Competition and the Industrial Challenge for the Digital Age

Jean Tirole

Competition and the Industrial Challenge for the Digital Age[1]

Jean Tirole[2]

September 2, 2022
Prepared for *Annual Review of Economics*

Abstract: Tech giants' dominance does not confront us with an unpalatable choice between laissez-faire and populist interventions. The paper takes stock of available knowledge, considers desirable adaptations of regulation in the digital age, and draws some conclusions for policy reform.

Keywords: regulation, divestiture, antitrust, industrial policy, contestability, mergers, data.

JEL codes : D42, L1, L4, L5, L9.

[1] I am grateful for extremely helpful comments to Michele Bisceglia, Erik Brynjolfsson, Judith Chevalier, Diane Coyle, Jacques Crémer, Andrei Hagiu, Massimo Motta, Patrick Rey, Paul Seabright, Alex White, Vanessa Zhang, and especially Fiona Scott-Morton and John van Reneen. This project received funding from the European Research Council (ERC) under the European Union's Horizon 2020 research and innovation programme (grant agreement no. 669217 - ERC MARKLIM). The author is honorary chair of the Toulouse School of Economics, whose Digital Center receives financial support from sponsors.

The paper was initially written as a background piece for the IFS Deaton Review on "*Inequalities in the Twenty-First Century*", of which panel the author is a member. The evidence on increasing markups and their causes is reviewed for the Deaton Review by Jan de Loecker, Tim Obermeier, and John van Reenen. The dominance of tech giants is widely regarded as one of (a number of) drivers of the increase in top-income inequality, a topic that will not be covered in this paper (for empirical evidence that correlations between measures of innovation and top income inequality at least partly reflect a causality from innovation to top income shares, see Aghion et al 2019).

[2] Toulouse School of Economics (TSE) and Institute for Advanced Study in Toulouse (IAST).

1. Introduction

The initial enthusiasm for the ongoing technological revolution has recently given way to a global "techlash". Many academics[3] and policymakers call for taming the large tech platforms, regulating them as public utilities, breaking them up, using a tougher antitrust enforcement, or engaging in industrial-policy programs in big data and AI. This paper investigates the merits of the various arguments[4].

Economists' standard view on what has been happening is that numerous industries are now subject to substantial economies of scale or scope, a winner-take-all scenario, and widespread market power. Incumbents enjoy direct network externalities (our concurrent joining of Facebook or Twitter allows us to interact through these platforms) or indirect ones similar to those associated with urban amenities (I benefit from your using a search engine, a GPS navigation app such as Waze, or a delivery service because that improves their quality). Competition in the market may also be limited by the existence of large fixed costs. For example, designing a first-rate algorithm, web-crawling and indexing (all of which are necessary for a search engine to be effective, especially if it aims at satisfactorily responding to uncommon queries) is onerous; accordingly, there are really only two players in the English-language segment: Google and Bing[5], with Google overly dominant.

Limited competition stemming from network externalities and fixed costs generates large markups for winners and a concomitant willingness to lose money for a long time to buy some prospect of a future monopoly position. Firms accordingly need deep pockets, as is observed directly (Amazon lost money for a long stretch of time and Uber engaged in expensive recruiting of drivers through bonuses) and suggested indirectly (firms that have never turned any profit reach phenomenal market caps).

Monopolies always raise concerns about high prices, low innovation, and - if the monopoly position may be challenged- possible abuses of dominant position against potential rivals. Tech giants are no exception.

The possibility of consumer harm through high prices is sometimes questioned by platforms on the ground that many services are available for free to consumers. This argument however ignores levies on the other side of the market. Advertisers pay hefty fees for advertising on the platforms; these fees raise their cost of doing business, with potential indirect harm to

[3] See for instance books by Thomas Philippon (2019) or Eric Posner and Glen Weyl (2018), admittedly with a scope much broader than just tech, and the reports cited in footnote 4.

[4] There have been several excellent academically oriented recent reports on the evolution of regulation of the digital economy. Particularly prominent ones include the European Commission's report (Cremer et al 2019) for Europe, the Furman report (Coyle et al 2019) and the subsequent CMA interim report for the UK, and the Stigler report (Scott Morton et al 2019) for the US. These reports, despite some differences, exhibit a fair amount of convergence. For French language readers, I recommend Combes et al (2019).

[5] Other players may use either under a syndication arrangement. See CMA (2019, pp 75-77) for more details.

consumers. Similarly, the fees paid by the merchants, so their goods and services be listed and recommended by the platforms, increase consumer prices. The "no-consumer-harm" argument also ignores the theoretical possibility that a zero price may still be too high, as data are extremely valuable to platforms for purposes unrelated to the activity that generated the data collection in the first place (that is, the flow of payments could alternatively be toward consumers: See Section 3 for a discussion).

Yet high profits might be the cost to pay for the very existence of the very valuable services. The consumer must in some way pay for the industry's investment costs. So, a better posed question is "Are platform profits in line with investment costs, or do platforms enjoy "supranormal profits" or "ex-ante rents"?"

Whether the high profits made by Google, Facebook and other dominant platforms really constitute supranormal profits is debated; identifying supranormal returns requires data not only on profits currently made by a dominant firm, but also on the losses it incurred during the shakeout period leading to monopolization, and on the probability of emerging as the winner of the contest; needless to say, we have little data on the latter two variables.

Excessive prices are not the only issue with monopolies. As was recognized long ago, a monopoly's management enjoys an "easy life" and may not keep its costs under control, as it is not spurred by competition. Monopolies also may fail to innovate, as they are loath to cannibalize their own products. They may even fail to adopt minor innovations. A case in point is provided by the taxi monopolies across the world. The very useful "innovations" introduced by ride-hailing companies such as Uber, Didi, or Lyft (geolocation, traceability, preregistered credit card, electronic receipt, mutual rating…) were neither new nor rocket science. Yet, they had not been taken on board by traditional taxi monopolies, resulting in suboptimal service. Interestingly, in some cities the very same taxi monopolists reacted to Uber's entry with introducing apps, accepting credit cards or offering a fixed price from the airport to the city center. The virtues of competition in action…

Note, finally, that even if there were no supranormal profits, this would not mean that there is no scope for policy intervention. Firms might be playing dirty tricks in the marketplace, spend money on killer acquisitions or hire battalions of lobbyists and lawyers to acquire or preserve their dominant position. Contestability does not rule out social waste.

This paper considers desirable adaptations of regulation to the digital age. It is organized as follows: Section 2 analyses the merits of alternative institutions and policies to regulate the tech sector. Section 3 discusses data-related issues. Section 4 comments on the resurgence of industrial policy and on trade-related issues. Finally, Section 5 focuses on institutional innovation and Section 6 concludes[6].

[6] The techlash admittedly has broader origins than the focus of these notes; citizens are also concerned about the future of work in the AI and robotics era, about tax optimization by global platforms, about threats to their privacy or about the political power of large platforms. Conversely, some of the issues considered in these notes are broader. Let me mention some other omissions and limitations:

2. Market power and regulation in the digital age

2.1 Motivation

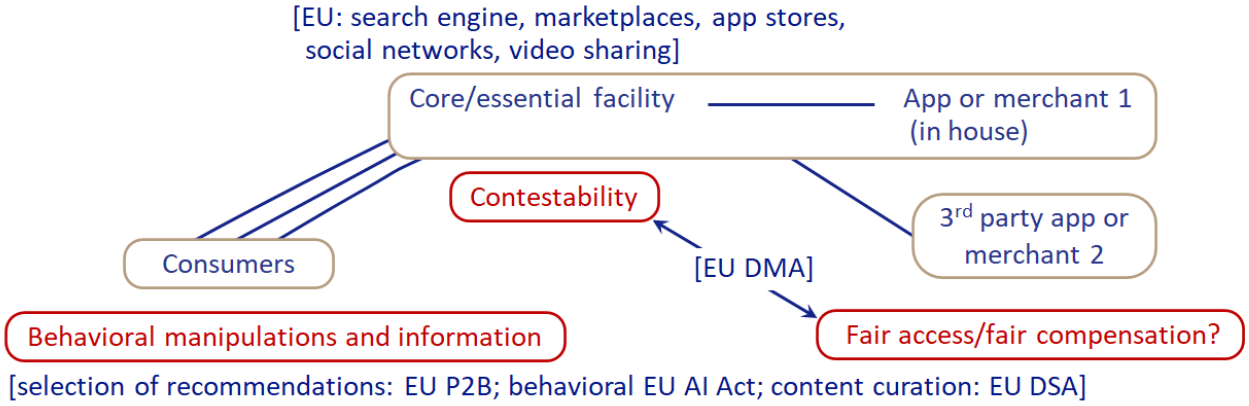

Figure 1: scope of policy intervention in two-sided platforms

To discuss policy proposals, it is useful to use the simplified description of the platform model in Figure 1, and relate it to the proposals made in the EU Digital Market Act (DMA), a proposed EU regulation by the European Commission that was adopted in July 2022 by the EU Council[7].

This figure depicts a platform that controls the merchants', apps' and advertisers' access to a fraction of consumers; implicitly, the latter do not "multihome", i.e. work with multiple platforms (at least in their usage, they may multihome in membership), and so they are "unique customers" of the platform.

For some of the concerns expressed in this paper, the platform may not be dominant in the standard sense; for instance it might be serving say 20% of the customers, on whose access it has acquired a monopoly. Nonetheless, most of the antitrust concerns relate to dominant platforms such as Google search or Amazon marketplace.

- The treatment will be Western-economies centric. It should nonetheless be borne in mind that nine out of the top twenty tech companies are Chinese. While China has different institutions (a strong industrial policy, ownership through Variable Interest Entities, political connections of State Owned Enterprises which may avail themselves of ministerial intervention when facing an investigation or benefit from a soft budget constraint) and therefore would require a treatment of its own right, it should nonetheless be noted that many of the concerns highlighted below (such as exclusivity requirements, own-brand favoritism, data as a barrier to entry, preemptive mergers) are also pregnant in China.
- I omit the issue of privacy, and content myself with noting its occasional tensions with competition policy.
- I also ignore the issue of the political influence of platforms (not just in the form of conscious or unknown sharing of data with political organizations eager to better target their propaganda); some platforms such as Google and Facebook are large media groups, and politicians may be concerned by a potential change in the coverage they would receive if they pushed for more regulation. This concern is particularly strong when the platform has "unique viewers" (so it can shape opinions more easily).

[7] The American Innovation and Choice Act (passed in the House Judiciary Committee on January 20, 2022) largely emulates the DMA.

The "core segment" that stands in between consumers and business users (merchants, apps, advertisers) may for example be a search engine, a digital marketplace, an app store, a social network or a video-sharing platform according to the DMA. Entry in this core segment often faces important barriers; in this respect, the notion of core segment is closely related to those of "essential facility", "natural monopoly" or "bottleneck", which are familiar from traditional antitrust theory and practice. We, perhaps a bit loosely, will employ these terms interchangeably with "platform" or "gatekeeping platform". The merchants, apps or advertising segments are usually called "potentially competitive segments" or "non-natural-monopoly segments".

As indicated in Figure 1, the DMA focuses on two concerns:

- *Contestability*: can a more efficient entrant enter the core market?
- *Fairness*: do users (consumers, business) receive a fair share of their contribution to the ecosystem? Do they have equal access to core services?

while various other pieces of EU law (the EU Regulation on platform-to-business relations- P2B-, the Artificial Intelligence Act, the Digital Services Act) focus instead on (non-market-power related) user protection such as transparency, content curation or the exploitation of our behavioral weaknesses.

2.1.1 Contestability

The DMA lists a number of practices that may prevent a rival platform from competing with the incumbent one. The first concern is the so-called "applications barriers to entry": if the incumbent platform bundles some apps with its core service, competing apps may exit (or not enter) and so a new platform may be deprived of independent apps. Accordingly, the DMA prohibits tying between core services and other services.

Next, the DMA aims at facilitating multihoming by banning exclusivity requirements by the dominant platform. To understand why, consider the following (fictitious) Uber/Lyft example. Uber and Lyft are two ride-hailing platforms, with Uber currently the most successful one. Both sides of the markets (passengers, drivers) can multihome on both platforms and many platform users do. Suppose that Uber were to demand exclusivity from the drivers, requiring that they do not offer their services on Lyft if they are on the Uber platform. Then drivers would most likely select Uber as it has a larger installed base of passengers and therefore offers more access to rides/passengers; previously multihoming passengers in turn would desert Lyft and singlehome on Uber. Industry concentration would result from the exclusivity requirement.

