation and ultimately harming consumers (Box 2).

Box 2. How gatekeepers can leverage market-power in related markets

Connected objects include smartphones and other connected devices -- such as smart home appliances, wearable devices (e.g. smart watches or fitness trackers), connected vehicles (e.g. cars and trucks) – which generate a large amount of data. When a firm controls access to these data, such control can be used to foreclose or exploit independent providers of complementary products and services that need these data to market their products²³.

Voice assistants are terminal devices offered by platforms operating digital ecosystems (e.g. Amazon's Alexa, Apple's Siri, and Google Assistant). Voice assistants are likely to become users' main interface for all their online activity, bringing single homing to its extreme. The level of personalisation allowed by these assistants makes switching assistants very costly, given the difficulty to train new ones and transfer information between those operating on different platforms. Control over these terminal devices can allow dominant platforms, not only to expand their ecosystem, but also to direct users towards the platform's own goods and services, thus reinforcing their position in downstream markets (Rabassa, 2019^[30]).

Operating systems (OS) used on terminal devices, such as mobile phones or tablets, are key entry points to online content ((ARCEP, 2018^[31])). The most used OSs for smartphones, which are almost unchallenged in their control of this market, are pre-installed by two providers, Apple (iOS) and Google (Android). Hence the choice of the terminal has an impact on the choice of the OS and, thereafter, of the content, applications, and services the device allows access to. While the limits that OS providers pose to their users in terms of accessible applications and services can have technical justifications

²² Amazon, for example, runs a marketplace, where sellers can offer their products to Amazon users, and it also sells its own products through the same platform.

²³ Despite the considerable amount of data these devices generate, they are not covered by some of the regulatory frameworks discussed in this paper (see Table 3 below).

(e.g. enhanced security, cost efficiencies or the provision of seamless services), they can also reflect the use of OS providers' market power to steer users towards their own products and services and foreclose or exploit downstream rivals²⁴.

Distribution platforms or App stores, such as Google Play and Apple Store, are the only channel through which application developers can offer their products to smartphone users. For reasons of technical security and data safety, the two operating systems that operate on the majority of smartphones, Apple iOS, and Google Android, do not allow other app stores to be installed. This implies that when a platform that provides an app store offers its own application alongside competing third-party applications (e.g. Spotify and Apple Music), it might have the incentive to favour the former. For instance, it may impose excessive restrictions on third-party applications, by setting abusive terms and conditions, implementing discriminatory fees, rejecting applications' enhancements, or even blocking third parties' access to certain services and devices of the mobile ecosystem.²⁵

Setting conditions for business interactions

Dominant platforms can leverage their market power to impose on their business users unfair, and even exploitative, terms and conditions, and/or subject them to frequent unilateral changes. The latter practice creates considerable uncertainty and disruption for their business users, who may be forced by these changes to modify their business model without notice. Moreover, business users are often required to automatically, and sometimes tacitly, accept the new terms and conditions, with no margin for negotiations and no alternative other than terminating the contract in case of disagreement.

These terms and conditions range from charges to access the platform and its services, to the obligation to respect minimum standards for delivery and return policies, model contracts and retail price controls; limiting the data business users can access, as well as the way in which they can present their offers on the platform. Finally, they can considerably affect the prices business users can charge to their customers (Cr mer, 2019_[32]).²⁶

Policies to promote competition and innovation in digital markets

Competition issues in digital markets have challenged competition law enforcers...

Competition issues in digital markets have spurred a flurry of competition and antitrust investigations on the two sides of the Atlantic, sometimes responding to complaints by competitors or consumers, often resulting in fines and structural remedies.²⁷ These were aimed at taming (ex-post) the potential damaging consequences of abuses of market dominance on consumer welfare. The proliferation of cases also spurred a wide debate on the potential for competition laws and enforcement practices to address issues arising in digital markets and the possible need to adapt and update existing laws and practices to the digital era. Some countries (prominently Germany, Austria, Italy, and China) have already implemented

²⁴ See (CMA, 2022_[211]) for a more detailed discussion of these risks.

²⁵ Again, see (CMA, 2022_[211]) for a more detailed discussion of these risks.

²⁶ https://ec.europa.eu/competition/information/digitisation_2018/contributions/prosiebensat1.pdf

²⁷ Recent surveys of such cases can be found for instance in (OECD, 2020_[17])

changes in their competition laws to adapt them to developments in digital markets. Similar changes are also being discussed in other countries, such as Korea, Australia, and Canada.^{28,29}

Reviewing competition policy interventions and the debate around the ex-post enforcement of competition law by antitrust authorities in digital markets is outside the remit of this paper, whose primary purpose is to discuss the scope for ex-ante regulation.³⁰

Only merger control is discussed, because it is an ex-ante rather than ex-post tool, and it is particularly relevant in the context of digital markets. As mentioned in the previous section, acquisitions can be a powerful way for digital incumbents to either become gatekeepers or strengthen their dominant position, possibly extending it to adjacent markets.

Merger control

Concerns over the capability of merger control regimes to capture acquisitions of innovative new entrants especially in digital markets (so-called ‘killer acquisitions’ discussed previously) have risen in recent years, leading to changes or proposed changes in legislation or in enforcement practices. Concerns stem from the criteria and thresholds that permit to examine mergers currently in place in many jurisdictions, which may no longer reflect the real risks of specific transactions in digital markets.

The OECD (OECD, 2020a^[33]) reports that 52 of the 55 surveyed jurisdictions (which include all OECD member states) use turnover as the main criteria, or as one of the criteria, for determining which mergers should be examined by the competition agency. These jurisdictions set high turnover thresholds to ensure that only mergers involving large firms are submitted to a review by the competition agency, on the ground that these mergers have the most potential to affect competition. However, the turnover of start-ups is often too low to meet these thresholds, leaving acquisitions of innovative start-ups outside the scope of merger control regimes.

To address the risk of under-enforcement in digital markets, a number of jurisdictions have implemented or are discussing changes in their merger control frameworks. These changes broadly fall in two categories:

- Amendments to existing competition laws, which range from the addition of thresholds based on the value of the transaction to the existing turnover thresholds, such as already implemented in Germany and Austria; to reversing the burden of proving that the merger does not violate competition law in the case of transactions that would concentrate markets beyond a certain threshold, such as currently discussed in the US Congress in proposals to amend the 1914 Clayton Antitrust Act (Competition and Antitrust Law Enforcement Reform Act of 2021). Similar changes are also being discussed in Korea³¹.
- Specific new legislations, which include applying a special merger regime to companies that have a ‘Strategic Market Status’ due to their substantial market power in digital markets, such as currently discussed in the UK Parliament, and as proposed in the US “Big Tech” bills, currently

²⁸ China’s National People’s Congress on June 23 passed a [revised](#) version of the Anti-Monopoly Law (AML), which took effect on August 1, adding fresh emphasis on the digital economy, strengthening merger review thresholds, and increasing penalty fines. The state administration for Market Regulation has also released a set of *Anti-Monopoly Guidelines for the Platform Economy* in February 2021 (see https://gkml.samr.gov.cn/nsjg/fldj/202102/t20210207_325967.html)

²⁹ Foreseen changes in Canada involve amendments to the competition act to deal with the digital economy, including expansion of abuse of dominance provisions.

³⁰ For a good overview of this debate refer to OECD (2015^[201]).

³¹ <https://iclg.com/practice-areas/merger-control-laws-and-regulations/korea>;
https://www.kimchang.com/en/insights/detail.kc?sch_section=4&idx=21945

under Congressional review; or imposing on firms designated as “gatekeepers in core platform services” an obligation to inform the competition authority of any planned acquisition, as in the EU Digital Markets Act.³²

... but ex post measures can hardly deal with structural entry barriers and evolving market structures of digital markets...

The ability to discipline the behaviour of dominant firms in digital markets purely by means of competition law enforcement has been widely disputed and a consensus among legislators and policy makers is forming around the need to complement ex-post enforcement with ex-ante regulations that are specific to these markets. Indeed, outside merger control, the role of competition law is only to identify and sanction a number of well-codified anticompetitive behaviours, and it cannot be used to address structural barriers that may have an impact on the level of competition and innovation in a market, even without specific violations of competition law.³³

For instance, if a firm has become a gatekeeper because it offers a superior product that a majority of users prefer to other alternatives, under competition law the firm cannot be prevented from enjoying the benefits that derive from its success. This position of dominance is the result of a competitive process in markets characterised by strong scale economies and network effects, which has rewarded the most innovative or efficient firm with greater market power. Competition law does not “prohibit” a firm from holding such a dominant position, it only forbids the firm from abusing it. However, when structural features of the market allow this dominant position to become entrenched and, as a result, not contestable by new entrants, even if more innovative or efficient than the incumbent, consumer welfare is negatively affected. This can occur even if no competition law violations have taken place.

Similarly, if a gatekeeper can collect better data because a wider customer base chooses to use its products, it could refuse to give others access to them without violating competition law. Yet, when data represent an almost insurmountable barrier to entry, markets that are part of the gatekeeper’s ecosystem can become de facto not contestable³⁴. This in turn lowers competitive pressures, with possible detrimental effects on innovation incentives, efficiency, and consumer welfare, both via reduced product quality and variety and via possible abuses of market power on intermediate and final users. When such a barrier emerges, ex-post antitrust enforcement alone cannot ensure that these markets remain contestable and that the benefits of competition accrue to consumers.

In addition, even in situations where violations of competition law have taken place, competition law enforcement appears insufficient to address the type and scale of concerns arising in digital markets. First,

³² The EU Digital Markets Acts use the term gatekeepers, which was introduced earlier in the paper to generally indicate firms with a very high degree of market power, to define the firms on which it imposes a number of obligations. Hence the term from a generic economic term takes on a more precise legal meaning, as a company will be considered a gatekeeper according to the Digital Markets Act only if it meets a number of qualitative and quantitative criteria that prove it enjoys an entrenched and durable position or it is foreseeable that it will enjoy such a position in the near future. In addition, a company can be a gatekeeper according to the Digital Markets Act only relative to one or more “core platform services” (namely online search engines, online intermediation services, online social networking services, video-sharing platforms, operating systems, interpersonal communication services, cloud computing and advertising) and the term cannot refer to all its activities.

³³ In a few jurisdictions, such as the UK and Iceland, the competition authority currently has the power to perform market investigations in markets that appear not to work well for consumers for reasons that go beyond standard violations of competition law and impose behavioural and structural remedies.

³⁴ There are still dissenting view on whether data can become such an insurmountable barrier (see, for instance, Lambrecht and Tucker (2017_[193])).

the nature of enforcement actions is such that investigations can focus only one or few very specific breaches of competition law and cannot address systemic concerns.

Secondly, enforcement actions are necessarily retrospective, thus they can only address negative consequences after they have occurred, and they cannot pre-empt competitive harm. Because the specific features of digital markets favour the entrenchment of market power, ex-post interventions cannot eliminate the advantage gained by dominant firms in the meantime.

Hence other policy tools are being currently sought as a complement to competition law enforcement – prominently ex-ante obligations and prohibitions.³⁵

... calling for new ex ante regulations to promote entry and competition in digital markets

Reliance on specific ex-ante regulatory frameworks is based on the idea that lack of contestability in digital markets is due to structural barriers to entry that competition law is unable to address, and to market characteristics that make competition law less effective in avoiding market outcomes that are detrimental to consumers.³⁶ Recognising this, several OECD jurisdictions have introduced, or are discussing introducing, ex-ante regulatory frameworks covering specifically digital markets.

Comprehensive frameworks have been approved or are currently being discussed in the European Union, the United Kingdom, and the United States, with different states of advancement in the legislative process (Box 3).³⁷ The OECD Inventory of new rules for digital markets (OECD, 2022^[34]) gathers proposed or enacted legislative reforms that have been developed to address digital competition issues in OECD jurisdictions, providing an objective comparison of “ex ante” regulations in digital markets across G7 countries, based on their status, scope, institutional setting and content.

Although the proposed EU, UK and US frameworks differ sometimes in substantial ways, they all impose a set of conduct obligations and requirements broadly aimed at ensuring fair trading and contestability in digital markets. In addition, all these proposals foresee their application only to a small number of platforms with entrenched market power in digital markets.

The next subsections describe more in details the key characteristics of these legislative proposals. Additional information can be found in the analytical note (OECD, 2022^[35]) that accompanies the OECD inventory of digital reforms.

³⁵ As underlined in (Digital Competition Expert Panel, 2019^[39]) “*antitrust enforcement, although having an important role, [...] intentionally, resolves only issues narrowly focused on a specific case. In digital markets this has not established clear and generalised rules and principles to give businesses certainty about the boundaries of acceptable competitive conduct*”.

³⁶ The parallel between the regulatory regime employed to introduce competition in telecoms markets, when these were liberalised, and what would be needed to ensure contestability in digital markets, suggested in (Competition and Markets Authority, 2020^[85]), is a useful comparison. See also the parallel between utility ex-ante regulation and regulation of digital markets drawn by Martin Cave in <https://www.competitionpolicyinternational.com/what-lessons-can-be-drawn-for-digital-platforms-from-the-regulation-of-traditional-networks/>.

³⁷ This overview does not claim to be exhaustive. In particular it does not include recent legislative initiatives discussed or introduced in some EU member states, such as Germany, as it was decided to keep the focus on the EU-wide DMA, which is likely to have a much wider impact. OECD (2021^[202]) provides an analysis of initiatives in individual EU countries. In addition, this overview does not discuss interventions regulation relationships between media companies and platforms, such as the News Media and Digital Platforms Mandatory Bargaining Code introduced in Australia in 2021.

Box 3. The EU, UK, and US proposals to regulate digital markets: genesis and state of advancement

Partly inspired by a report commissioned in 2019 (Crémer, 2019^[36]), in December 2020 the European Commission proposed a comprehensive framework to deal with competition issues in digital markets, focusing on large providers of core online platform services: the Digital Markets Act (Commission, 2020^[37]). After extensive stakeholder consultations and negotiation with the EU Parliament and within the Council, the political agreement on the law was reached in March 2022 by the European Parliament and the EU Council and the text was adopted on 14 September 2022. Its implementation and enforcement in EU Member States will take place as of 2 May 2023.

Legislation currently under review in the UK Parliament reflects the Final Report of the UK Competition and Markets Authority (CMA, 2020^[38]), in turn drawing from the previous Furman Report (Digital Competition Expert Panel, 2019^[39]). Following the CMA proposals and recommendations by the Digital Competition Expert Panel and the Digital Markets Taskforce, a Digital Markets Unit was created within the CMA whose objective will be to promote competition in digital markets for the benefit of consumers via set of Codes of Conduct and Pro-Competitive Interventions imposed ex-ante on a restricted set of firms with substantial and entrenched market power, which gives them a strategic position ('Strategic Market Status') in one or more activities. The Competition, Consumer and Digital Markets Bill is expected to be enacted in the course of 2023.

The Stigler Report (Stigler Committee, 2019^[40]) and the US House investigation by the Judiciary Committee on competition in digital markets (U.S. House Judiciary Committee, 2020^[41]), which investigated the market power of four of the largest tech platforms, Facebook, Google, Amazon, and Apple, resulting in a 450-page report, both recommended measures to rein in the power of "Big Tech" firms. As a result, a series of bills were proposed, the so-called "Big Tech" bills (Congressional Research Services, 2021^[42]), which are currently under Congressional review: i) the American Innovation and Choice Online Act, ii) the Ending Platform Monopolies Act, iii) the Platform Competition and Opportunity Act, and iv) the Augmenting Compatibility and Competition by Enabling Service Switching Act.

Another bill being considered, the Trust-Busting for the Twenty-First Century Act, proposes even stricter obligations for the Big Tech companies. More recently, the Digital Platform Commission Act of 2022 was also introduced to the US Congress. This takes a more encompassing approach to regulation of digital platforms, covering also dimensions beyond competition (such as protecting small businesses, media pluralism, consumers health, privacy and preventing disinformation and hate speech conducive to violence).

Table 1. Status of legislative proposals³⁸

	European Union	United Kingdom	United States
Reform Bill	Digital Markets Act (2022)	Digital Markets, Competition and Consumer Bill (2020)	American Innovation and Choice Online Act (2021) Ending Platform Monopolies Act (2021) Platform Competition and Opportunity Act Augmenting Compatibility and Competition by Enabling Service Switching (ACCESS) Act (2021) Trustbusting for the Twenty-First Century Act (2021) Digital Platform Commission Act (2022)
Status of reform process	Enacted	Under parliamentary discussion.	Under Congressional review.
Expected implementation	Early 2023	No sooner than 2024	No information

³⁸ For more details please refer to (OECD, 2022^[34]).

These ex-ante regulatory proposals have been inspired by a lively academic and policy debate concerning the best ways to ensure market contestability and foster innovative new entry in digital markets, while not discouraging dominant platforms from investing and improving their products.

Australia is also considering potential ex-ante regulatory interventions. In December 2022, the Treasury department of the Australian government launched a public consultation on the Australian Competition and Consumer Commission's ('ACCC') recommendations for regulatory reform to address competition and consumer issues in the context of digital platform services, which have been issued by the ACCC in its fifth interim report of its Digital Platform Services Inquiry (ACCC, 2021^[43])

In China, the State Administration for Market Regulation has announced two guidelines, one which categorises digital platforms according to their size (super, large, and medium-to-small) and another that imposes extra responsibilities and obligations on platforms that fall into the super and large categories.³⁹⁴⁰

Identification of the subset of firms targeted by regulation in digital markets

These regulatory proposals apply only to a subset of platforms. For shorthand, in the rest of this paper they will be generally referred to as “gatekeepers”. In all frameworks a set of criteria, largely based on size and on the ability of platforms to influence the digital markets they operate in, identifies which firms are to be considered as gatekeepers. The UK proposed legislation (henceforth UK SMS regime) and the US “Big Tech” bills (henceforth US BT) propose a regime where the competent authority applies these criteria to identify the platforms that should be designated as gatekeepers⁴¹. The EU Digital Market Act (henceforth EU DMA), instead, requires companies to self-assess and, where relevant, to notify the EC about their status as gatekeepers⁴².

In addition, to ensure that the ex-ante obligations cover only activities where there is a risk that competition is affected, these regulatory frameworks apply to a subset of the services provided by these platforms. (Table 2).

³⁹ See <https://www.competitionpolicyinternational.com/converging-proposals-for-platform-regulation-in-china-the-eu-and-the-u-s-comparison-and-commentary/>

⁴⁰ See the State Administration for Market Regulation, “The Announcement for Public Comments on the ‘Guidelines for Classification and Grading of Internet Platforms (Draft for Comment)’ and the ‘Guidelines for Implementing Subject Responsibilities on Internet Platforms (Draft for Comment)’ [关于对《互联网平台分类分级指南（征求意见稿）》《互联网平台落实主体责任指南（征求意见稿）》公开征求意见的公告],” October 29, 2021, available at https://www.samr.gov.cn/hd/zjdc/202110/t20211027_336137.html.