A variant of the no-exclusivity requirement is the DMA request that business users must be able to indicate other channels of interaction to their users, a phenomenon called "disintermediation". The DMA also wants to encourage multihoming by banning "Most Favored Nation" (or "Price Parity") clauses, which, as we will later see, incentivize singlehoming.

The DMA likewise wants to facilitate consumer switching between platforms. In the case of social networks, this in general requires (static and dynamic) data portability. Consumers do not want

to have to post the same content, update their contact lists, etc. multiple times. But absent portability, they have to do so if they want to try another social network or to multihome on multiple social networks. Such smooth switching is facilitated by interoperability[8].

Finally, the DMA controversially wants to prevent dominant platforms from combining data from different services or obtained from 3rd parties. This demand is motivated by the fact that large platforms like Google or Facebook have much more data than the rival platforms, making the platform market hard to contest. On the other hand, data silos imply a loss in the quality of service.

2.1.2 Fairness

Platforms compete in various degrees in the markets they operate, as illustrated in Figure 2. While Airbnb and Booking are pure players (they do not own apartments and hotels, which they might be tempted to recommend first), many platforms are hybrid. Hybrid platforms (or pure player platforms which enter sweet deals with specific business users) raise the issue of the level-playing field in potentially competitive segments.

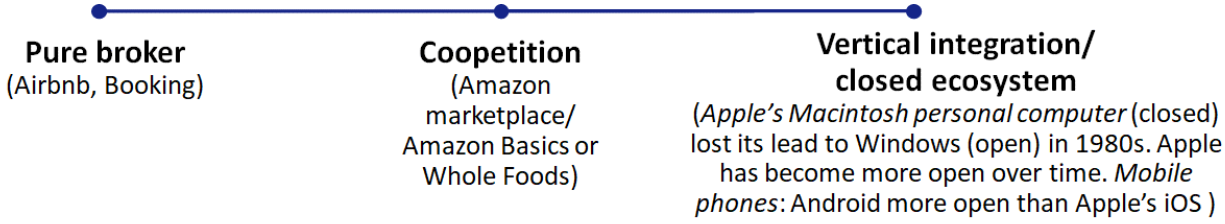

Figure 2: Pure, hybrid and vertically-integrated platforms

(a) The DMA view on fairness

The DMA's list of violations of fairness includes (a) self-preferencing; (b) the use of non-public data obtained from 3rd- party business users to offer platform's own products; (c) restrictions on uninstalling preinstalled software applications; (d) bundling (conditioning access or preferred status on the purchase of other products).

The DMA's approach is three-pronged. First, the regulator will designate gatekeeping platforms on the basis of 9 specified core platform services, as well as some mechanical market share measures[9]. The regulator will impose a number of obligations on these platforms. Designated platforms can appeal.

[8] It is not clear how interoperability will be governed. Who will design the Application Programming Interfaces? The dominant platform? A standard-setting organization? The regulator?

[9] For example, 45 million users (merely registered or actually active? If the latter, how does one define "active"?) and 10,000 business users. One issue of course is that, as we later note, the gatekeeper need not be large to raise a subset of the concerns; it suffices that it controls access to unique customers.

The DMA defines 21 obligations (8 of which are self-enforcing, the rest may be further specified by the European regulator). There is a heavy emphasis on self-execution: The platform must harness users and trusted flaggers to act as whistleblowers, and further employ algorithms to monitor its compliance with the law. The platform must further self-report to the regulator on its effort to abide by the law.

The enforcement will be performed by the EU regulator, with a private enforcement in national courts, which raises the issue of uncoordinated indirect regulation by the Member States[10]. Penalties can be large (up to 10% of worldwide turnover).

(b) Grounds for concern

Should we be worried about unfair access conditions? According to the Chicago School of antitrust, a rich ecosystem allows a platform to raise the price of its core service; and so a platform would be shooting itself in the foot if it foreclosed access to a superior application, thereby making its ecosystem less attractive. The argument is well-taken, but there are several reasons why it often does not apply.

The first reason why the rich-ecosystem argument may not hold has already been mentioned: The incumbent platform may want to erect barriers to entry in the core market. Put differently, the platform would not benefit from foreclosing a rival app, absent any threat of entry in its core segment. But such foreclosure may deter entry into the core segment if it induces a shortage of independent apps.

The second reason is that the platform may not want to raise the price of its core service. Indeed, a free access to the core service (search engine, marketplace, etc.) is commonplace in the digital economy. The free-of-charge property suggests that the platform would like to subsidize (charge a negative price), rather than charge for, the core service, but cannot do so because of arbitrage: Bots for instance can mimic real users to benefit from the negative price. The optimality of the negative price comes from a negative opportunity cost: a user's activity generates advertising, merchant fees, data that are highly valuable for the platform. But arbitraging "fake users" generate no such benefits.

A third reason why the rich-ecosystem argument may fail is linked to another non-negative price constraint, this time in the app markets. The rivals' inability to compete with negative prices implies supranormal profits for the winner apps[11]. The latter enjoy not only the fruits of their competitive advantage, but they also reap the benefits of customer relationships (again advertising, commissions, and data). The rival apps cannot compete the latter away through low prices as these are constrained to be non-negative. The platform accordingly may want to engage in price and non-price foreclosure[12].

[10] The European Commission can put in a brief, though.

[11] See Bisceglia-Tirole (2022) for an investigation of the impact of these two non-negative-price constraints.

[12] Price foreclosure refers to high access charges that squeeze the margin of the rival apps. Non-price foreclosure refers to a variety of practices that may handicap the rival offerings: degradation of interoperability, delisting or

2.1.3 What's not in the DMA?

Platforms raise a number of regulatory issues that are not covered under the contestability and fairness tropisms of the DMA. Since this paper is about market power, we only briefly mention the associated issues.

A set of issues broadly unrelated to market power relates to content. A second European piece of legislation, the Digital Services Act (DSA), defines the curating duties of platforms. Here again the focus is on large platforms, but even more than for the market power issues addressed by the DMA, it is not clear that large platforms should be the unique focus[13].

Regulators are worried about platform dissemination of illegal content (such as child pornography or the disclosure of plans of a nuclear plant), of hate speech or incitement to terrorism, of fake news[14], of conspiracy theories, of slander, and of petitions by false scientists. The platform may not only have suboptimal incentives to eliminate these, but they may even gain from keeping consumers as long as possible on platform, and therefore may benefit from sensational content.

There is also a concern about platforms' (a) peddling, likely involuntarily, defective products (Amazon bears no responsibility on the products sold on its platform), (b) exploiting our cognitive weaknesses (through confusing choices, a false sense of urgency, or the promotion of digital addiction), and (c) recommending products that do not serve the consumer's interests, simply because they bring higher merchant fees (for 3rd party products) or higher markups (for in-house ones).

Current regulation is mostly self-regulation. Platforms issue guidelines against hate speech, harassment, sexual content, misinformation, slurs about disability, etc. In 1996, Section 230 of the US Communications Decency Act foresaw no liability for defective products, illegal content, defective goods, or fake news. The purpose at the time was to jumpstart the consumer Internet revolution, but it is widely recognized today that the system is somewhat broken along these dimensions.

Despite this verdict there will be a debate regarding sanctions and enforcement. For one thing, platforms, unlike courts, do not levy fines. They can delete posts, temporarily freeze accounts, suspend users, or add a tag ("disputed"). Such sanctions may not be powerful enough. Jiménez Duran (2022) shows that content moderation may not moderate users on Twitter. Finally, there is the issue of the legitimacy of platforms in defining what content should be curated and how, although people recognize that they likely are the most cost-effective actors to implement the curation.

---

listing in a very unfavorable position, etc; such non-price foreclosure is more likely when the core service makes little money when providing access to 3rd party suppliers.

[13] Indeed, it could be argued that large platforms have more reputational capital to lose if consumers are hurt. And the possibility of eyeballs (who cannot be presumed to always search for accurate news) and producers of dubious content migrating toward smaller platforms suggest a comprehensive focus anyway.

[14] "Masks are useless, vaccines are dangerous, the earth is flat, climate change is not related to human activity, etc".

2.2 Merits of the various approaches

(a) Does old-style regulation apply to tech companies?

Shortly after the enactment of Sections 1 and 2 of the Sherman Act in the US in 1890, which created modern antitrust enforcement, the US also laid the groundwork for the regulation of public utilities (private companies in a monopoly position serving network industries such as telecoms, electricity or railroads). Regulatory agencies were set up to collect cost and revenue information about these natural monopolies and to guarantee a fair rate of return on their realized investment cost (technically, their "rate base").

The regulatory apparatus was completed, already in the early 20th century, by a judicial review of the regulatory process and decisions; the review was meant to protect private investors in those utilities from an expropriation of their investment through low regulated prices, or conversely to protect consumers from regulatory capture, abusive tariffs and, later on, from a lack of competition in non-natural-monopoly segments.[15].

In the late 20th century emerged a growing discontent about the poor quality and high cost of public services run by (public or private) incumbent monopolies regulated by the government. Cost-of-service regulation often gave way to "incentive regulation" (price caps, fixed price contracts, and more generally performance-based-regulation), which attempts to make firms more accountable for their performance and thereby gives them incentives for cost reduction[16].

Despite this substantial improvement, there is still a sense in which profits are kept roughly in line with costs, for several related reasons[17]. The first is that profits that are completely disconnected from costs are not "time-consistent": The public uproar triggered by "abnormal profits" makes it difficult for regulators to abide by their initial incentive scheme; and this is particularly the case if regulators are not in a position to resist politicians' demands[18]. Second, very powerful incentives

[15] Indeed, the AT&T 1984 divestiture, which aimed at facilitating competition in potentially-competitive services such as long-distance and international calls, was initiated by the US Department of Justice rather than by the regulatory authority, the FCC, and the application of the consent decree between AT&T and the FCC was supervised by Judge Harold Greene.

[16] In fact, there was a much broader reform, of which the introduction of mechanisms for sharing efficiency gains between customers (or taxpayers) and the operator was the first leg. The other reforms were

1. the privatization of operators in Europe;
2. the possibility for natural monopolies to rebalance their tariffs (raising prices on market segments with inelastic demand to cover network's fixed costs, lowering prices on elastic-demand segments);
3. the opening to competition of activities that do not have natural monopoly characteristics (by granting licenses to new entrants and regulating the conditions of their access to the incumbent operator's essential infrastructures);
4. the independence of regulatory authorities.

[17] Developed in Laffont- Tirole (1993).

[18] Interestingly, high prices seem to be politically better tolerated if a) the industry is not run by a regulated monopolist, and relatedly b) if people believe that the firms "deserve" their rewards. In the pharmaceutical industry, high prices, while always unpopular, seem to be less contentious for new drugs than for off-patent ones, which seems consistent with this conjecture. But we know little about the formation of public opinion's beliefs in the matter.

tend to leave very high rents when the firm has key cost or demand information that is not available to the regulator. Third, the high profit stakes that exist under incentive regulation create serious concerns about regulatory capture.

Today's tech companies exhibit natural-monopoly characteristics much like those of the network industries of the 20th century: network effects, high fixed costs and low (or even negative) marginal costs. Hence the occasional suggestion to apply public utility regulation to the tech sector. Yet, cost-of-service and incentive regulations are hard to apply to the tech sector for two reasons. First, firms are not followed by the regulator over their lifecycle, making it difficult to measure their "investment cost" (the analog of the rate base for public utilities) and therefore to grant them a "reasonable rate of return", which incidentally would require also to factor in an (unobserved) probability of success[19].

Second, and another novelty relative to traditional network industries[20], tech giants are global firms, operating with inputs that are shared across countries (intellectual property, data, servers, supply chain, logistics). The absence of a supranational regulator raises the question of who would oversee the granting of a proper rate of return and the allocation of contributions to this rate of return across jurisdictions; one does not know how to coordinate regulators and to prevent transfer pricing optimization[21].

(b) Structural policies and breakups

An alternative approach to full-scale regulation consists in insulating a "natural monopoly" (or bottleneck" or "essential facility") segment, as became popular in the late 20th century. This segment remains regulated and is constrained to provide a fair and non-discriminatory access to competitors in segments that do not exhibit natural-monopoly characteristics and therefore can sustain competition. This was the rationale for the 1984 AT&T divestiture: The "Baby Bells" were put in charge of the local loops, which at the time were perceived as being hard to duplicate, while competition was enabled for long-distance and international calls. Similarly, in power markets, the high-voltage grid is a natural monopoly, while competition in generation developed in many countries. In the rail industry, the tracks and stations are obvious essential facilities, while operating companies can compete for passengers and freight.

The breakup paradigm is intellectually appealing. The devil is in the detail, though.

In the tech industry, the first challenge is to identify a stable essential facility. It must be stable because divestitures take a while to perform, and the cost of implementing them would not be worth its while if the location of the essential facility kept migrating. This condition may not be met, though. While the technology and market segments of electricity, railroads and (up to the

[19] The same issue arises for innovative drugs.

[20] Developing countries offer exceptions to this rule, as public utilities there may be subsidiaries of foreign suppliers.

[21] As is familiar from tax optimization, accounting tricks are bound to exploit differences in regulatory treatments across jurisdictions.

1980s) telecoms had not changed much since the early 20th century, digital markets are fast-moving. Rapidly morphing technologies and demands make it difficult for regulators to identify, collect data on, and regulate essential facilities.

The second challenge is that one wants to break up the incumbent without destroying the benefits of network externalities. For example, breaking a social network into two or three social networks may not raise consumer welfare. Either consumers will be split into separate communities, preventing them from reaping the benefits of network externalities; or, separated from their friends, they will re-join on one of the broken-up sites, re-creating the monopoly. Relatedly, if the essential facility is data, as data are much more powerful when different data sets obtained as a byproduct from multiple activities are combined, a breakup might deteriorate performance.

Finally, dominant firms may strategically intertwine different services to make it difficult for authorities to "unscramble the eggs"[22]; in this respect, it may well be easier to prevent a merger than to undo it (we will return to this later).

These obstacles need not be daunting, but the bottom line is that only a detailed plan, with a clear description of the associated costs and a comparison with alternative ways of reducing market power, will do.

(c) Competition policy

Absent clear plans for regulation or breakups, competition policy (which deals with abuses of dominant position and cartelization, including through its merger review process) and consumer protection (including data privacy) may remain the main games in town, although perhaps not in their current form (as we discuss next when we cover light-touch regulation). That however does not mean that competition policy is costless either. For one thing, it is slow. A fine on an incumbent for anticompetitive behavior may serve as a deterrent for future such behavior, but it does not really help the entrant that went belly up in between.

Competition policy is mostly backward looking[23]; as such, it may expose incumbents to legal uncertainty, unless the issue has arisen sufficiently often that a clear doctrine has emerged. Put differently, dominant firms may not be able to avail themselves of clear guidelines on what they can and cannot do. While competition policy will always embody a retrospective component, this raises the question of a more prospective approach based on a code of competitive conduct, indeed one that is adapted to the speed of digital markets. Competition policy in the digital age must achieve speedy and offer decisive resolution, and it must be agile to react to new environments and benefit from learning-by-doing. We will return to these points in Section 5.

[22] For example, Mark Zuckerberg, Facebook's chief executive, announced in January 2019 that he planned to integrate the social networks' messaging services - WhatsApp, Instagram and Facebook Messenger-, unifying their technical infrastructure.

[23] An exception is merger policy, which is a reason to give it a bigger role in preventing further concentration.

(d) Competition policy crossed with regulation, or "light-touch regulation"

Several reports call for the creation of a specialized regulatory agency, a "Digital Markets Unit" (Furman report for the UK) or a "Digital Authority" (Stigler report for the US). This specialized authority will focus on the digital economy and oversee only the large incumbents; according to the Furman report, perhaps a dozen of companies would be given "strategic market status (SMS)" and thereby be designated as falling under its authority. The agency will be a mix between a competition authority and a regulator.

Like classic antitrust, the Digital Markets Unit will shun the exercise of setting a rate base and determining a fair rate of return; as we discussed, this form of regulation is almost infeasible in a free-entry world and with global firms. It will also refrain from setting final prices, even in the flexible form of a price cap; it may however monitor wholesale tariffs so as to create a fair digital ecosystem.

From the regulatory paradigm, it will borrow its "sectoral"[24] focus. It accordingly will have to adopt an approach that is more forward-looking than that of current competition authorities, in several ways. And, like a regulator, it will collect data about dominant firms and build up industry-specific knowledge on how the sector works. Large firms will have to pre-notify their acquisitions. In addition, the Digital Markets Unit will define a code of conduct[25]; in this setting of rules for digital platforms, it will be similar in spirit to the EU Regulation on platform-to-business relations ("P2B regulation", which entered into force in July 2019). The P2B regulation instituted a transparency requirement meant to limit platforms' self-preferencing in favor of their private label brands, and to thereby promote competition among merchants.

Enunciating a code of conduct and collecting industry information however will not be effective unless the Digital Markets Unit is endowed with enforcement power. The CMA[26] interim report suggests a few directions for such a reform: The authority would have the "ability to suspend decisions of SMS firms pending the result of an investigation, including the imposition of interim measures, to block decisions of SMS firms at the end of an investigation, and to appoint a monitoring trustee to monitor and oversee compliance by an SMS firm."[27]

Light-touch regulation is appealing, but it also has its limits. First, it does not cover abuses in which smaller firms are equally involved (like the Most-Favored-Nation clauses that we will later review); these presumably will still be handled by the competition authority.

---

[24] By "sectoral", I mean that large firms outside the digital sector will remain under the current regime. Of course, firms like Google or Amazon operate in many industries (health, mobility, telecommunications, retail & e-commerce, advertising, search…). Conversely, firms in most industries have developed a digital strategy.

[25] Adherence to the code of conduct will not be voluntary, though. Rather, it will resemble a law written up by the regulator, and like a law, will be stated in broad terms (such as "Non-pro-competitive self-preferencing is prohibited") rather in detailed, specific ones.

[26] Competition and Market Authority, the antitrust enforcer in the UK.

[27] This approach is consistent with US antitrust tradition, which puts relatively more emphasis on remedies than on fines, relative to the European Union.

Second, it will have to avoid regulatory capture, which is one of the reasons why multi-industry regulators and competition authorities were created in the past. This raises the issue of where the new agency should be located. It could be part of the Competition Authority, part of another agency such as the telecom regulator[28], or a stand-alone entity. Making it part of the Competition Authority would reduce a bit the risk of capture and would also avoid the lengthy debates about which companies are really digital, which might arise if the unit is located within a sectoral regulator. One thing is clear, though: Turf wars must be avoided.

2.3 The importance of preserving contestability

An alternative to competition in the market is competition for the market, namely "dynamic competition". Because network externalities and/or fixed costs imply that a monopoly is more efficient than multiple non-interoperable firms, a substitute to creating multiple competitors might be to keep incumbents on their toes through the threat of entry and to rely on their eagerness to keep their monopoly rents. This is indeed the line taken in the public discourse by some of the tech giants.

There is a grain a truth in the argument. Theoretically, monopolies may serve the consumer interest as long as (a) incumbents compete in prices and innovation (which benefit consumers) and not through dirty tricks (which do not), and (b) innovative firms (firms that improve the attractiveness of the ecosystem) enter the market. The market is then said to be "contestable". If so, *potential* competition keeps incumbents on their toes: The latter innovate to avoid being replaced, and they charge low prices so as to take advantage of network externalities and thereby deter entry[29]. The important caveat is that, for "competition for the market" to operate, efficient rivals must (a) be able to enter and (b) enter when able to. They may not[30].

(a) Preserve multihoming/ limiting exclusivity requirements

Suppose, first, that the entrant challenges the incumbent directly in its core, monopolized market. The challenge for the entrant in this frontal attack is to overcome its scale handicap. As we have discussed, interoperability and multihoming are conducive to entry in the core market.

User multihoming is also key to reducing "applications barriers to entry" in the platform business. The incumbent may make its life miserable by demanding exclusivity from third-party providers or apps. We earlier mentioned the fictitious example of ride-hailing platforms. Similarly, most

[28] The Stigler report (2019, pp 18) suggests locating the agency within the Federal Trade Commission: "*we envision—at least initially—to have the Digital Authority as a subdivision of the FTC, an across-industry authority with a better-than-average record of avoiding capture. Most importantly, the Digital Authority will have to be very transparent in all its activities.*"

[29] See Fudenberg-Tirole (2000).

[30] What follows focuses on the incumbent's conduct. Switching costs and behavioral biases favoring known brands may also protect the incumbents and must be addressed through specific instruments.

large apps' multihoming in the mobile operating system market[31] is essential for keeping more than one platform alive.

(b) Prevent "defensive acquisitions" and "entry for buyout"

We noted earlier that, for contestability to operate, it does not suffice that efficient entrants be able to enter. It must also be the case that they do enter. If instead they sell out to the incumbent, little value is created for the consumer. Rather, the entrant makes money out of the threat to compete with the incumbent and "ransoms" the latter. Overall, development costs make the entry-for-buyout a socially negative-sum game. There is a second social cost: Innovation is incentivized away from new functionalities and toward me-too innovations.

Concerns about a potential suppression of competition for instance surfaced when Facebook purchased Instagram and WhatsApp, two social networks. There is also evidence that the new product itself, and not only its competing with the incumbent product, may be suppressed in "killer acquisitions". Some empirical work following pharma projects pre-and post-acquisition finds evidence of such killer acquisitions[32].

Incumbents react to such claims in several ways. First, they rightly point out that fully conclusive evidence that a merger is anti-competitive is difficult to obtain: It is hard to prove that the acquired companies *will* compete with the incumbent in the but-for world without the merger. Indeed, it is a feature of early acquisitions that empirical evidence is lacking: The competition, if any, has not yet taken place at the time of the merger. Relatedly, the trajectory of the entrants' projects is often unpredictable.

Second, incumbents note that there are many more acquisitions than IPOs. They argue that restraints on acquisitions would impose costs. First, by limiting the set of potential buyers. To understand why, recall that there are two exit mechanisms for start-ups and their venture backers: IPOs and a sale to an existing company; the incumbents' claim is therefore that a prohibition of early acquisitions by dominant firms would restrict VCs' and startuppers' exit possibilities. However, if Instagram and WhatsApp had been prohibited from selling out to Facebook, many other acquirers, including tech giants without a strong social network could have acquired them; so, the exit-channel argument does not seem that strong.

Third, another efficiency defense is also sometimes brought forth: The incumbent firm is really acquiring talent when purchasing the start-up ("acqui-hiring"). True enough, but again this talent could be equally purchased by other tech companies searching for talent, but not owning directly competing products.

Why are such early mergers not challenged? The answer is two-fold. First, most mergers are below the radar of competition authorities, as most jurisdictions have turnover thresholds over

[31] Bresnahan et al (2015) show that the most popular apps end up on mobile platforms iOS (Apple) and Android, preventing tipping in favor of one of them.
[32] Cunningham et al (2021).

which the merger should be notified and the competition authority can review them. Obliging large tech companies to notify acquisitions[33] would be a first step. The second issue can be found in the current burden of proof, which under judicial review largely lies with the competition authority[34]. This burden of proof provides incumbents with a strong incentive to perform pre-emptive acquisitions, as no empirical evidence can be brought against such mergers. This would suggest shifting the burden of proof to the dominant firm if the merger occurs early in the acquired entity's life. The platform would be asked to explain (e.g. provide tech trends and technological evidence) why the merger is procompetitive. This alternative approach is appealing, if only because it is not easy to find an alternative modus operandi.

Of course, acquisitions by incumbents need not be anti-competitive, i.e. suppress competition or kill the product outright[35]. But it makes sense to force large incumbents to notify their acquisitions and to assign the burden of proof upon them when there is a suspicion that the acquired entity might become a competitor in the absence of merger.

Finally, following the astronomical sums paid by Facebook for WhatsApp and Instagram, many have wondered whether one could not use the acquisition prices as signals that the merger is anti-competitive. The starting point for this argument is well taken: Because competition destroys profit, an incumbent is willing to pay more for suppressing it than a third-party investor is willing to pay for an entrant that will compete with the incumbent.