⁴¹ In the US these platforms are referred to as “covered platforms” and in the UK and firms with “strategic market status”.

⁴² The EU DMA also allows the EC to designate as gatekeepers platforms that do not meet the quantitative criteria, but satisfy the qualitative ones.

Table 2. Activities covered by these regulatory frameworks

European Union	United Kingdom	United States
<p>The Act applies to “core platform service”. Article 2(2) defines “core platform service” and includes a list of specific activities that are included under such definition. These are the following:</p> <p>(a) online intermediation services;</p> <p>(b) online search engines;</p> <p>(c) online social networking services;</p> <p>(d) video-sharing platform services;</p> <p>(e) number-independent interpersonal communications services;</p> <p>(f) operating systems;</p> <p>(g) web browsers;</p> <p>(h) virtual assistants;</p> <p>(i) cloud computing services;</p> <p>(j) online advertising services, including any advertising networks, advertising exchanges and any other advertising intermediation services, provided by an undertaking that provides any of the core platform services listed in points (a) to (i).</p>	<p>The scope of the regime will be limited to digital activities. A definition of the activities in scope is being prepared.</p> <p>Detailed guidance will be published on how this definition will be applied in practice and what activities it will include.</p>	<p>Section 3(a)(9) of the American Choice and Innovation Online Act limits its application to online platforms and defines them as a website, online or mobile application, operating system, digital assistant, or online service that:</p> <p>(A) enables a user to generate content that can be viewed by other users on the platform or to interact with other content on the platform;</p> <p>(B) facilitates the offering, advertising, sale, purchase, payment, or shipping of products or services, including software applications, between and among consumers or businesses not controlled by the platform operator; or (C) enables user searches or queries that access or display a large volume of information.</p> <p>Section 3 of the Open App Markets Act enumerates obligations of “covered companies” with respect to mobile operating systems, operating system configurations, and app stores</p>

Source: (OECD, 2022^[34])

Obligations imposed on gatekeepers: flexibility vs legal certainty

In designing the obligations that are imposed on gatekeepers, there is a clear trade-off between flexibility, on the one side, and legal certainty and speed of identification, on the other. Flexibility is required to adapt obligations to different business models⁴³ and technological developments, while legal certainty and speed are needed to ensure predictability, thereby reducing uncertainty detrimental for investment, and avoiding the entrenchment of market power in markets that are characterised by fast dynamics.

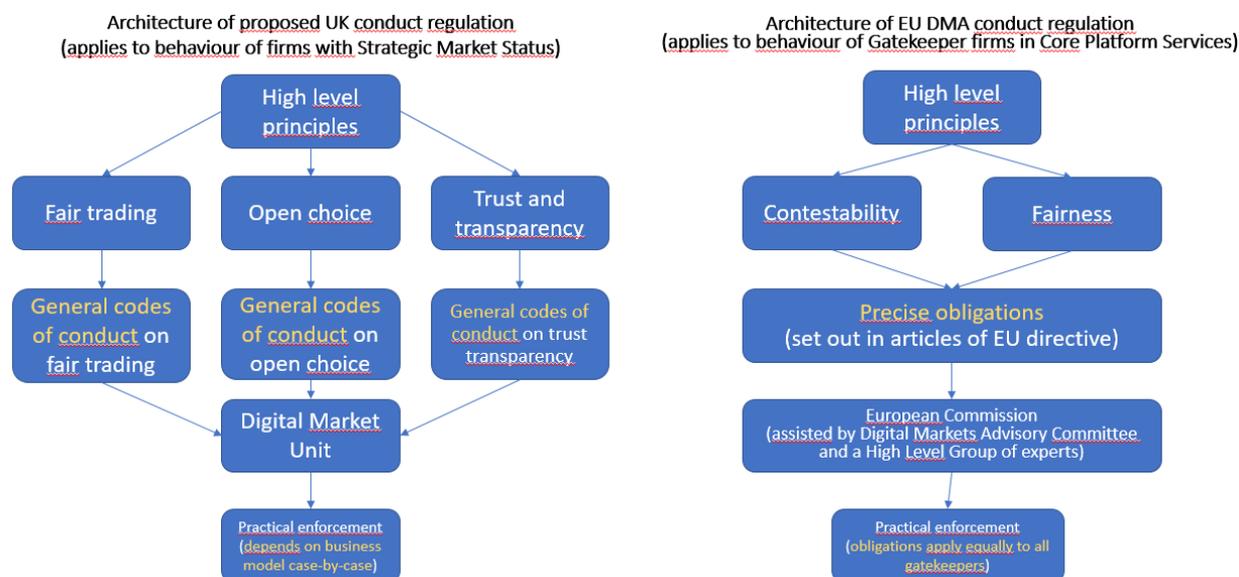
Currently, different approaches have been taken to reconcile flexibility, legal certainty, and speed of identification (Figure 8):

- the EU DMA has adopted a rather rigid approach. It includes an exhaustive list of positive and negative self-executing obligations that apply to the designated gatekeepers, regardless of their specific business model. These firms do not have the option to justify any behaviour in violation of these obligations by arguing that it brings efficiencies, or that it does not have an exclusionary effect on competitors. The US Tech Bills follow a similar approach, but the obligations are wider in scope and need to be enforced through the US court system. In addition, though not granting gatekeepers room for an efficiency defence, the US Tech Bills permit an “affirmative defence” if gatekeepers can prove that their conduct does not harm the competitive process or is necessary to comply with privacy rules.
- The proposed UK legislation does not lay down any pre-defined obligations or per se prohibitions, rather it sets out general objectives to keep flexibility to address firms’ changing and evolving behaviours. Subsequent codes of conduct, tailored on the targeted firms, should then lay down the high-level principles and standards gatekeepers should conform to, as well as guidance on the interpretation of those principles, with non-exhaustive “examples” of what firms must or must not

⁴³ (Caffarra and Scott Morton, 2021^[147]) distinguish three main kinds of digital platform business models – ad-funded platforms (e.g. Google, Facebook), transaction or matchmaking platforms (e.g. Amazon, AirBnB) and OS ecosystem platforms (e.g. Appstore, MS Microsoft, Android). They insist that each model has different economic properties (e.g. type of scale economies and network effects, potential for competitors to bypass the platform) and incentives that have very different implications in terms of the competition problems the platforms can engender.

do. If gatekeepers were to undertake behaviours that may have an adverse impact on competition the application of pro-competitive interventions is possible. Designated gatekeepers would be able to justify conducts on the ground that these bring efficiencies or other benefits.

Figure 8. Comparative architectures of the proposed UK and EU conduct regulations



Nature of the obligations imposed on gatekeepers

The obligations envisaged in these regulatory proposals tend to focus on two main areas: ensuring fair trading and maintaining contestability. Drawing a clear line between these two objectives, and therefore between the regulatory requirements meant to foster each one, is not clear-cut. (Prado, 2022^[44]) argues that the main difference is that the first objective mostly concerns the protection of competition *in* the market, while the second relates to fostering competition *for* the market.⁴⁴

Fair trade

Promoting fair trade involves ensuring transparency in platforms' transactions with business users and final consumers, as well as preventing abuses of market power over business users by gatekeepers.

Legislations specifically aimed at guaranteeing transparency in business-to-business interactions with large digital platforms have been recently introduced by the EU and Japan and are under discussion (at the time of writing, October 2022) in Korea. However, these provisions focus only on clarity and certainty about of terms and conditions imposed on business users (Box 4). The EU DMA, the UK SMS regime and the US BT take a more holistic approach aimed at ensuring effective competition in digital markets to the benefit of both business users and final consumers, which includes more than just provisions on terms and conditions.

These latter frameworks also include measures that seek to prevent gatekeepers from retaining key information obtained from their business and final users. For instance, the EU DMA imposes transparency obligations in the relationships between gatekeepers, and the advertisers and publishers that use their

⁴⁴ Competition in the market is competition between firms that are already present in the market. It differs from competition for the market, which is common in markets that cannot sustain more than one large player (and potentially a few much smaller ones), and refers to the ability of innovators to enter a market and displace the incumbent.

services, including on the specific prices charged and on the performance information collected, while the UK legislative proposal imposes provision of clear information to consumers and transparency about fees.

Additional measures attempt to curb the scope for gatekeepers to exercise their market power over business users. They range from preventing restrictions on pricing or abusive practices via unfair conditions (EU DMA), to forbidding interference with or restrictions to business users' pricing of their products (US BT) and avoiding the imposition of any unreasonable restrictions on business users and requiring trade on fair and reasonable contractual terms (UK legislative proposal). They also include prohibitions to condition access to a gatekeeper's platform, or preferred placement on it, on the use of other products or services offered by the platform (US BT), or to bundle services in markets where the platform has market power with other services in a way that could have more adverse effects than efficiency gains for consumers (UK legislative proposal).

Box 4. Regulations focusing on transparency and fairness of terms and conditions in business-to-business interactions with large digital platforms

The 2019 EU "Regulation on promoting fairness and transparency for business users of online intermediation services"⁴⁵ (P2B Regulation) established a harmonised legal framework that guarantees minimum transparency and redress rights to business users of online search engines, online marketplaces, online social media services, online software application services and application stores (referred to as "online intermediation services"). It also imposes a ban on certain unfair practices such as delisting -- i.e. the restriction, suspension, or termination of a seller's account -- when implemented without clearly stated reasons and requires online intermediation services to disclose information on how they determine rankings, including the possibility to influence ranking against any direct or indirect remuneration. To complement this regulation, the EC published a set of guidelines on ranking transparency⁴⁶, which give greater clarity on how to comply with the obligation to disclose the main parameters determining the ranking.