There are serious obstacles concerning the use by competition authorities of acquisition prices as screening devices, though. First, a high absolute acquisition price may be due to a high level of innovation; this would suggest looking instead at the relative price that the incumbent and third-party acquirers are willing to pay for the entrant. Second, to assess this relative price, there must exist observable bids, while acquisitions may be the object of opaque negotiations. Third, even if the incumbent and the entrant are on a trajectory to be substitutes[36] and there are observable bids, the differential between the bids of the incumbent and of third-party investors may be small for multiple reasons, even though the difference in willingnesses to pay is large. In an ascending

[33] As is mandated by the EU Digital Market Act for instance.

[34] This discussion oversimplifies reality. Competition practitioners distinguish between burden of proof and standard of proof. Typically, in antitrust, the plaintiff or the authority must show that the conduct or the merger have an anticompetitive effect. Only if they succeed, does the burden of proof shift to the defendant or merging parties to demonstrate procompetitive effects of the behavior or merger (efficiency defense). In that sense the current burden of proof favors the defendant (the merging parties).
The standard of proof is more about what constitutes convincing evidence or reasonable likelihood. Of course, the effects of the allocation of burden of proof hinge strongly on the associated standard of proof.

[35] Suppose for example that the new product is equally attractive as the incumbent's product, but along different dimensions. Its development will be hard to fund through the financial market, as the absence of global comparative advantage will have the entrant compete head-to-head with the incumbent. By contrast, the incumbent may be interested in acquiring the product and combine the entrant's superior functionality into its own, delivering a better overall product which raises both profit and consumer welfare. See Motta-Peitz (2020) for other reasons why an acquisition by a powerful incumbent may still be welfare-enhancing.

[36] If complements, then price differentials might reflect the higher or lower degree of complementarity with the various buyers, the willingness to eliminate double marginalization, etc.

auction, the winning bid is by definition the second-highest bid. Neither can we assume that bids will remain invariant when the regulatory framework makes use of acquisition prices. The incumbent can arrange accomplice bids that lie just below its own. Moreover, even in the absence of fake bids, the threat of investigation may make the entrant less greedy when negotiating with the incumbent.

(c) Secure fair access for complementors to facilitate entry into the core segment

It often makes more sense for an entrant to enter as a complementor first rather than challenging the core business of the incumbent firm, which benefits from inertia in this core segment. Consider therefore a less direct attack on the monopoly's position, in which a firm, whose entry in an adjacent space[37] (as a complementor) by itself does not threaten the incumbent, may later expand its product line and grow into a substitute for the monopoly segment.

That competition often comes from initial complementors has been alleged for a long time. In the browser case in the 1990s, Microsoft was accused of favoring its Internet Explorer browser over the Netscape one. Parties agreed that at the time Netscape was a complementor to Windows; so, there was no short-run incentive for Microsoft to eliminate Netscape, because a strong browser, regardless of the identity of its owner, made Windows more attractive. Competition authorities (as well as Microsoft's CEO in an internal memo) however viewed Netscape as a potential competitor for Windows in the longer run, as it is was alleged that Netscape apps, which were Unix-based so mainly open source, could have been delivered via the browser outside the Windows OS[38].

Finally, we already mentioned the applications-barriers-to-entry argument[39]. A concern for the antitrust authority is the platform's desire to protect its core segment (the platform business) by depriving alternative platforms from the apps that they need to compete with the incumbent platform; put differently, by supplying key apps internally, the incumbent platform makes an entering platform depend on its goodwill.

2.4 The importance of preserving fair access

a) Motivation

Independently of the contestability concerns just reviewed, authorities may be concerned about the fairness of access by 3rd party apps to the core segment. For one thing, it is commonplace for

[37] Because it is costly to enter multiple segments at a time, such entry most often concerns a single niche segment: Google entered in the search business; Amazon initially sold books online; and Uber's strategy was to start by entering the taxi business.

[38] This reasoning was also at the heart of the European Commission's case against Microsoft in workgroup servers. The degradation of interoperability between the Windows OS and rival server OS (Unix, Linux, Novell…) was viewed as a way of inhibiting dynamic competition (e.g. reducing the risk of apps being delivered on server side without needing Microsoft on the desktop). See Kühn-Van Reenen (2009).

[39] The standard references here are Choi-Stefanadis (2001) and Carlton-Waldman (2002).

platforms to operate markets but also compete in them (as depicted in Figure 1). Amazon marketplace serves Amazon Basics or Whole Foods as well as third party products; Apple's app store supports both Apple's own apps and independent apps… Such dual presence as owner of, and seller in the marketplace raises concerns about self-preferencing. The European Commission's Google Shopping case was based on the claim that the Google search engine favored its own offerings. Regarding advertising intermediation services, there was a debate prior to the 2007 acquisition of DoubleClick's ad server by Google; the impact of Google's vertical integration in the intermediation services (running both ad servers, which serve publishers on one side and advertisers on the other, and the ad exchange standing in between) is still very much of a concern today[40].

Competition authorities are thus concerned about the dominant platform creating market power for in-house complementors. Unfair competition may take the form of a display preference for own services, a tie-in or loyalty rebates; alternatively, the platform may prey on a rival app to force it out of the market. In some cases, the dominant platform may legitimately want to avoid the double marginalization that naturally stems from high app prices in rather non-competitive complementary segments.

To be certain, the concern about self-preferencing is ancient (consider private labels in supermarkets). But there is a feeling that the new digital platforms have an unprecedented ability to (a) favor their own brands when making a recommendation to consumers, and (b) cheaply gather substantial information about third-party products and selectively create copycats for the most successful ones (a behavior that is not covered by the EU P2B regulation, which focuses on favoritism and transparency). Such strategies are particularly harmful to rival brands as the latter may have no other places where to sell.

In 2018, India issued regulations for foreign e-commerce platforms; besides their protectionist bent, noteworthy is the prohibition of (a) exclusivity requirements (the e-commerce platform cannot prevent or discourage the merchant from selling goods on other platforms, which may be a reasonable requirement in the case of a dominant platform), and (b) sales by platforms of products from companies in which they have an equity interest. This second aspect of the Indian structural remedy is extreme; private labels may result from serendipitous innovations; and they also have the potential to eliminate double marginalization. One would want to design less intrusive/more flexible interventions. However, the remedy illustrates the overall concern about tech companies competing with their customers.

The concept of "fair access" is however broader than just the "absence of self-preferencing". Even a pure platform player, which does not compete in the market it creates (Airbnb, Booking), may charge merchant fees that are too high for instance. There have been lately a number of debates about the levels of such fees, from the 3% demanded by many payment systems to the 30%

[40] Google is alleged to have a last-look advantage over rival ad servers and therefore to be able to apply only a tiny margin when overbidding rivals for publisher impressions. The possibility of self-preferencing is analyzed in detail in Geradin (2020).

standard commission on apps and in-app purchases of digital goods and services charged by Apple App Store, Google Play or Galaxy Store[41].

b) The old debate on access to public utilities' bottlenecks

The debate on the terms and conditions of access to dominant platforms is reminiscent of that on the regulation of access in network industries in the 1990s. The latter considered an essential facility (the local loop in telecoms; the rails, signaling and stations for railroads; the transmission grid for electricity…) and the conditions of access of the competitors in a competitive complementary segment (long-distance calls; train operators; power generators…) to this essential facility.

The economic literature on the opening of competition in network industries reached five conclusions[42]:

1. The access to an essential infrastructure must be regulated as its owner has little incentive to let others compete in adjacent segments.
2. The so-called efficient-component-pricing rule (known as "ECPR" or "Baumol-Willig rule") balances the conflicting objectives of not providing the essential infrastructure owner with incentive to engage in non-price foreclosure[43] and of not penalizing efficient competitors: it states that the access price be equal to the lost margin in the competitive segment. The notion of ECPR is illustrated in Figure 3 in the context of a one-sided market, in which it was first enunciated. In this figure, an upstream firm U (the counterpart of the platform[44] in Figure 1) can give access to its bottleneck segment (rails and stations, high-voltage transmission grid…) to an internal downstream firm (D_1) and a 3rd party one (D_2); the unit cost of giving access (denoted by c_0) is the same for internal and external access. The internal supplier D_1 can produce at unit cost c_1 to serve the final consumers and charges price p_1 to them. ECPR states that the access charge a should not exceed the margin made by D_1 in the final segment: $a \leq p_1 - c_1$. It is a sort of Pigovian rule, as it forces D_2 to internalize the lost markup when it takes a consumer away from D_1, with the idea that this markup contributes to the recovery of the implicit fixed cost of the bottleneck segment.
   However, ECPR is only a partial rule: it does not say what the incumbent's access price- or equivalently, given the rule- final price should be. Put differently, it only expresses a coherence in the incumbent's price structure and does not address the price level issue.

[41] Some of these platforms allow lower rates under certain conditions.
[42] See Laffont-Tirole (1994, 1999).
[43] Non-price foreclosure strategies in telecoms included refusals and delays in interconnection (staggering of upgrades to delay the introduction of a service offered by a competitor, claims of insufficient capacity), forcing rivals to purchase elements or functionalities they did not need, delays in providing number portability, etc.
[44] The difference between an upstream firm and a platform is that the platform has a commercial relationship with final consumers, while the upstream firm does not (consumers are served by the downstream suppliers).

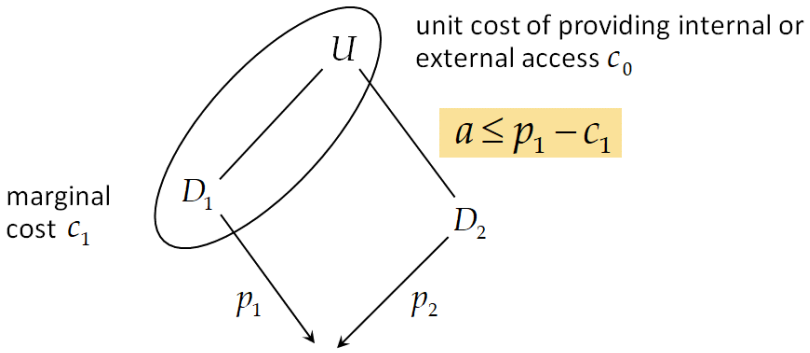

Figure 3: Using ECPR to price access

3. An access markup does not always imply that competitors are disadvantaged in their competition with the incumbent: a higher access price raises the opportunity cost of the incumbent one-for-one if the final demand satisfied by the incumbent reduces one-for-one that for the entrant.
4. Marginal-cost pricing of access is not the right social benchmark. First, it implies that the competitive segment does not contribute to the recovery for the fixed cost of the essential infrastructure (there is a good reason why the infrastructure is essential!). Second, a low access price incentivizes foreclosure ("self-preferencing" in platform language) and therefore requires a heavy investment in regulatory capacity: the vertically-integrated incumbent cannot make money by selling access and therefore must make its money on the competitive segment.
5. It is useful to think of intermediary services as enabling final services. In theory the optimal access charge should be equal to the marginal cost of giving access plus a Ramsey markup that contributes to covering the essential infrastructure's fixed cost.

c) The specificities of the digital world

Do the previous precepts apply to the digital world? That is, can we just relabel "essential infrastructure owner" as "platform", "foreclosure" as "self-preferencing", and design digital regulation around such principles? There are a number of differences. For one thing, as we already noted, there is no regulation of the overall rate of return in the case of platforms. While regulating access prices in a public utility context is complex, the lack of accounting data makes the same exercise even more arduous in the digital world. Antitrust has never been at ease with the setting of access prices[45].

A second difference stems from the multi-sidedness of the digital markets. The literature here is very large and would require a full treatment of its own. Researchers have looked at the incentives platforms face in their choice of merchant fees and at whether the hybrid platform model should be prohibited. A non-exhaustive list of interesting recent papers on the topic includes Anderson-

[45] A case in point is that of New Zealand, which abrogated the telecom regulator in the 1990s at a moment at which competition on long distance and international calls was opened. The antitrust authority, which by default was put in charge of access pricing, felt little equipped for this new task.

Bedre-Defolie (2021), Allain et al (2016), Choi-Whinston (2022), Etro (2021 a, b), Gomes-Tirole (2018), Hagiu et al (2021), Jeon-Rey (2022), Wang-Wright (2017), and Zennyo (2021).