The 2020 Japanese Act on "Improving Transparency and Fairness of Digital Platforms"⁴⁷ regulates digital platforms that exceed certain size thresholds in specific markets. It imposes obligations like those envisaged by the EU P2B Regulation. These include the requirements to disclose terms and conditions of their contracts with business users, to provide prior notice of any amendments to them, and to establish procedures and systems to ensure fairness of transactions. Furthermore, the act requires digital platforms to submit a report to the Minister for Economy, Trade, and Industry (METI) every fiscal year, with an overview of the measures they have taken and a self-assessment. METI has to review these results and publish the key results. If, as a result of the review, METI identifies concerns of anticompetitive behaviours, it must report them to the Japan Fair Trade Commission. Similarly, Korea's proposed Act on Fair Intermediate Transactions on Online Platforms proposal intends to ensure a transparent and fair business environment for third party business users of large platforms and online businesses. It also prohibits abuse of superior bargaining power by platform providers.

⁴⁵ EU Regulation 2019/1150 available at <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32019R1150&qid=1563459381357>

⁴⁶ Commission Notice Guidelines on ranking transparency pursuant to Regulation (EU) 2019/1150 of the European Parliament and of the Council 2020/C 424/01 available at [https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:52020XC1208\(01\)&from=EN](https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:52020XC1208(01)&from=EN)

⁴⁷ https://www.meti.go.jp/english/policy/mono_info_service/information_economy/digital_platforms/tfdpa.html

Contestability

Ensuring contestability involves preventing exclusionary or discriminatory behaviours by gatekeepers that impede entry by innovating competitors or limit their ability to expand and attract users. This includes removing unnecessary barriers to access to data when these represent a major barrier to entry in a market.

One set of measures is specifically aimed at preventing foreclosing, discrimination and self-preferencing against potential rivals.⁴⁸ For instance, the EU DMA imposes a prohibition on granting preferential treatment in ranking services to the gatekeeper's own products and contains provisions that prevent self-preferencing via mandated distribution channels (e.g., app stores), or via compatibility restrictions in operating systems, virtual assistants, or web browsers. These are supplemented by provisions aimed at ensuring fair, reasonable, and non-discriminatory access to app stores by business users. These provisions also cover possible self-preferencing or exclusionary practices in cases of vertical integration into OS, terminals or connected devices (e.g., vehicles) as well as via differential pricing or contractual conditions. The proposed US BT explicitly forbid gatekeepers to advantage their own products and services over those of third-party service providers or restrict business users from accessing the platform (or its software) on the same terms as the platform operator's own businesses.⁴⁹ In line with its high-level spirit, the proposed UK legislation includes a broad prohibition to unduly apply discriminatory terms, conditions or policies on business users and to self-preference in any way a platform's own services.

Another set of measures aims at preventing user lock-in by lowering switching costs to promote platform contestability, competitive pressures, and innovation. Lowering costs for users of changing their intermediation platform mainly involves easing the ability to multihome via systems interoperability and data portability (often beyond that already allowed by privacy laws).⁵⁰ The power of these obligations is that they can help to overcome the negative consequences of network effects for competition, while retaining the benefits and thereby facilitating the development of competition in the market.

Measures on interoperability include ensuring third party access for number-independent communications (such as Whatsapp, Messenger or Skype), lifting restrictions (including via OS exclusivity) on the ability of users to switch between the applications of the platform and those of other platforms (EU DMA), imposing undue restrictions on the ability of customers to use other providers that compete with the designated platform and requiring the platform to take reasonable steps to ensure that core services interoperate with third party technologies (UK proposal), and compelling gatekeepers to make their products and services compatible with those offered by competitors (US BT).

On the access to and use of data collected by gatekeepers, the 3 regulatory frameworks differ to some extent. Table 3 summarises the key obligations each one imposes.

⁴⁸ Self-preferencing is a practice that mostly arises in relation to platforms that, in addition to providing intermediation services, also sell their own products. Therefore, they might have an incentive to favour their own products, for example by giving them a preferential ranking on the platform, compared to third-party competing products.

⁴⁹ Some US proposals take an even more restrictive approach by forbidding to use the platform to sell or provide other products or services or operate both a platform and another "line of business" if doing so would create a "conflict of interest".

⁵⁰ Some jurisdictions have introduced mandatory data portability to give individuals greater control over their personal data as part of their privacy laws. Examples are the EU GDPR and the California Consumer Privacy Act (CCPA).⁵⁰ This right has been introduced as a privacy-enhancing tool, and not as a regulatory remedy to improve competition. However, some have advocated its use to counter the lock-in effects of digital services by facilitating switching to alternative suppliers.

It should be reminded that these obligations apply only to the digital activities to which the regulatory frameworks apply (see Table 2 above). For example, in the European Union these obligations do not apply to the data generated by the use of connected devices⁵¹.

Table 3. Requirements concerning use and access to data that would apply to designated digital platforms

Aim of regulation	European Union	United Kingdom	United States
Access to data	<p>Keep users in control of their personal data in user-friendly ways ensure access to data generated by end-user or business-user activity continuously and in real time (e.g. via API and portability)</p> <p>Provide third-party online search engine operators with access -- on fair, reasonable and non-discriminatory terms -- to ranking, query, click and view data in relation to free and paid search generated by end users on its online search engines</p>	<p>Require platforms to provide third parties access to certain categories of data (e.g. click and query data)</p> <p>Allow consumers to share the data that platforms hold on them with third party business parties</p>	<p>Prohibiting conduct that may materially restrict or impede a business user from accessing data generated on the platform by the activities of the business user, or through an interaction of a customer of the platform with the products or services of the business user</p>
Use of data	<p>Preventing unauthorized use, cross-use, and combination of user data from different services</p>	<p>Requiring use of data from customers only in ways that are reasonably related to the provision of services</p> <p>Introduction of a transaction ID considering privacy concerns</p> <p>Prohibiting platforms from combining certain categories of data within their ecosystems</p>	<p>Prohibiting use of data obtained or generated on the covered platform by business users or their customers to support the platform operator's own product or services</p>

When it comes to data portability, the US BT requires gatekeepers to maintain a set of transparent, third-party accessible interfaces that allow transfer of data in a structured and machine-readable format, while the EU DMA requires gatekeepers to provide effective portability of data that permit continuous and real-time access, and it imposes additional specific data access remedies on search engines. The UK proposal, in line with its more principle-driven approach, contemplates that, where data represent a key barrier to new entrants, gatekeepers can be required to grant third-party firms access to them via remedies tailored to the specific problem at issue (Box 5).

⁵¹ However, the EU is planning to address this through a new legislation, the Data Act, which is currently being discussed by the European Parliament and Council. This act focuses on the data generated by the use of connected devices, and includes measures to allow users of connected devices to gain access to personal and non-personal data generated by their use and to share such data with third parties. The aim is to foster the development of data-driven innovative aftermarkets and value-added services. This Act differs from the DMA in that its obligations to provide access to this data applies to all manufacturers independently of their size or market share.

Box 5. Access to data in digital markets: the UK proposal

Consistent with its general approach to ex ante regulation in digital markets, the UK proposal is rather flexible when it comes to access to data. It gives the Digital Market Unit, who will enforce the legislation, considerable leeway in the choice of the specific intervention(s) to impose on gatekeepers, depending on the nature of the competition barriers it tries to address, the characteristics of digital activities it would apply to, as well as of the business model that underlies the activity.

The possible remedies are grouped into:

“Consumer control remedies – These enable consumers to better control their personal data, for example by controlling the terms on which it is collected, how it is used, who it is shared with and facilitating consumer-led data mobility. They would complement existing data protection rights

Data access remedies – These enable third parties to access data held by SMS firms. They can be used where access to data is a key barrier to new entrants being able to develop new innovations in a market.

Data silo remedies – These remedies limit how data can be shared and used between different business units within an SMS firm”.