A third difference with public-utility regulation, stressed in Bisceglia-Tirole (2022), is that opportunity costs are often negative (a consumer brings in ancillary benefits through advertising, merchant fees and data). This often results in free-of-charge usage[46]. As we noted, the platform may not benefit from a better ecosystem if it does not want to raise the price to the consumer in reaction to the improved offering (a zero price may be too high in the first place from the point of view of the platform). A second price constraint arises on the app side, as competing sellers may enjoy undissipated rents. These two price constraints play out in different circumstances. The latter operates for low access fees, when the platform's opportunity cost in the app market is negative. The former arises when the access charge, and therefore the app prices are high, making it necessary for the platform to stop charging for the core product in order to maintain the consumers on the platform.

3. Data

Data raise multiple issues, including some related to the protection of privacy. I will here focus on competition-related issues, on which our knowledge is still unfortunately quite patchy.

3.1 Who should own the data?

The current, ubiquitous arrangement is the so-called "services-for-data" arrangement. We enjoy great e-mail, search, video, social network, maps and other services, which are paid for with the data we provide to the platform[47]. In turn, the platform makes money by selling targeted advertising or by using data to produce new services (data are needed for instance to produce recommendations or to develop autonomous cars, delivery drones, health care diagnostics and treatments). There is discontent with the services-for-data model, but no straightforward alternative to free services has yet emerged. There have been proposals nonetheless:

(i) *No or limited data collection.* The website can refrain from collecting data. Or there may be short-term data collection, for example one that allows only for contextual advertising, which is based on what the user is looking at or searching for (as is the case for DuckDuckGo's search engine). The issue then is whether the protection of privacy would not hamper functionalities, for example lead to poor recommendations. In any case, the lack of data collection, which is currently a major source of income for platforms, is likely to require content pricing for the services they offer.

(ii) *Compensation of user through micropayments.* In this alternative, the platform would still own the data it collects but would pay users in cash rather than in kind. There are obstacles

[46] Some implications of the non-negative-price constraints have been drawn in various contexts; see, e.g., Chen-Rey (2012), Choi-Jeon (2021) and Gomes et al (2022).

[47] Posner and Weyl (2019) note that the payment may be in the wrong "currency" if the user does not like the free services offered by the platform.

to payments in cash, though. First, it may be subject to gaming, i.e. be vulnerable to bots if activity on the website is remunerated through positive payments. The second issue concerns pricing: Users are unaware of the value (for the firm) and cost (for themselves) of their data, and how these are affected by the feasibility of portability and other considerations. For example, the platform can learn about me directly from me, or indirectly from people like me[48]. The solution of compensating users through micropayments probably requires a trusted intermediary to guarantee the quality of data to firms and to extract value for these data on behalf of consumers. This however would add an extra layer into the system, which would take its cut.

(iii) *Data licensing and data trusts*. It is a common and reasonable view that data is the ultimate public good and should be shared among potential users. Unless the law declares data to be an essential facility, though, forcing Google, Apple or Uber to share their data without compensation might amount to an expropriation of their investment and would likely be challenged in court[49].

Some have therefore proposed that data be shared through a licensing system in which the data owners would be remunerated on a fair, reasonable and non-discriminatory (FRAND) basis. The idea is the same as that underlying the treatment of essential patents in most standard setting processes. FRAND payments to data owners seem conceptually reasonable, but a host of practical questions arise, such as the nature and format of data to be licensed in this manner or the price (or prices in the case of field-of-use pricing) fetched by the license. Anyone familiar with the complexity of the FRAND licensing system will identify the intricacies involved in designing such an approach[50]. The intricacies are compounded, as asymmetries of information about what is in the data set is even higher than in understanding what a patent license exactly delivers.

The third possibility would be to have data-using institutions create their own data trust. So far, most, but not all existing data trusts have been initiated by authorities in regulated industries (mobility, energy).

(iv) *Consumer-centric data*. Finally, initiatives such as Tim Berners-Lee's Solid have consumers control their own data storage and access. The challenge will be to design a value proposition for consumers and data-users alike.

The first use of an individual's data is targeted to the individual himself/herself. It is straightforward to envision users controlling which doctors and institutions they will provide their medical data to. Similarly, one presumes that some consumers will be willing

[48] For a study of the consequences of such data disclosure externalities, see Choi et al (2019). Internalities are studied in Liu et al (2020).

[49] Data are notoriously hard to value. For a discussion of why this is so, see Coyle et al (2020). For one thing, one must distinguish between potential profits for data users and social value. For another, profits hinge on forecasts about hard-to-predict future uses and privacy and competitive-access regulations; furthermore, markets for data may not be thick. On the consumer side, there have been so far widely diverging estimates of willingnesses to pay for privacy; and these willingnesses to pay probably are formed under very incomplete information about what is and will be done with the data, and about whether the same data can be obtained through multiple channels. Other contributions by economists include Acemoglu et al (2021) and Bergemann et al (2022).

[50] For a description of these intricacies and a proposal for reform, see Lerner-Tirole (2014, 2015).

to give their data for targeted advertising purposes against a lower price for services. For such uses, the issue is mainly one of information and transaction costs, although there may be externalities as well, that reduce social welfare (as when the individual communicates personal health information to obtain a better deal from insurers, raising the cost of insurance for other consumers).

The second use of data is to create a pool of data which enables firms to create better algorithms; with some exceptions (say, rare diseases), the marginal value of an individual's data is near zero, but there is large value in the collective amassing of data for the purpose of analysis (as when the collection helps medical diagnostics or the drug approval process). That raises a pricing problem, as the average value largely exceeds the marginal one.

3.2 Data as a barrier to entry?

A related debate stems from the concern that data might soon act as a barrier to entry into new services. There is no question that Google and Facebook in particular have access to very large sets of data not available to others; that gives them dominance in search advertising (Google) and display advertising (Facebook, and to a lower extent Google through YouTube). Platforms use social plugins to track users across the web (that is, outside their ecosystems[51]) and develop full browsing profiles of them. The platforms also use caching; caching improves the external content's loading speed, but also forces external content providers to share data with the platforms. That deprives the content providers from access to unique data, that, subject to privacy regulation, they could monetize at higher prices. Finally, if privacy regulation is strengthened and consumers feel more engaged in monitoring websites' privacy policies (which amounts to the consumers' incurring a fixed cost of checking whether to grant consent), large platforms may have an advantage over smaller ones, as their consent forms apply over a much larger set of services or to more important ones; relatedly, privacy regulation may make it easier to share data internally (within a "walled garden") than across firms. The question then is, how critical is it to have access to massive data sets to supply targeted advertising or to develop new products and services?

Some authors argue that there are diminishing returns in the amount of data[52]. The underlying argument is the Law of Large Numbers. To predict the time that cars will take from A to B, a GPS navigation software app does not need thousands of cars. Others (e.g., Posner and Weyl 2018) object to this argument on the grounds that, while the Law of Large Numbers indeed applies to a given use, new and more complex uses emerge regularly, that invalidate the effect of the law. Alternatively, economies of scope rather than scale may be at work. There may be complementarities between sources of data; e.g. a search engine may have a better predictive performance when the search combines information about the keyword as well as user characteristics[53].

[51] Google also shares data with mobile suppliers through Android, and platforms often share data with their third-party apps.

[52] See Bajari et al (2019), and the references therein.

[53] Schaefer-Sapi (2019).

Data may also create a switching cost and deny users a costless migration to a new platform. That is, user switching between platforms is difficult if data transfer is infeasible or time-consuming. To be certain, GDPR creates data portability rights based on an open standard. However, it does not define a technical standard. Its portability requirement applies only to data which consumers provide directly. And it is not dynamic in that the user must port repeatedly to update content and contacts; the latter may have no consequence if the user has decided to switch to another platform, but this is not so if the user wants to multihome or is still uncertain about wanting to switch and just wants to try an alternative platform. In this respect, the 2019 Furman Review argues that content that should be portable in a dynamic fashion includes past purchases, music playlists and other entertainment consumptions, and social network data (profile, contacts, and shared contents). The higher the portability cost for the consumer, the less likely are users to coordinate to switch to a superior platform.

Hagiu and Wright[54] discuss when data create a barrier to entry. The value of the marginal data depends on the required accuracy of the forecast. When the accuracy is key (they cite disease prediction systems, online search engines), firms with a data advantage may have a strong competitive advantage. Of course, how big is big enough is an empirical matter; they note that Apple Maps starts competing with Google Maps in the US, but not in countries where it has a smaller user base. Other determinants of data as a source of important competitive advantage are the absence of substitute data in the marketplace and the availability of unique data-analytics capability. By contrast, data whose value is rapidly depreciating do not confer any lasting competitive advantage.

While the data-barrier-to-entry argument will surface in many contexts, it has so far focused on the large profits made by Google on search advertising (in response to the consumer's expression of interest) and by Facebook on display advertising (partly geared toward raising brand awareness). Google's extensive data collection (reinforced by its contracts with Apple and Android mobile phone manufacturers to set Google search as a default on the browser[55]) allows it to personalize advertising and generate much more revenue for the advertisers than other outlets. And Google can capture a sizeable "ad tech tax"[56]. Accordingly, interventions such as forcing third-party access to Google's click and query data are being considered[57].

As for Facebook, (limited) data portability already exists, enabling the possibility of an individual's migration toward another social network. "Social graph APIs"[58] would further allow users to invite their friends to join the new platform and multi-home; cross-posting ability would allow a user to stay on multiple social networks at low cost. As was the case for telecommunications or open banking standards, such interoperability standards probably could only be set by governments or neutral not-for-profit bodies.

---

[54] Hagiu-Wright (2020).

[55] With costless thinking and decision-making, the default would be irrelevant. Research in behavioral economics, including in the tech industry, shows that defaults do matter.

[56] See CMA (2019, pp 40, 52-53).

[57] E.g. CMA (2019, pp 228).

[58] CMA (2019, pp 99).

4. Industrial policy

4.1 A virtuous process for industrial policy

Governments may apply two broad types of interventions to correct market failures: *Non-targeted policies* do not attempt to choose winners and losers. Rather, the government uses technology-neutral policies, such as carbon pricing or R&D tax credits. By contrast, *industrial policy* refers to policies that are targeted towards specific sectors, technologies, and even companies.

It is easy to find arguments in favor of industrial policies. They may create cluster effects through infrastructure sharing, enable the informal sharing of information[59] (as when Steve Jobs and his developers learned about graphical interface while visiting nearby Xerox Park), and promote joint learning by doing. As important, but less emphasized, is the existence of a labor market; most start-ups are bound to fail, and even if they do not, entrepreneurs and their collaborators look for new challenges; a cluster allows for a low-personal-cost job mobility.

State aid to industry is not just about creating clusters; it is also about avoiding losing them. Indeed, it is allowed for EU disadvantaged areas. Criscuolo et al (2019) examine a policy change increasing the weight of community unemployment and per-capita GDP in deciding on the eligibility of areas in which (mostly manufacturing) projects can access public subsidies[60]. They find a substantial impact of subsidies on employment and activity in the case of small firms (replicating thereby some studies concerning different interventions), and that these effects do not come at the detriment of employment and activity in neighboring areas. There is no effect for large firms by contrast, which the authors interpret as stemming from large firms' higher ability to game the system (by moving jobs across areas to benefit from public subsidies).

A different argument refers to public R&D and its spillovers. The idea is that fundamental and applied research by the public sector irrigates the private sector, and especially so through the cluster effects just described. Public research generates both *explicit knowledge*, a global public good transmitted and available worldwide through international conferences, scientific publications, open source initiatives and expired patents, and *tacit knowledge* embedded in the researchers[61]. This tacit knowledge combined with limited mobility (family and social graph, culture, language…) implies that the spillovers from public research benefit the country more than the rest of the world. The empirical question, though, is "how much?"

We lack empirical evidence on the location of the beneficiaries of spillovers. On the anecdotal side, we know that many breakthrough technologies that emanated from the work of DARPA, the NIH and the NSF benefited Silicon Valley and the broader American industry more than the rest

[59] As developed in AnnaLee Saxenian's celebrated 1994 book on Silicon Valley.

[60] Their focus is the Regional Selective Assistance program in the UK, which funds, in disadvantaged areas, projects that would not have occurred otherwise (additionality criterion).

[61] In between stands the knowledge gained by others in bilateral discussions, courses and conferences; this form of knowledge diffusion usually involves more local participants than foreign ones.

of the world[62]. On the other hand, the fundamental discoveries in deep learning made in the US seem to benefit Chinese firms at least as much as American ones[63].

Finally, industrial policy (which may well operate against competition) may occasionally serve to preserve competition. A case in point is Airbus, which created a credible competitor to Boeing.

With such solid arguments, why are most economists[64] wary of industrial policy? The standard quip here is *"The State picks winners, losers pick the State"*. My own country is chock-full of bad experiences: Concorde, Bull, Thomson, Agence de l'Innovation Industrielle, 1984 contaminated blood, diesel subsidies… A mix of hubris, capture, protectionism and just very poor information. Meetings discussing projects or industries to be selected as beneficiaries of the government's largesse can be frightening; participants, except advocates of their own industry, hold very little information. However, there is a concern that the evidence both for and against industrial policy is only anecdotal. But there are two good reasons for identifying best-practice approaches: First, a well-designed industrial policy offers the earlier-discussed benefits. Second, politicians are going to do industrial policy anyway, so it is incumbent on experts to give some advice on how to do it right.

In Tirole (2017), I make, and explain the rationale for, eight recommendations to be followed if one is to engage in industrial policy:

1) Identify the market failure, so as to design the proper policy
2) Use independent high-level experts to select the projects and the recipients of public funds
3) Pay attention to the supply side (talents, infrastructure) and not only to the demand side[65]
4) Adopt a competitively neutral policy
5) Do not prejudge the solution, but rather define objectives[66]
6) Evaluate ex post, disseminate the results, and include a ''sunset clause'' in each program, forcing its closure in the event of a negative assessment
7) Involve the private sector in risk taking to avoid white elephants
8) Strengthen universities and bring them closer to the start-up world.

[62] See, e.g., Moretti et al (2016).
The US is an unexpected industrial-policy role model, with DARPA (Defense Advanced Research Projects Agency), NIH (National Institute of Health), NSF (National Science Foundation), which laid the foundations, for many of today's biotech and information technologies.

[63] Lee (2018).

[64] With notable exceptions, such as Mariana Mazzucato, Dani Rodrik or Joe Stiglitz.

[65] Regions and municipalities may want to start a cluster, in biotech, green technologies or AI, but not have the people who are going to make it happen. Clusters should avoid the "Field of dreams" mindset (from the movie in which the main character, played by Kevin Costner, builds a baseball field in the middle of Iowa following a voice saying "If you build it, he will come", where "he" refers to a famous baseball player, Shoeless Joe Jackson. Unfortunately, in reality "they" often do not come if they are not already there).

[66] Think of Covid vaccines!

Such a code of conduct for industrial policy raises the question of how one ensures that authorities (say, the EU) obey these principles, all the more that some recommendations stress the need for independent decision-making in an era when populism and calls to reaffirm the primacy of politics in public decision-making are running high. At a minimum, there should be a clean description of these principles (an analogue might be the Directive on public contracts) and the monitoring by an independent agency of compliance with this code.

4.2 International trade, dumping and state aid

Is industrial policy better justified when there is a (long-lasting) trade war and a failure of the WTO to straighten things out? When a country exhibits a particularly close relationship between its firms and the government? If so, should we have any safeguards?

In international matters, multilateralism is the economists' preferred approach to conflict resolution. Alas, the WTO has not always been very agile, not to mention that the concept of multilateralism is not flying high in these populist days[67].

There is a widespread feeling that Europe shoots itself in the foot by being stricter in its application of WTO rules on state aid and dumping, as compared to China and the US. The latter more eagerly engage in state aid (especially China), and in the case of the US are more prone to using compensatory measures. First, Europe adds to the list of criteria identifying unfair competition the notion of interest of the Union; low import prices benefit importers and consumers, making it more difficult to identify harm and justify local industry subsidies. This notion of interest (combined with an intertemporal vision, which already lies within the mandate) intellectually does make sense, but puts the EU at a disadvantage with regards to countries which content themselves with the minimal compliance with the WTO rules; my gut feeling is that a WTO change of rules, if feasible, would be more appropriate than a renunciation to the concept of EU interest.

Second, the European Commission needs approval by the European Council. The infringing countries can try to use "divide and conquer" strategies to prevent the Council from going along with the Commission. Combes et al (2019) propose to eliminate the veto of the European Council to make anti-dumping and anti-state-aid policies more effective and comparable with other countries; they further suggest that decision-making with respect to commercial practices take place at DG Competition, which seems to make sense but would require to increase the number of case handlers, which is particularly small in the EU. They also propose to increase the presumption of prejudice for state subsidies that have not been notified to the WTO, and to align the WTO rules on services with those relative to merchandises.

[67]Indeed, the WTO's appellate body lost its ability to arbitrate trade disputes, due to the Trump administration's blocking of new nominations, implying that losers of a trade dispute can appeal with the guarantee that no decision will be made.

5. Institutions

Finally, institutions must be strengthened to reflect the new economic environment. Two remarks before we review possible changes. First, this strengthening, which may require new degrees of freedom for independent agencies, is not a foregone conclusion given the current mood regarding the primacy of politics. Second, what is needed is not a drastic change in antitrust law; indeed, the age-old statutes are worded in a broad enough manner that many of the behaviors we are concerned about are somehow already embodied in law. In contrast, the regulatory apparatus must be made more agile and in tune with evolving ecosystems and economic thinking in the digital age.

5.1 Independence

The independence of competition authorities is being questioned in some countries. Proposals often stop short of calling for a return to old-style ministerial decision-making; but they may put competition authorities on a tight leash by conferring on politicians the ability to overrule competition authorities' decisions[68]. There are also calls for excluding certain industries or firms from the scope of competition policy. As well as political demands to grant broader missions to competition authorities: Stakeholder protection (employment, environment), industrial policy…[69]

We should remind ourselves of why we have independent agencies in the first place. The rise of independent agencies historically grew out of a discontent with the political process. Politics indeed are subject to capture and electioneering. Independent agencies also face the risk of capture, but they are immune to electioneering[70]. For instance, because politicians' eagerness to be reelected led to credit booms, central banks were made independent to tame inflation and, later, to avoid lax prudential supervision. Relatedly, independent regulatory authorities were set up to oversee the telecoms, electricity and other network industries in order to protect private investors in those utilities from an expropriation through low prices, or conversely to protect consumers from abusive tariffs (and, later on, from a lack of competition in non-natural monopoly segments). Political economy constraints can be tackled by designing institutions that resist political pressure, at least on a specific policy move[71].

[68] In 2019, France and Germany issued a joint manifesto to protect their industrial champions. They proposed a reform of EU competition law, which would for instance allow member states to overturn merger decisions made by the European Commission.

[69] For instance, the EU Competition Commissioner's mandate now includes industrial policy objectives; while this dual mandate may avoid a turf war and no one knows how it will play out, the temporal proximity of this change in mandate with the Franco-German rejection of the Commission's Alstom-Siemens decision raises the concern that competition policy in Europe be weakened in the process.

[70] Political interference into agency decision-making may indirectly reintroduce electoral concerns; as I later emphasize, "independence" is never absolute and is a matter of degree.

[71] Overall agency policy is another matter.

A corollary to independence is its greater acceptance of evidence-based public decision-making. Consequently, independent agencies are more often populated with high-expertise staff (for example, PhDs and the like)[72]. A related corollary is greater transparency as to the motives: Publications of minutes for Central Banks, public consultations for regulators, majority and dissenting opinions for Supreme Courts…

Agencies furthermore can develop a sense of mission[73]. Conglomerate agencies do not (accordingly, well-managed agencies may resist being granted new tasks). In addition, professionals and narrow specialists are instrumental in creating this sense of mission (internally), intertemporal consistency, and legal certainty (externally). As agency theory shows, clear missions and advocacy can create focus and accountability. They also reduce the likelihood of challenge to the agency's independence by preventing it from entering too much into the political terrain and engaging in mission creep.

5.2 Improving processes

It is easy to point at the drawbacks of classical approaches: Self-regulation (which is self-serving), competition policy (whose processes are too slow, and decisions accrue too late), utility regulation (mostly infeasible in the tech industry as we earlier argued).

We need more reactive antitrust, that involves (but remains independent from) actors, and establishes guidelines that are not cast in stone and evolve as our knowledge progresses. Put differently, the regulations should be adaptive[74], elicit industry and academia's information, and minimize legal uncertainty. Again, new institutions may not be needed, but the existing toolkit could be used more systematically.

A case in point is business review letters[75], insufficiently used in the US and unused in Europe. The flagship application of such letters is DOJ's 1997 business review letter dealing with patent pools. Patent pools exemplify practices that have the potential to both substantially improve industry efficiency and allow the industry to cartelize. Oversimplifying, patent pools are desirable when patents are complements and reduce competition if they are substitutes (as they then allow cartelization); but it is hard to know whether patents are complements or substitutes, all the more that this pattern may depend on uses, on prices, and also may evolve over time. No wonder that competition authorities tread carefully.

[72] There may be an issue with causality here. In Maskin-Tirole (2004), "technical decisions"- on which the electorate is likely to be poorly informed about its own interests- is best left to independent agencies, while societal issues should be conferred to majority voting (with protection of the minority on specific issues).

[73] See Dewatripont et al (1999) and Dewatripont-Tirole (1999) for some benefits of mission-oriented organizations.

[74] Traditional regulations get changed in a very slow, formal, notice-and-comment kind of way. They are not quickly adaptive the way a broad principle like "don't engage in self-preferencing" could adapt to a new kind of platform.

[75] A business review letter allows "persons concerned about the legality under the antitrust laws of proposed business conduct to ask the Department of Justice for a statement of its current enforcement intentions with respect to that conduct" (https://www.justice.gov/atr/what-business-review).

However, neither the broadly-laissez-faire approach of pre-WW2 nor the quasi-prohibition of patent pools that followed the famous 1945 Supreme Court Hartford-Empire decision[76] are acceptable. In reaction to the developing patent thicket, the DOJ, with the help of Berkeley economists, adopted in the 1990s a balanced viewpoint of saying that the *presumption* was that patent pools were legal provided they satisfied several (mostly information-light) conditions. These conditions were later refined as knowledge evolved, and were enshrined in guidelines in the US, Europe and Japan, among other countries. Note the use of "presumption": This presumption does not mean that the practice then meets a per-se approval standard, but that the legal uncertainty has been much reduced.

Collective negotiations in mobile payments is another case in point. The issue is that wallet providers control NFC[77] and can impose terms and conditions to card issuers. The latter have little bargaining power as platforms may develop a reputation for not negotiating, and cardholder multihoming further weakens card issuers' bargaining position. Accordingly, countries such as Canada and China have allowed collective negotiations. Yet, we may shudder at the thought that buyers of a service gang up to negotiate favorable terms from a supplier. Indeed, the hazard of an anti-competitive boycott had been identified early in the history of antitrust (in Section 1 of the 1890 Sherman Act[78]). Accordingly, such a process at the very least must be approved and supervised.

Yet another instrument is regulatory sandboxes, which are testing grounds for new business models that are not protected by current regulation or supervised by regulatory institutions.

5.3 The production of guidelines

Industry more and more faces difficulties in knowing whether certain actions are licit or not. This is partly because technological innovation is rapid, partly because our knowledge is fragmented, and clear-cut rules are not always available.

There are two potential objections to the call for more guidance. First, and as we have already noted, guidelines exist and are used in various forms already: business review letters, block exemptions, various guidelines on vertical and horizontal agreements. The second is that competition authorities would be overwhelmed with requests for letters of comfort if it had to answer each and every of them; in this respect, the competition authority must be able to pick its fights.

Let me give two illustrations involving current practices that have potentially very detrimental consequences, but for which efficient remedies must be found that do not introduce their own inefficiencies.

[76] Justice Hugo Black declared that "The history of this country has perhaps never witnessed a more completely successful economic tyranny over any field of industry than that accomplished by these appellants."
[77] Near-field communication.
[78] Corresponding to article 101 in Europe.

(a) Common ownership by institutional investors

There is currently much concern in the US about the power of institutional investors (diversified mutual funds, asset managers…). Vanguard, Fidelity, Blackrock, State Street, Berkshire Hathaway and others have accumulated substantial holdings in oligopolies (airlines, banking…). Because institutional investors are active in governance, they may exercise direct control to prevent competition among industry participants: They may deter a firm's management from invading rival firms' turfs or from sinking competitive investments. They can to this effect engage in not-so-subtle pressure, threaten not to re-appoint the manager, reject her nominations to top positions or stop managerial pet projects. They may refuse to tender shares to raiders who would increase competition. They may design managerial incentive packages oriented toward absolute performance evaluation rather than relative performance evaluation schemes that would make managers more aggressive competitors.