References

- (n.a.) (2020), *Online platforms and digital advertising*, [77]
<http://www.nationalarchives.gov.uk/doc/open-government->
- ACCC (2021), *Digital advertising services inquiry - final report*, [43]
<https://www.accc.gov.au/publications/digital-advertising-services-inquiry-final-report>.
- Aghion et al. (2018), “Firm Dynamics and Growth Measurement in France”, *Banque de France Working Paper Series* no. 676. [159]
- Aghion et al. (2017), “Missing Growth from Creative Destruction”, *National Bureau of Economic Research November Working Paper* 24023. [158]
- Akcigit, U. and S. Ates (2019), *Ten Facts on Declining Business Dynamism and Lessons from Endogenous Growth Theory*, National Bureau of Economic Research, Cambridge, MA, [200]
<https://doi.org/10.3386/w25755>.
- Akerlof, G. (1970), “The Market for “Lemons”: Quality Uncertainty and the Market Mechanism”, *The Quarterly Journal of Economics*, Vol. 84/3, pp. 488-500. [54]
- Allen, D. et al. (2019), “Some Economic Consequences of the GDPR”, [138]
<https://ssrn.com/abstract=3160404>.
- Andrews et al (2014), ““Do Resources Flow to Patenting Firms?: Cross-Country Evidence from Firm Level Data””, *OECD Economics Department Working Papers*, 1127. [160]
- Andrews et al. (2016), ““The Best versus the Rest: The Global Productivity Slowdown, Divergence across Firms and the Role of Public Policy” *OECD Productivity Working Papers* 5”, *OECD Productivity Working Papers*, 5. [161]
- ARCEP (2018), *Les terminaux, maillon faible de l’ouverture d’internet*. [31]
- Attrey, A., M. Leshner and C. Lomax (2020), “The role of sandboxes in promoting flexibility and innovation in the digital age”, *Going Digital Toolkit Policy Note* 2, [104]
<https://goingdigital.oecd.org/toolkitnotes/the-role-of-sandboxes-in-promoting-flexibility-and-innovation-in-the-digital-age.pdf>.
- Australian Competition and Consumer Commission (2019), *Digital Platforms Inquiry: Final Report*. [79]
- Australian Government (2019), *Regulating in the digital age: Government response and Implementation Roadmap for the Digital Platforms Inquiry*. [78]
- Australian Transport Commission (2018), *Guidelines for trials of automated vehicles in Australia*, [105]
<https://www.ntc.gov.au/codes-and-guidelines/automated-vehicle-trial-guidelines>.
- Bajari, P. et al. (2018), “The Impact of Big Data on Firm Performance: An Empirical Investigation”, *NBER Working Paper Series* 24334, <http://www.nber.org/papers/w24334>. [131]
- Barnett et al. (2014), “The productivity puzzle: a firm-level investigation into employment behaviour and resource allocation over the crisis”, *Bank of England Working Paper*, no. 495.. [162]

- Beck, T. (ed.) (2018), "The walking dead? Zombie firms and productivity performance in OECD countries", *Economic Policy*, Vol. 33/96, pp. 685-736, <https://doi.org/10.1093/epolic/eiy012>. [197]
- Bedre-Defolie, O. and R. Nitsche (2020), "Why Do Markets Tip? An Overview and Some Insights for Policy", *Journal of European Competition Law & Practice*, Vol. 11/10. [146]
- Berlingieri et al. (2017), "The Great Divergence(s)", *Centre for Economic Performance (LSE) Discussion Papers*, no.1488. [163]
- Bloom et al. (2020), "Are Ideas Getting Harder to Find?", *American Economic Review*, Vol. 110(4). [164]
- BMWi Commission 'Competition Law 4.0' (2019), *A new competition framework for the digital economy*, <http://www.bmwi.de>. [29]
- Bolton, G., E. Katok and A. Ockenfels (2004), "How Effective Are Electronic Reputation Mechanisms? An Experimental Investigation", *Management Science*, Vol. 50/11, <https://pubsonline.informs.org/doi/abs/10.1287/mnsc.1030.0199>. [100]
- Bourreau, M. and A. de Stree (2019), "Digital Conglomerates and EU Competition Policy", *SSRN Electronic Journal*, <https://doi.org/10.2139/ssrn.3350512>. [15]
- Bourreau, M. and A. de Stree (2019), "Digital Conglomerates and EU Competition Policy", <https://poseidon01.ssrn.com/delivery.php?ID=402119071098092001112117108012127117098000220290120820940080910861110800870001101010490580061000161210160670801150681130790821040320690650060650120750690920821080070810530720231140831130711000061130921270890800>. [117]
- Bourreau and D. Stree (2019), "Digital Conglomerates and EU Competition Policy", <https://ssrn.com/abstract=3350512>. [68]
- Brescia, R. (2016), "Regulating the Sharing Economy: New and Old Insights into an Oversight Regime for the Peer-to-Peer Economy", *Nebraska Law Review*, Vol. 95/1, <http://digitalcommons.unl.edu/nlr/vol95/iss1/4>. [52]
- Brynjolfsson and McAfee (2014), *The second machine age: Work, progress, and prosperity in a time of brilliant technologies*, WW Norton & Company. [180]
- Brynjolfsson, E., D. Rock and C. Syverson (2021), "The Productivity J-Curve: How Intangibles Complement General Purpose Technologies", *American Economic Journal: Macroeconomics*, Vol. 13/1, pp. 333-372, <https://doi.org/10.1257/mac.20180386>. [169]
- Brynjolfsson, E., D. Rock and C. Syverson (2017), *Artificial Intelligence and the Modern Productivity Paradox: A Clash of Expectations and Statistics*, National Bureau of Economic Research, Cambridge, MA, <https://doi.org/10.3386/w24001>. [168]
- Byler, Flores and Lewris (2017), *Using advanced analytics to drive regulatory reform: Understanding presidential orders on regulation reform*. [61]
- Byrne et al. (2016), "Does the United States Have a Productivity Slowdown or a Measurement Problem?", *Brookings Papers on Economic Activity*, pp. 109–57. [189]
- Cabral et al. (2021), "The EU Digital Markets Act: A Report from a Panel of Economic Experts", *Publications Office of the European Union*. [192]

- Caffarra, C., G. Crawford and T. Valletti (2020), “‘How tech rolls’: Potential competition and ‘reverse’ killer acquisitions”, *Vox EU*, <https://voxeu.org/content/how-tech-rolls-potential-competition-and-reverse-killer-acquisitions>. [69]
- Caffarra, C. and F. Scott Morton (2021), “The European Commission Digital Markets Act: A translation”, *VoxEU*, <https://voxeu.org/article/european-commission-digital-markets-act-translation> (accessed on 11 March 2021). [147]
- Calvano and Polo (2020), “Market power, competition and innovation in digital markets: A survey”, *Information Economics and Policy*. [67]
- Cappai, M. and G. Colangelo (2020), “Navigating the Platform Age: the ‘More Regulatory Approach’ to Antitrust Law in the EU and the U.S.”, *SSRN Electronic Journal*, <https://doi.org/10.2139/ssrn.3572629>. [191]
- Caro de Sousa, P. and C. Pike (2020), “How Soon is Now?”, *Competition Law and Policy Debate*, https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3706772. [92]
- Cennamo, C. and D. Sokol (2021), “Can the EU Regulate Platforms Without Stifling Innovation?”, *Harvard Business Review*, <https://hbr.org/2021/03/can-the-eu-regulate-platforms-without-stifling-innovation>. [148]
- CEPR (2020), *Google/Fitbit will monetise health data and harm consumers*, https://cepr.org/sites/default/files/policy_insights/PolicyInsight107.pdf. [132]
- CERRE (2020), *Digital Markets Act: Making economic regulation of platforms fit for the digital age*. [80]
- CERRE (2020), *The Role of Data for Digital Markets Contestability: Case Studies and Data Access Remedies*. [130]
- CMA (2022), *Market Study into Mobile Ecosystems*. [211]
- CMA (2020), “Online platforms and digital advertising: market study final report”, https://assets.publishing.service.gov.uk/media/5fa557668fa8f5788db46efc/Final_report_Digital_ALT_TEXT.pdf. [38]
- CMA (2015), *The Commercial Use of Consumer Data*. [9]
- Cohen, M. and A. Sundararajan (2015), “Self-Regulation and Innovation in the Peer-to-Peer Sharing Economy”, *University of Chicago Law Review Online*, Vol. 82/1, https://chicagounbound.uchicago.edu/uclrev_online/vol82/iss1/8/. [102]
- Comin, D. and M. Mestieri (2018), “If Technology Has Arrived Everywhere, Why Has Income Diverged?”, *American Economic Journal: Macroeconomics*, Vol. 10/3, pp. 137-178, <https://doi.org/10.1257/mac.20150175>. [173]
- Commission, E. (2020), “Regulation of the European Union and of the Council on contestable and fair markets in the digital sector (Digital Markets Act)”, <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52020PC0842&from=en>. [37]

- Competition and Markets Authority (2020), *A new pro-competition regime for digital markets: Advice of the Digital Markets Taskforce*, [85]
https://assets.publishing.service.gov.uk/media/5fce7567e90e07562f98286c/Digital_Taskforce_-_Advice_-.pdf.
- Competition and Markets Authority (2020), *Online platforms and digital advertising*, [95]
https://assets.publishing.service.gov.uk/media/5fa557668fa8f5788db46efc/Final_report_Digital_ALT_TEXT.pdf.
- Competition and Markets Authority (2016), *Retail Banking Market Investigation*, [141]
<https://assets.publishing.service.gov.uk/media/57ac9667e5274a0f6c00007a/retail-banking-market-investigation-full-final-report.pdf>.
- Competition Policy Council (2021), *Digital Platforms: Oversight if Necessary, But Not Necessarily Regulation*, [97]
https://www.cdhowe.org/sites/default/files/attachments/communiques/mixed/Communique_2021_0107_CPC.pdf.
- Competition Policy Council (2021), *Digital Platforms: Oversight if Necessary, But Not Necessarily Regulation*, [145]
https://www.cdhowe.org/sites/default/files/attachments/other-research/pdf/Communique_2021_0107_CPC.pdf.
- Competition Policy International (2020), *A Tale of Two Markets: Self-Preferencing*, [73]
<https://www.competitionpolicyinternational.com/wp-content/uploads/2020/06/AC-June-II.pdf>.
- Condorelli and Padilla (2019), "Harnessing Platform Envelopment in the Digital World", [21]
https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3504025.
- Congressional Research Services (2021), "The Big Tech Antitrust Bills", [42]
<https://crsreports.congress.gov/product/pdf/R/R46875>.
- Corrado et al. (2022), "Data, Digitization and Productivity", *CRIW-NBER Conference on Technology, Productivity and Economic Growth* Spring 2022. [5]
- Corrado et al. (2022), "Measuring data as an asset: "Framework, methods and preliminary estimates", *OECD Economics Department* forthcoming. [11]
- Corrado, C. (ed.) (2005), *Measuring Capital and Technology: An Expanded Framework*, Chicago, IL: University of Chicago Press. [166]
- Corrado, C. et al. (2021), "New evidence on intangibles, diffusion and productivity", *OECD Science, Technology and Industry Working Papers*, No. 2021/10, OECD Publishing, Paris, <https://doi.org/10.1787/de0378f3-en>. [170]
- Corrado, C. et al. (2022), "The value of data in digital-based business models: Measurement and economic policy implications", *OECD Economics Department Working Papers*, No. 1723, OECD Publishing, Paris, <https://doi.org/10.1787/d960a10c-en>. [4]
- Corrado, C., C. Hulten and D. Sichel (2009), "INTANGIBLE CAPITAL AND U.S. ECONOMIC GROWTH", *Review of Income and Wealth*, Vol. 55/3, pp. 661-685, [167]
<https://doi.org/10.1111/j.1475-4991.2009.00343.x>.