There are good reasons for this common ownership development, though. Investors demand low-cost, diversified funds. Besides, there is evidence that investor activism, if not short-term oriented, can discipline management. So, the concern for not throwing the baby out with the bathwater must be addressed.

One thing is clear: There is no need for new laws. For instance, in the US, the Sherman Act (1890) and Section 7 of the Clayton Act (1914) long ago worried about such cartelization though cross shareholdings. These statutes define the spirit and objectives of the law, but they do not address the details of what is allowable and what is not; neither have they pondered about liability and enforcement (as an institutional investor's responsibility might depend on what portfolio other investors select).

But there is a clear need for guidance. Asking diversified investors to be passive investors would deprive many firms from the voice of outside investors. An alternative would be to restrict diversification to operate only across but not within industries, limiting these large institutional investors' holdings to a single firm per industry for concentrated industries[79]. My point here is not to make specific recommendations, but rather to insist on the need to develop guidelines that help institutional investors to know what they are entitled to do and to benefit from some legal certainty, at least in the short run. Such guidelines may be updated over time as new knowledge accrues about their consequences.

(b) Best price guarantees (MFNs) and excessive merchant fees

Much work has been performed in the last two decades to understand the implications of most-favored-nation (MFN) clauses in platform markets, illustrated in Figure 4. These clauses offer the platforms' customers a guarantee that they will enjoy the lowest possible price when buying on the platform; this promise is backed contractually by the merchant's commitment not to offer lower prices either on competing platforms or on its own website or other direct sale outlets.

[79] See e.g. Posner et al (2017), for a proposal of such guidelines.

Such practices are ubiquitous in the tech industry and have been banned partly or totally in several cases (involving Amazon or Booking.com) in the UK, Germany, France and other European countries.

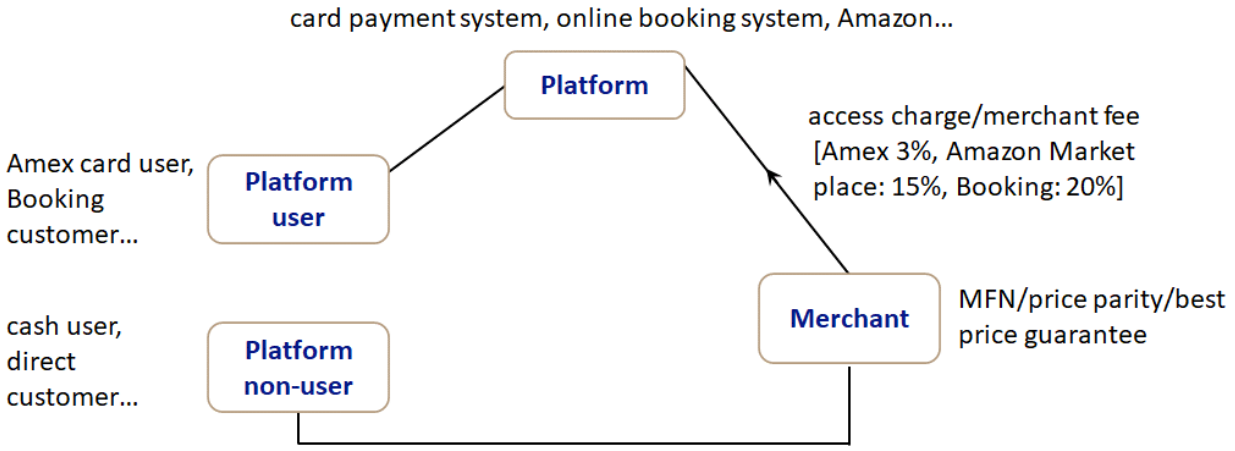

Figure 4: How MFNs allow platforms to tax their rivals

The concern with MFNs is that they allow platforms to tax their competitors. A platform that signs up a wide range of merchants on the MFN clause can impose its fees, terms and conditions: Because the platform's customers have no incentive to look elsewhere, the platform is the unique route for the merchant to reach these "unique customers" (in the industrial organization jargon, the platform is a "bottleneck" for the access to these customers). The platform can then demand hefty fees. These hefty fees however might not benefit the platform if they were passed through to the platform's customers, who would then find the platform less attractive.

The key point, though, is that this fee is passed through to all customers purchasing from the merchant, and not only to the platform's ones. In this sense, the MFN clause enables a platform to levy a tax on its rivals. The merchant would want to charge Booking.com customers a higher price than to other customers if Booking.com's merchant fee is, say, 25% of the transaction; but it cannot do so as it is bound to giving Booking.com customers the best available price; put differently, the merchant is stuck with a choice between paying the hefty fee and forgoing the platform's customers. In addition, this feature has nothing to do with the platform's being "dominant". For instance, if the platform has a 20% market share, 80% of the cost of the merchant fee is passed through to customers not using the platform.

Again, while policy intervention is warranted, one should remember that there are efficiency rationales for MFNs. First, one would not want the platform itself to be expropriated from its investment. The hazard here is that we use the service of Booking.com to find the hotel we like and then go directly to the hotel's website to enjoy a lower price (the so-called "showrooming"). This may be an issue if search costs are low.

A "narrow MFN" in principle protects online travel agencies against such opportunistic behavior by preventing the hotels from undercutting on their websites and possibly for walk-ins as well.
Second, there is a potential "reverse expropriation problem", this time when search costs are high. The merchant may apply a high surcharge for using the platform; this problem is known in the payment card industry as excessive surcharges. The customer may go through a low-cost airline's lengthy reservation process, coordinate with friends and family, and in the last screen find out that there is a €10 surcharge for using a credit card. Such hold-ups do not exist under a no-surcharge rule, which is the payment-card equivalent of a MFN[80].

Regulating MFNs is not straightforward. Consider a prohibition. The OTA[81] platform can recreate an implicit MFN by moving down in the recommendation list hotels that do charge lower prices on another platform or on their own websites. Because the algorithm that delivers recommendations is somewhat opaque (if only because ratings must be curated in order to be useful, say by deleting apparently self-serving ones, and because higher weights must be given to more accurate raters), it is difficult for a regulator to demonstrate that an hotel which takes advantage of the price freedom associated with a prohibition of MFNs has been discriminated against. A second (and legal!) strategy for bypassing a prohibition of MFNs has the platform develop a preferred merchant program, which is optional but gives display priority to those who agree on the MFN clause.

My last caveat is that we cannot today avail ourselves of guidelines allowing merchants to know what admissible surcharges they can impose on consumers, assuming MFNs are made illicit.
Accordingly, policy interventions in Europe have taken the form of a prohibition, either of narrow or of broad MFNs[82].

An exception concerns payment cards, for which the EU uses some implementation of the "tourist test", which caps the merchant fee at the merchant's convenience benefit from using the card[83].
The logic is a Pigovian one: Provided the card is accepted, the customer picks the method of payment (cash, check, digital payment…), and so no externality is exerted if the merchant's convenience benefit is equal to the platform's merchant fee. The "tourist test" terminology stems from the fact that when facing a one-shot customer and deciding whether to accept or turn down the card, the merchant would compare the fee and the convenience benefit; by contrast, with a repeat customer, the merchant is concerned with the customer's not returning if the merchant turns down the card and so the merchant's demand for the card service is less elastic.

Despite these difficulties, it seems worth doing something about MFNs considering their ubiquity and the gigantic amounts of money involved.

---

[80] For studies of optimal surcharging, see e.g., Gomes-Tirole (2018), and Bourguignon et al (2019).

[81] Online travel agency.

[82] A narrow MFN prohibits the merchant from charging a lower price on its own platform (or by phone or mail order); a broad MFN applies the prohibition to all sales, i.e. on other intermediating platforms (e.g. Expedia) as well.

[83] See Rochet-Tirole (2011) for the theoretical derivation of the tourist test. The merchant's convenience benefit includes the reduced occurrence of robberies, the speed of payment at the point-of-sale, and accounting benefits. There is a large literature on MFNs (e.g., Boik-Corts 2016, Edelman-Wright 2015, Foros et al 2017, Gomes-Mantovani 2021, Johansen-Vergé 2017, Johnson 2017, Rochet-Tirole 2002, and Wang-Wright 2020), which I will not review here.

5.4 Agency coordination

International aspects. The first possible inter-agency coordination failure is the lack of international cooperation among competition authorities or sectoral regulators. I earlier emphasized that Big Tech are global players, so a coordinated response would be ideal. At the very least, the sharing of information across national agencies is called for. Less regulatory heterogeneity around the world would most often be desirable as well. Take privacy regulation or competition policy (for instance, even countries that were like-minded on the issue of MFNs, such as France, Germany and the UK, did not coordinate their regulatory response). Not much new on that front: It has long been recognized by industry and authorities alike that multinational firms incur costs of conforming with multiple, inconsistent regulations; imagine, say, that different authorities agree on breaking up a firm, but demand the divestiture of different segments. Finally, there may be forms of hidden "tax competition", as when a regulator or court designs remedies so to bring investments and activity on its soil.

On the enforcement front, a global firm may react to an adverse decision by boycotting the country in question. For instance, Google News withdrew from Spain when a new law forced aggregators to pay news publishers. Second, there is the issue of extraterritoriality when domestic customers are served through websites located abroad. Finally, the monitoring of compliance by the firm exhibits some returns to scale, further stressing the need for international cooperation.

Jurisdictional overlap and externalities. All regulatory institutions face complex coordination issues. Cross-agency conflicts may result from ill-defined mandates; for example, when a hotel's ranking on Booking.com depends on the commission paid by the merchant, the issue is more one of consumer protection (misleading representation of relative attractiveness) than one of competition, even though the case may be subject to a review by the competition authority.

The conflict may result alternatively from externalities among different forms of regulation. The regulation of competition interacts with data protection and labor market regulation, for instance.

That some labor practices selected by companies may be anticompetitive is well known (think of non-compete clauses). But labor laws themselves have the potential to be anticompetitive; if making Uber drivers employees, perhaps for worker protection purposes, prevents them from multi-homing, competing ride-hailing platforms will have a hard time keeping an installed base of drivers, and therefore of customers as well.

Data protection regulation may also interfere with competition in two ways. Data protection that makes it harder to resell data (which may have a legitimate privacy rationale) may strengthen the dominance of large data collectors[84]. Moreover, cumbersome privacy regulation augments the unit cost of small and medium companies relative to their bigger competitors.

[84] In the EU, the competition authority viewed the preparation of GDPR as a privacy issue.

These externalities among public policies may not be internalized because of turf wars. And it is not straightforward to design institutions that promote coordination; one possibility is to create a special instance or process that will lead to the exchange of information; this is useful, but there is only so much we can expect from this. Competition and protection agencies already know that their policies interact, yet may not act on this knowledge.

6. Summing up

Tech giants' dominance does not confront us with an unpalatable choice between laissez-faire and populist interventions. While the purpose of the paper was to take stock of our knowledge in the matter and investigate the existing tradeoffs, a few conclusions emerge. The first is that public policies can be much improved within the confines of existing laws. Many current concerns indeed were anticipated by our legislative apparatus. But implantation lags the evolution of technology, business and society. I argued that old-style regulation is impractical in an era of global firms, rapid technological progress and contestable markets; information is just lacking for a proper regulation. I also raised some reservations about divestitures, more on practical than on theoretical grounds; a fast-moving technology, the incumbents' habit of scrambling the eggs, and (again) the global nature of tech companies make it hard to identify a stable essential facility, split it from the rest of the company and regulate it. For sure, a clear and coherent plan must be drawn if policymaking is going to take this route. For the moment, preventing the eggs from being scrambled in the first place sounds like a simpler policy. However, it requires forcing the tech giants to notify their acquisitions and, for early acquisitions raising a suspicion that the acquired company might one day become a competitor, shifting the burden of proof toward the tech company.

Regarding the need for contestability, I stressed the competitive benefits of multihoming, and the concomitant surveillance of exclusivity contracts imposed by dominant platforms. I also reviewed the other strategies that can help secure some contestability of those markets.

Competition authorities should remain wary of self-preferencing by these dominant platforms, although there is here no silver bullet. Firms that are both a marketplace/technological platform and merchants supplying this marketplace/apps cannot treat equally a rival offering that is inferior to its own. But self-preferencing to the detriment of equal or superior offerings has the potential to be anticompetitive, and economists should put more work on designing guidelines that would facilitate the authorities' dealing with such behaviors. The broader question of fairness also requires developing general rules for determining what a reasonable access charge might be.

Regarding data ownership, I discussed alternatives to the current "services-for-data" arrangement: Limited data collection, micropayments, data licensing and data trust, consumer-centric data; and the implications of these for data as a barrier to entry. My view here is that, like in the case of GDPR-like privacy regulation, academic thinking lags the technological and business evolution. The same holds for industrial policy and state aid, whose popularity in Europe, China, the US and several other parts of the world has grown in recent years. Economists do have some

useful theoretical and empirical knowledge on these issues, but by and large have under-invested in the area.

Institutional change will be crucial to make competition policy more agile and effective. The balance between anticipating evolutions and reacting ex post should tilt more toward the former. This requires collecting information about dominant firms and their markets, designing codes of good conduct (and making more use of business review letters, provided that the antitrust authority can pick its fights), and the antitrust authority's being given the ability to impose interim measures. And, as earlier discussed, the process for merger reviews must be amended.

Finally, economists must develop knowledge that will percolate and guide antitrust practitioners. The antitrust world is often neither black nor white. We discussed corporate strategies, such as common ownership and best-price guarantees that have perfectly acceptable rationales but can also be strongly anticompetitive. Structural approaches such as prohibition of behaviors run the risk of throwing the baby out with the bathwater. We therefore must strive at designing rules that do not require too much regulatory information and enable more selective interventions.

References

Acemoglu, D., Makhdoumi, A., Malekian, A., and A. Ozdaglar (2021), "Too Much Data: Prices and Inefficiencies in Data Markets," *American Economic Journal: Microeconomics*, (forthcoming).

Aghion, P., Van Reenen, J. and L. Zingales (2013), "Innovation and Institutional Ownership," *American Economic Review*, 103: 277-304.

Aghion, P, Akcigit, U, Bergeaud, A, Blundell, R, and D. Hemous (2019), "Innovation and Top Income Inequality," *Review of Economic Studies*, 86: 1-45.

Allain, M.L., Rey, P. and C. Chambolle (2016), "Vertical Integration as a Source of Hold-up," *Review of Economic Studies*, 83(1): 1–25.

Anderson, S. P. and Ö. Bedre-Defolie (2021), "Hybrid Platform Model," CEPR Discussion Paper No. DP16243.

Azoulay, P., Fuchs, E., Goldstein, A. P., and M. Kearney (2019), "Funding Breakthrough Research: Promises and Challenges of the 'ARPA Model'," *Innovation Policy and the Economy*, 19: 69-96.

Azoulay, P., Graff Zivin, J.S., Li, D., and B.N. Sampat (2019), "Public R&D Investments and Private Sector Patenting: Evidence from NIH Funding Rules," *Review of Economic Studies*, 86(1): 117-152.

Bajari, P., Chernozhukov, V., Hortaçsu, A. and J. Suzuki (2019), "The Impact of Big Data on Firm Performance: An Empirical Investigation," *American Economic Review Papers and Proceedings,* 109: 33-37.

Bergemann, D., Bonatti, A. and T. Gan (2022), "The Economics of Social Data: An Introduction," *Rand Journal of Economics*, April, 1–34.

Bisceglia, M. and J. Tirole (2022), "Fair Gatekeeping in Digital Ecosystems," mimeo.

Bourguignon, H., Gomes, R., and J. Tirole (2019), "Shrouded Transaction Costs: Must-Take Cards, Discounts and Surcharges," *International Journal of Industrial Organization*, 63: 99-144.

Bresnahan, T., Orsini, J. and P.L. Yin (2015), "Demand Heterogeneity, Inframarginal Multihoming, and Platform Market Stability: Mobile Apps," mimeo.

Boik, A., and K. S. Corts (2016), "The Effects of Platform Most-Favored-Nation Clauses on Competition and Entry," *Journal of Law and Economics*, 59 (1): 105-134.

Carlton, D., and M. Waldman (2002), "The Strategic Use of Tying to Preserve and Create Market Power in Evolving Industries," *Rand Journal of Economics*, 33: 194-220.

Choi, J.P. and D.S. Jeon (2021), "A Leverage Theory of Tying in Two-Sided Markets with Non-negative Price Constraints," *American Economic Journal: Microeconomics*, 13(1): 283-337.

Choi, J.P., Jeon, D.S. and B.C. Kim (2019), "Privacy and Personal Data Collection with Information Externalities," *Journal of Public Economics*, 173: 133-124.

Choi, J.P., Jeon, D.S., and M. Whinston (2022), "Tying in Markets with Network Effects," mimeo

Choi, J.P., and C. Stefanides (2001), "Tying, Investment and Dynamic Leverage," *Rand Journal of Economics*, 32: 52-71

CMA (2019), *Online Platforms and Digital Advertising: Market study interim report*, Competition and Markets Authority

Combe, E., Hyppolite, P.A., and A. Michon (2019), *L'Europe face aux nationalismes économiques américain et chinois (1), (2), (3)*, Fondation pour l'Innovation Politique.

Coyle, D., Fletcher, A., Furman, J., Marsden, P., and D. McAuley (2019), *Unlocking Digital Competition, Report of the Digital Competition Expert Panel.*

Coyle, D., Kay, L., Diepeveen, S., Tennison, J., and J. Wdowin (2020), "The Valuation of Data: Policy Implications," mimeo, Cambridge University and Open data Institute.

Crémer, J., de Montjoye, Y.A., and H. Schweitzer (2019), *Competition Policy for the Digital Era*, European Commission.

Criscuolo, C., Martin, R., Overman, H. and J. van Reenen (2019), "Some Causal Effects of an Industrial Policy," *American Economic Review*, 109: 48-85.

Cunningham, C., Ederer, F., and S. Ma (2021), "Killer Acquisitions," *Journal of Political Economy*, 129 (3): 649 – 702.

Dewatripont, M., and J. Tirole (1999), "Advocates," *Journal of Political Economy*, 107(1), 1-39.

Dewatripont, M., Jewitt, I., and J. Tirole (1999), "The Economics of Career Concerns, Part II: Application to Missions and Accountability of Government Agencies," *Review of Economic Studies*, 66(1), 199-217.

Easley, D., Huang, S., Yang, L. Z. Zhong (2018), "The Economics of Data," mimeo.

Edelman, B. and J. Wright (2015), "Price Coherence and Excessive Intermediation," *Quarterly Journal of Economics*, 130: 1283-1328.

Etro, F. (2021a), "Platform Competition with Free Entry of Sellers," Working Papers - Economics wp2021_22.rdf, Università degli Studi di Firenze.

Etro, F. (2021b), "Device-Funded vs Ad-Funded Platforms," *International Journal of Industrial Organization*, 75: 1-18.

Foros, Ø., Kind, H. J. and G. Shaffer (2017), "Apple's Agency Model and the Role of Most-Favored-Nation Clauses," *Rand Journal of Economics*, 48 (3): 673-703.

Fudenberg, D., and J. Tirole (2000), "Pricing a Network Good to Deter Entry," *Journal of Industrial Economics*, 48(4): 373-390.

Geradin, D. (2020), "Online Platforms and Digital Advertising Market Study: Observations on the Statement of Scope," mimeo.

Gomes, R. and A. Mantovani (2021), "Regulating Platform Fees under Price Parity," mimeo.

Gomes, R., Rey, P., and J. Tirole (2022), "Screening under Price Constraints," mimeo.

Gomes, R., and J. Tirole (2018), "Missed Sales and the Pricing of Ancillary Goods," *Quarterly Journal of Economics*, 133(4): 2097-2169.

Gomes, R. and J. Tirole (2018), "Missed Sales and the Pricing of Ancillary Goods," *Quarterly Journal of Economics*, 133(4): 2097-2169.

Gruber, J., and S. Johnson (2019), *Jump-Starting America: How Breakthrough Science Can Revive Economic Growth and the American Dream*, New York: Public Affairs Publishers.

Hagiu, A., and J. Wright (2020), "When Data Creates Comparative Advantage," *Harvard Business Review*, January–February 2020 Issue.

Hagiu, A., Teh, T.H. and J. Wright (2021), "Should Platforms Be Allowed to Sell on their Own Marketplaces?," *Rand Journal of Economics*, forthcoming.

Jeon, D.-S., and P. Rey (2022), "Platform Competition and App Development," mimeo.

Jiménez Durán, R. (2022), "The Economics of Content Moderation: Theory and Experimental Evidence from Hate Speech on Twitter," mimeo.

Johansen, B. and T. Vergé (2017), "Platform price parity clauses with direct sales," Working Papers in Economics 01/17, University of Bergen, Department of Economics

Johnson, J. (2017), "The Agency Model and MFN Clauses," *Review of Economic Studies*, 84 (3): 1151–1185

Kühn, K.U. and J. van Reenen (2009), "Interoperability and market foreclosure in the European Microsoft case" in Bruce Lyons (Editor) *The Economics of European Competition Cases,* Chapter 2, 50-72 Cambridge: Cambridge University Press.

Laffont, J.J, and J. Tirole (1993), *A Theory of Incentives in Regulation and Procurement*, MIT Press.

Laffont, J.J, and J. Tirole (1994), "Access Pricing and Competition," *European Economic Review*, 38: 1673-1710.

Laffont, J.J, and J. Tirole (1999), *Competition in Telecommunications*, MIT Press.

Lee, K.F. (2018), *AI Super-Powers: China, Silicon Valley and the New World Order*, Houghton Mifflin Harcourt.

Lerner, J. and J. Tirole (2014), "A Better Route to Tech Standards," *Science*, 343: 972-973.

Lerner, J. and J. Tirole (2015), "Standard Essential Patents," *Journal of Political Economy*, 123(3): 547-586.

Liu, Z., Sockin, M. and W. Xiong (2020), "Data Privacy and Temptation," mimeo Princeton University.

Maskin, E. and J. Tirole (2004), "The Politician and the Judge: Accountability in Government," *American Economic Review,* 94: 1034-1054.

Moretti, E., Steinwender, C. and J. van Reenen (2016), "The Intellectual Spoils of War: Defense R&D, Productivity and Spillovers," working paper.

Motta, M., and M. Peitz (2021), "Big Tech Mergers," *Information Economics and Policy* (54), March.

Philippon, T. (2019), *The Great Reversal: How America Gave Up on Free Markets,* Harvard University Press.

Posner, E., and G. Weyl (2018), *Radical Markets: Uprooting Capitalism and Democracy for a Just Society*, Princeton University Press.

Posner, E., Scott Morton, F., and G. Weyl (2017), "A Proposal to Limit the Anticompetitive Power of Institutional Investors," *Antitrust Law Journal* 81: 669.

Rochet, J.C., and J. Tirole (2002), "Cooperation among Competitors: Some Economics of Payment Card Associations," *Rand Journal of Economics*, 33(4): 549-570.

Rochet, J.C., and J. Tirole (2011), "Must-Take Cards: Merchant Discounts and Avoided Costs," *Journal of the European Economic Association*, 9(3): 462-495.

Saxenian, A. (1994), *Regional Advantage: Culture and Competition in Silicon Valley and Route 128*, Harvard University Press.

Schaefer, M., and G. Sapi (2019), "Data Network Effects: The Example of Internet Search," mimeo, Berlin School of Economics.

Scott Morton, F., A.l Ezrachi, P., Jullien, B., Katz, R., Kimmelman, G., Melamed, A. D., and J. Morgenstern (2019), *Committee for the Study of Digital Platforms Market Structure and Antitrust Subcommittee Report*, George J. Stigler Center for the Study of the Economy and the State, the University of Chicago Booth School of Business.

Tirole, J. (2017), *Economics for the common good*, Princeton University Press.

Wang, C. and J. Wright (2017), "Ad-Valorem Platform Fees and Efficient Price Discrimination," *Rand Journal of Economics*, 48: 467-484.

Zennyo, Y. (2021), "Platform Encroachment and Own-Content Bias," forthcoming in *Journal of Industrial Economics*.