- Costa, H. et al. (2021), “Are online platforms killing the offline star? Platform diffusion and the productivity of traditional firms”, *OECD Economics Department Working Papers*, No. 1682, OECD Publishing, Paris, <https://doi.org/10.1787/1e2bbe10-en>. [2]
- Costa, H. et al. (2021), “Welcome to the (digital) jungle: Measuring online platform diffusion”, *OECD Economics Department Working Papers*, No. 1683, OECD Publishing, Paris, <https://doi.org/10.1787/b4e771d7-en>. [165]
- Cowen (2011), *The great stagnation: How America ate all the low-hanging fruit of modern history, got sick, and will (eventually) feel better*, Penguin. [175]
- CPI (2021), “Antitrust Chronicle - U.S. House Report on Digital Markets”, *Competition Policy International*, <https://www.competitionpolicyinternational.com/wp-content/uploads/2021/01/ANTITRUST-CHRONICLE-SPECIAL-EDITION-WINTER-2021-US-REPORT-ON-DIGITAL-MARKETS-CPI.pdf>. [109]
- CPI (2020), “Antitrust Chronicle - Self Preferencing”, *Competition Policy International*, Vol. 3/2, <https://www.competitionpolicyinternational.com/wp-content/uploads/2020/06/AC-June-II.pdf>. [84]
- Crémer (2019), *Competition policy for the digital era*. [32]
- Crémer (2019), *Competition policy for the digital era*. [36]
- Criscuolo (2021), “Productivity and business dynamics through the lens of COVID-19: The shock, risks and opportunities”, *paper for the 2021 ECB Forum on Central Banking*. [27]
- Cunningham, Ederer and Ma (2018), “Killer Acquisitions”, pp. 436-4687, <https://ssrn.com/abstract=3241707>. [26]
- Decker, R. et al. (2016), “Declining Business Dynamism: What We Know and the Way Forward”, *American Economic Review*, Vol. 106/5, pp. 203-207, <https://doi.org/10.1257/aer.p20161050>. [199]
- Decker, R. et al. (2016), “Where has all the skewness gone? The decline in high-growth (young) firms in the U.S.”, *European Economic Review*, Vol. 86, pp. 4-23, <https://doi.org/10.1016/j.euroecorev.2015.12.013>. [198]
- Delgado, J. (2021), *Regulating Digital Gatekeepers: Lessons from the Banking Industry*, <https://www.competitionpolicyinternational.com/regulating-digital-gatekeepers-lessons-from-the-banking-industry/>. [142]
- Dellarocas, Dini and Spagnolo (2006), *Designing Reputation (Feedback) Mechanisms*, Cambridge University Press. [57]
- Deloitte (2018), *A journey through the FCA regulatory sandbox*, <https://www2.deloitte.com/content/dam/Deloitte/uk/Documents/financial-services/deloitte-uk-fca-regulatory-sandbox-project-innovate-finance-journey.pdf>. [106]
- Derviş and Qureshi (2016), “The productivity slump - fact or fiction: the measurement debate”, *Brookings Institution*. [186]
- Derxl, J. (2018), *Data Access and Control in the Era of Connected Devices*. [153]
- Digital Competition Expert Panel (2019), *Unlocking digital competition*. [39]

- Dokei, T. et al. (2021), *Recent Developments in Competition Law and Policy in the Digital Economy in Japan*, Competition Policy International, [151]
<https://www.competitionpolicyinternational.com/wp-content/uploads/2021/03/3-recent-developments-in-competition-law-and-policy-in-the-digital-economy-in-japan.pdf>.
- Dunne, N. (2020), “Platforms as regulators”, *Journal of Antitrust Enforcement*, [108]
<https://academic.oup.com/antitrust/advance-article/doi/10.1093/jaenfo/jnaa052/6018518>.
- Edelman, B. and D. Geradin (2016), *Spontaneous deregulation*, pp. 80–87, [49]
<https://hbr.org/2016/04/spontaneous-deregulation>.
- Eggers, W. (n.d.), *The future of regulation Principles for regulating emerging technologies A report from the Deloitte Center for Government Insights MIKE TURLEY*. [65]
- Englehardt, S. and A. Narayanan (2016), “Online tracking: A 1-million-site measurement and analysis”. [127]
- European Commission (2022), “Commission Staff Working Document. Accompanying report from the commission to the council and the European Parliament. Final report - Sector inquiry into consumer Internet of Thing {COM(2022) 19 final}.”, https://competition-policy.ec.europa.eu/system/files/2022-01/internet-of-things_final_report_2022_staff_working_document_0.pdf. [208]
- European Commission (2022), “Report from the Commission to the Council and the European Parliament. Final report - sector inquiry into consumer Internet of Things {SWD(2022) 10 final}”, https://competition-policy.ec.europa.eu/system/files/2022-01/internet-of-things_final_report_2022_en.pdf. [207]
- European Commission (2019), *Competition policy for the digital era*. [144]
- European Commission (2016), *Business-to-business relationships in the online platforms environment - Legal aspects and clarity of terms and conditions of online platforms*. [22]
- European Commission (2016), *Study on passenger transport by taxi, hire car with driver and ridesharing in the EU*, <https://ec.europa.eu/transport/sites/transport/files/2016-09-26-pax-transport-taxi-hirecar-w-driver-ridesharing-final-report.pdf>. [90]
- European Parliamentary Research Service (2019), *Fairness and transparency for business users of online services*, [75]
[https://www.europarl.europa.eu/RegData/etudes/BRIE/2018/625134/EPRS_BRI\(2018\)625134_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/BRIE/2018/625134/EPRS_BRI(2018)625134_EN.pdf).
- Ezrachi, A. and M. Stucke (2016), *The Rise of the Machines – How Automated Digital Assistants Can Reduce Competition (and the Cash in Your Wallet)*, <https://www.law.ox.ac.uk/business-law-blog/blog/2016/10/rise-machines-%E2%80%93-how-automated-digital-assistants-can-reduce> (accessed on 7 January 2021). [93]
- Ezrachi, A. and M. Stucke (2016), *Virtual Competition: The Promise and Perils of the Algorithm-Driven Economy*, Harvard University Press. [94]
- Farrel, J. and P. Klemperer (2006), “Coordination and Lock-In: Competition with Switching Costs and Network Effects”. [125]

- Fernald, J. (2015), "Productivity and Potential Output before, during, and after the Great Recession", *NBER Macroeconomics Annual*, Vol. 29/1, pp. 1-51, <https://doi.org/10.1086/680580>. [188]
- Fernald, J. (2014), *Productivity and Potential Output Before, During, and After the Great Recession*, National Bureau of Economic Research, Cambridge, MA, <https://doi.org/10.3386/w20248>. [178]
- Gal, P. et al. (2019), "Digitalisation and productivity: In search of the holy grail – Firm-level empirical evidence from EU countries", <https://doi.org/10.1787/5080f4b6-en>. [7]
- Geradin (2020), *Why is ex ante regulation of systemic online platforms needed on top of competition law?*, <https://theplatformlaw.blog/2020/05/07/why-is-ex-ante-regulation-of-systemic-online-platforms-needed-on-top-of-competition-law/> (accessed on 27 October 2020). [74]
- Geradin (2018), "What Should EU Competition Policy do to Address the Concerns Raised by the Digital Platforms' Market Power?". [66]
- Geradin, D., T. Karanikioti and D. Katsifis (2020), "GDPR Myopia: How a Well-Intended Regulation ended up Favoring Google in Ad Tech". [122]
- Goldberg, S., G. Johnson and S. Shriver (2021), "Regulating Privacy Online: An Economic Evaluation of the GDPR", <https://ssrn.com/abstract=3421731>. [136]
- Goldfarb, A. and C. Tucker (2011), "Privacy Regulation and Online Advertising", *Management Science*, Vol. 57/1, <https://www.jstor.org/stable/41060701>. [137]
- Goldman, E. (2011), *The Regulation of Reputational Information*. [56]
- Gopinath, G. et al. (2017), "Capital Allocation and Productivity in South Europe*", *The Quarterly Journal of Economics*, Vol. 132/4, pp. 1915-1967, <https://doi.org/10.1093/qje/qjx024>. [172]
- Gordon (2016), *The Rise and Fall of American Growth: The U.S. Standard of Living since the Civil War*, Princeton University Press. [176]
- Gordon, R. (2018), *Why Has Economic Growth Slowed When Innovation Appears to be Accelerating?*, National Bureau of Economic Research, Cambridge, MA, <https://doi.org/10.3386/w24554>. [177]
- Graef, I. (2020), "The Opportunities and Limits of Data Portability for Stimulating Competition and Innovation", *Competition Policy International*, <https://www.competitionpolicyinternational.com/the-opportunities-and-limits-of-data-portability-for-stimulating-competition-and-innovation/>. [139]
- Graef, I. (2019), "Differentiated Treatment in Platform-to-Business Relations: EU Competition Law and Economic Dependence", *Yearbook of European Law*, Vol. 38, pp. 448-499, <https://doi.org/10.1093/yel/yez008>. [28]
- Graef, I. (2019), "Differentiated Treatment in Platform-to-Business Relations: EU Competition Law and Economic Dependence", *Yearbook of European Law*, Vol. 38, pp. 448-499, <https://doi.org/10.1093/yel/yez008>. [76]
- Graef, I. (2019), "Rethinking the Essential Facilities Doctrine for the EU Digital Economy", *TILEC Discussion Paper*, https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3371457. [152]

- Graef, I. (2016), "EU Competition Law, Data Protection and Online Platforms: Data as Essential Facility", https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3635378. [121]
- Graef, I., J. Verschakelen and P. Valcke (2013), "Putting the right to data portability into a competition law perspective", *Law. The Journal of the Higher School of Economics*. [140]
- Haskel, J. and S. Westlake (2018), *Capitalism without Capital*, Princeton University Press, <https://doi.org/10.1515/9781400888320>. [183]
- Haucap, J. (2019), "Competition and Competition Policy in a Data-Driven Economy", *Intereconomics*, Vol. 54/4, pp. 201-208, <https://doi.org/10.1007/s10272-019-0825-0>. [13]
- He et al. (2017), "Scale Effects in Web Search". [118]
- Holmström et al. (2019), "Killer Acquisitions? The Debate on Merger Control for Digital Markets". [25]
- House Judiciary Committee (2020), *Investigation of Competition in Digital Markets*, https://judiciary.house.gov/uploadedfiles/competition_in_digital_markets.pdf. [96]
- International Monetary Fund (2019), *The Economics and Implications of Data: An Integrated Perspective*. [14]
- ITDP (2019), *Ride Fair: A Policy Framework for Managing Transportation Network Companies*, <https://www.itdp.org/wp-content/uploads/2019/03/2019.03.13.TNC-Policy.V9.pdf>. [89]
- Jovanovic, B. and P. Rousseau (2005), "General Purpose Technologies", in *Handbook of Economic Growth*, Elsevier, [https://doi.org/10.1016/s1574-0684\(05\)01018-x](https://doi.org/10.1016/s1574-0684(05)01018-x). [182]
- Kerber, W. (2019), "Data Sharing in IoT Ecosystems and Competition Law: The Example of Connected Cars", *Journal of Competition Law & Economics*, Vol. 15/4. [154]
- Kerber, W. (2018), "Data Governance in Connected Cars: The Problem of Access to In-Vehicle Data", *Journal of Intellectual Property, Information Technology and Electronic Commerce Law*. [155]
- Knight, B. and T. Mitchell (2019), "The Sandbox Paradox", *CSAS Working Paper 19-36*, <https://administrativestate.gmu.edu/wp-content/uploads/sites/29/2019/11/Knight-Mitchell-The-Sandbox-Paradox.pdf>. [107]
- Koopman, C., M. Mitchell and A. Thierer (2015), "The Sharing Economy and Consumer Protection Regulation: The Case for Policy Change", *The Journal of Business, Entrepreneurship & the Law*, Vol. 8/2, <http://ssrn.com/abstract=2535345><http://digitalcommons.pepperdine.edu/jbel><http://digitalcommons.pepperdine.edu/jbel/vol8/iss2/4>Electroniccopyavailableat:<https://ssrn.com/abstract=2535345>Electroniccopyavailableat:<http://ssrn.com/abstract=2535345>. [55]
- Koutroumpis, P., A. Leiponen and L. Thomas (2020), "Markets for data", *Industrial and Corporate Change*, Vol. 29/3, pp. 645-660, <https://doi.org/10.1093/icc/dtaa002>. [12]
- Kramer, J. (2023), *IMPROVING THE ECONOMIC EFFECTIVENESS of B2B AND B2C DATA SHARING OBLIGATIONS IN THE PROPOSED DATA ACT*. [210]

- Kramer, J. (2021), "Personal Data Portability in the Platform Economy: Economic Implications and Policy Recommendations", *Journal of Competition Law & Economics*, [128]
https://www.ibusiness.uni-passau.de/fileadmin/dokumente/fakultaeten/wiwi/lehrstuehle/kraemer/Kraemer_-_Personal_Data_Portability_in_the_Platform_Economy.pdf.
- Kwoka, J. and T. Valletti (2020), "Scrambled Eggs and Paralyzed Policy: Breaking Up Consummated Mergers and Dominant Firms", [133]
https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3736613.
- Lambrecht and Tucker (2017), "Can big data protect a firm from competition?", *Competition Policy International*, Vol. January. [193]
- Lerner, A. (2014), "The Role of "Big Data" in Online Platform". [112]
- Lusinyan, C. (2015), "U.S. Total Factor Productivity Slowdown: Evidence from the U.S", *IMF Working Papers*, 15. [185]
- Lynskey, O. (2017), "Regulating 'Platform Power'", *SSRN Electronic Journal*, [209]
<https://doi.org/10.2139/ssrn.2921021>.
- Mahnke, R. (2015), "Big Data as a Barrier to Entry", *Competition Policy International*. [120]
- Marchant, G., K. Abbott and B. Allenby (n.d.), *Innovative governance models for emerging technologies*. [64]
- Marco, D., Greco and Grimaldi (2016), "A formal definition of big data based on its essential features", *Library Review*, Vol. 65/3. [3]
- Martin, N. et al. (2019), "How Data Protection Regulation Affects Startup Innovation", *Information Systems Frontiers*, <https://doi.org/10.1007/s10796-019-09974-2>. [134]
- Mayzlin, D., Y. Dover and J. Chevalier (2014), "Promotional Reviews: An Empirical Investigation of Online Review Manipulation", *American Economic Review*, Vol. 104/8, [101]
https://www.marshall.usc.edu/sites/default/files/mayzlin/intellcont/mayzlin_et_al_2014-1.pdf.
- McAfee et al. (2012), "Big data: the management revolution", *Harvard business review*, [179]
 Vol. 90(10), pp. 60-68.
- Ministère de l'Économie et des Finances, Direction générale du Trésor (2019), *Digital platforms and competition*, <https://www.tresor.economie.gouv.fr/Articles/cd6f1d8d-e0a6-44ab-a4bc-3daf221d01cc/files/567a354e-0ab1-4580-b4aa-cc79b4678423>. [23]
- Mokyr, J. (2018), "The past and the future of innovation: Some lessons from economic history", [181]
Explorations in Economic History, Vol. 69, pp. 13-26,
<https://doi.org/10.1016/j.eeh.2018.03.003>.
- Motta and Peitz (2020), "Big Tech Mergers", [91]
https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3526079.
- Neumann, N., C. Tucker and T. Whitfield (2019), "How Effective is Third-Party Consumer Profiling and Audience Delivery? Evidence from Field Studies". [116]

- Nicoletti, G., C. von Rueden and D. Andrews (2020), “Digital technology diffusion: A matter of capabilities, incentives or both?”, *European Economic Review*, Vol. 128, p. 103513, <https://doi.org/10.1016/j.euroecorev.2020.103513>. [10]
- Nosko and Tadelis (2015), “The limits of reputation in platform markets: an empirical analysis and field experiment”, *NBER WORKING PAPER SERIES*. [60]
- OECD (2022), *analytical note on the OECD G7 inventory of new rules for digital markets*. [35]
- OECD (2022), “ICT Access and Use by Businesses”, *OECD Telecommunications and Internet Statistics* (database), <https://doi.org/10.1787/9d2cb97b-en> (accessed on 30 August 2022). [204]
- OECD (2022), *Inventory of new rules for digital markets*. [34]
- OECD (2021), “Ex ante regulation of digital markets,”, *OECD Competition Committee Discussion Paper*. [202]
- OECD (2020), *Abuse of dominance in digital markets*, <http://www.oecd.org/daf/competition/abuse-of-dominance-in-digital-markets-2020.pdf>. [17]
- OECD (2020), *Competition Trends*. [70]
- OECD (2020), *Digital competition policy: Are ecosystems different?*, [https://one.oecd.org/document/DAF/COMP/WD\(2020\)96/en/pdf](https://one.oecd.org/document/DAF/COMP/WD(2020)96/en/pdf). [83]
- OECD (2020), *Digital Economy Outlook*, OECD Paris. [195]
- OECD (2020), “Lines of Business Restrictions”. [72]
- OECD (2020), *Lines of Business Restrictions*, [https://one.oecd.org/document/DAF/COMP/WP2\(2020\)1/en/pdf](https://one.oecd.org/document/DAF/COMP/WP2(2020)1/en/pdf). [123]
- OECD (2020), “Start-ups, Killer Acquisitions and Merger Control”. [24]
- OECD (2019), *Going Digital: Shaping Policies, Improving Lives*, OECD Publishing, Paris. [6]
- OECD (2019), *Practical approaches to assessing digital platform markets for competition law enforcement*, [https://one.oecd.org/document/DAF/COMP/LACF\(2019\)4/en/pdf](https://one.oecd.org/document/DAF/COMP/LACF(2019)4/en/pdf). [18]
- OECD (2019), *An Introduction to Online Platforms and Their Role in the Digital Transformation*. [143]
- OECD (2019), *Competition for-the-market*, [https://one.oecd.org/document/DAF/COMP/GF\(2019\)7/en/pdf](https://one.oecd.org/document/DAF/COMP/GF(2019)7/en/pdf). [82]
- OECD (2019), *Enhancing Access to and Sharing of Data*. [126]
- OECD (2019), “ICT Access and Use by Businesses (Edition 2019)”, *OECD Telecommunications and Internet Statistics* (database), <https://doi.org/10.1787/340cf74a-en> (accessed on 30 August 2022). [205]
- OECD (2019), *Measuring the Digital Transformation: A Roadmap for the Future.*, OECD Publishing, Paris. [194]
- OECD (2019), *Measuring the Digital Transformation: A Roadmap for the Future*, OECD Publishing, Paris, <https://doi.org/10.1787/9789264311992-en>. [206]

- OECD (2019), *Regulatory effectiveness in the era of digitalisation*, [103]
<https://www.oecd.org/gov/regulatory-policy/Regulatory-effectiveness-in-the-era-of-digitalisation.pdf>.
- OECD (2018), *OECD Regulatory Policy Outlook 2018*. [157]
- OECD (2018), *Rethinking Antitrust Tools for Multi-Sided Platforms*, [19]
<https://www.oecd.org/daf/competition/Rethinking-antitrust-tools-for-multi-sided-platforms-2018.pdf>.
- OECD (2018), *Taxi, ride-sourcing and ride-sharing services*. [86]
- OECD (2017), *Competition Issues in Aftermarkets*. [156]
- OECD (2017), *Exclusionary Conduct in Multi-Sided Markets*, [16]
[https://one.oecd.org/document/DAF/COMP/WD\(2017\)28/FINAL/en/pdf](https://one.oecd.org/document/DAF/COMP/WD(2017)28/FINAL/en/pdf).
- OECD (2017), *Market definition in multi-sided markets*. [81]
- OECD (2016), *Protecting and promoting competition in response to “disruptive” innovations in legal services*. [45]
- OECD (2015), *Handbook on competition on the digital age*, OECD Publishing Paris. [201]
- OECD (2015), *The future of productivity*, OECD Publishing, Paris. [196]
- OECD (2014), “Cloud Computing: The Concept, Impacts and the Role of Government Policy”, [129]
OECD Digital Economy Papers 240, <http://dx.doi.org/10.1787/5jxzf4lcc7f5-en>.
- OECD (2013), *Guidelines Governing the Protection of Privacy and Transborder Flows of Personal Data*, https://www.oecd.org/sti/ieconomy/oecd_privacy_framework.pdf. [115]
- OECD (2013), *The OECD Privacy Framework*. [8]
- OECD (2007), *Refusals to supply*. [150]
- OECD (2006), *Competition and Regulation in Retail Banking*, [124]
<http://www.oecd.org/daf/competition/sectors/39753683.pdf>.
- OECD (1996), *The Essential Facilities Concept*. [149]
- OECD (2020a), *Competition Trends*. [33]
- Oppegaard et al. (2019), *Uber in the Nordic countries: Challenges and adjustments*. [88]
- Parker, Petropoulos and V. Alstyne (2020), “Digital Platforms and Antitrust”. [20]
- Pelkmans, J. and A. Renda (2014), *Does EU regulation hinder or stimulate innovation?*. [47]
- Pisu, M. et al. (2021), “Spurring growth and closing gaps through digitalisation in a post-COVID world: Policies to LIFT all boats”, *OECD Economic Policy Papers*, No. 30, OECD Publishing, Paris, <https://doi.org/10.1787/b9622a7a-en>. [1]
- Pollman, E. and J. Barry (2017), “Regulatory Entrepreneurship”, *Southern California Law Review*, Vol. 90, <https://ssrn.com/abstract=2741987>. [50]

- Prado, T. (2022), "Safeguarding Competition in Digital Markets: A Comparative Analysis of Emerging Policy and Regulatory Regimes", *SSRN Electronic Journal*, <https://doi.org/10.2139/ssrn.4137588>. [44]
- Rabassa (2019), *Connected objects, voice assistant, digital platform and data: a new way of consuming, an increasing market power for the tech giants?*. [30]
- Ranchordás (2015), "Does Sharing Mean Caring? Regulating Innovation in the Sharing Economy", *Minnesota Journal of Law, Science & Technology*. [63]
- Ranchordás (2013), "The whys and woes of experimental legislation", *Theory and Practice of Legislation*, Vol. 1/3, pp. 415-440. [62]
- Resnick, P. et al. (2000), "Reputation systems", *Communications of the ACM*, Vol. 43/12, <https://dl.acm.org/doi/10.1145/355112.355122>. [99]
- Rubinfeld, D. and M. Gal (2016), "Access Barriers to Big Data", *Arizona Law Review*, Vol. 59. [114]
- Schepp, N. and A. Wambach (2016), "On Big Data and Its Relevance for Market Power Assessment", *Journal of European Competition Law & Practice*, Vol. 7/2, https://watermark.silverchair.com/lpv091.pdf?token=AQECAHi208BE49Ooan9kKhW_Ercy7Dm3ZL_9Cf3qfKAc485ysgAAAqcwggKjBgkqhkiG9w0BBwagggKUMIICkAIBADCCAokGCSqGSib3DQEHATAeBgIghkqBZQMEAS4wEQQM5rQmAV4zEZ7pJh6BAgEQgIICWuGg0oxgmsC0ztCyOjqEObirVWq768-aDMMYAdPurTxa_m-e. [119]
- Seo, J. et al. (2018), "An Analysis of Economic Impact on IoT Industry under GDPR", *Mobile Information Systems*, <https://doi.org/10.1155/2018/6792028>. [135]
- Shelanski (2013), "Information, Innovation, and Competition Policy for the Internet", *University of Pennsylvania Law Review*. [71]
- Sichel, D. (2019), *Productivity Measurement: Racing to Keep Up*, National Bureau of Economic Research, Cambridge, MA, <https://doi.org/10.3386/w25558>. [187]
- Solow (1987), *We'd better watch out*. [171]
- Sorbe, S. et al. (2019), "Digital Dividend: Policies to Harness the Productivity Potential of Digital Technologies", *OECD Economic Policy Papers*, No. 26, OECD Publishing, Paris, <https://doi.org/10.1787/273176bc-en>. [190]
- Stigler Committee (2019), *Stigler Committee on Digital Platforms, Final Report*. [40]
- Sundararajan, A. (2017), *The Collaborative Economy: Socioeconomic, Regulatory, and Policy Issues*. [53]
- Syverson, C. (2017), "Challenges to Mismeasurement Explanations for the US Productivity Slowdown", *Journal of Economic Perspectives*, Vol. 31/2, pp. 165-186, <https://doi.org/10.1257/jep.31.2.165>. [184]
- Syverson, C. (2011), "What Determines Productivity?", *Journal of Economic Literature*, Vol. 49/2, pp. 326-365, <https://doi.org/10.1257/jel.49.2.326>. [174]
- Tadelis, S. (2016), "Reputation and Feedback Systems in Online Platform Markets", *Annual review of economics*, pp. 321-340, <https://doi.org/10.1146/annurev-economics-080315-015325>. [59]

- Thelen (2018), "Regulating Uber: The Politics of the Platform Economy in Europe and the United States", *Perspectives on Politics*, Vol. 16/4. [87]
- Thelen, K. (2007), "Regulating Uber: The Politics of the Platform Economy in Europe and the United States", *Perspectives on Politics*, Vol. 16/4, <https://pdfs.semanticscholar.org/fd73/38c05fc4505aee44e3b5c7a02c68cb40a3bb.pdf>. [98]
- Thierer (2016), "Innovation Arbitrage, Technological Civil Disobedience & Spontaneous Deregulation", *Technology Liberation Front*, <https://medium.com/tech-liberation/innovation-arbitrage-technological-civil-disobedience-spontaneous-deregulation-eb90da50f1e2>. [48]
- Thierer, A. (2016), *Permissionless innovation and public policy: A 10-point blueprint*. [51]
- Tobin Centre (2021), "International Coherence in Digital Platform: An Economic Perspective on the US", *Policy Discussion Paper* No. 5. [203]
- Tucker, C. and A. Lambrecht (2017), "Can Big Data Protect a Firm from Competition?", *Competition Policy International*. [110]
- Tucker, D. and H. Wellford (2014), "Big Mistakes Regarding Big Data", *The Antitrust Source*. [111]
- U.S. House Judiciary Committee (2020), *Investigation of Competition in Digital Markets*, https://judiciary.house.gov/uploadedfiles/competition_in_digital_markets.pdf?utm_campaign=4493-519. [41]
- Varian, H. (2017), "Use and Abuse of Network Effects". [113]
- Wallach, W. (2015), *A Dangerous Master: How to Keep Technology from Slipping beyond Our Control*. [46]
- You, L. and R. Sikora (2014), "Performance of online reputation mechanisms under the influence of different types of biases", *Information Systems and e-Business Management*, Vol. 12/3, pp. 417-442, <https://doi.org/10.1007/s10257-013-0229-9>. [58]