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Digital competition policy: Are ecosystems different? – Note by Amelia Fletcher

Hearing on Competition Economics of Digital Ecosystems

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Digital competition policy: Are ecosystems different?

1. Introduction

1. Over recent years, there has been an emerging consensus that there are a number of key economic characteristics of digital platforms that tend to generate competition concerns: economies of scale and scope, the multi-sided nature of these markets and network effects, the nature of data in these markets as a by-product but also as a key input; and the nature of consumer behaviour in these markets
2. There has been less focus, however, on the ‘ecosystem’ nature of the major platform companies, and the potential impact of this on competition. While much effort in competition policy has gone into understanding both multi-sided platform issues and conglomerate (multi-product market) issues, these topics have typically been examined separately. There has been limited work to date on how these issues interact in the context of digital ecosystem firms. Moreover, thinking about these digital players as ecosystems raises additional economic issues of that have also received little attention so far.
3. This brief article sets out some of the economic thinking on the competition issues associated with ecosystems to date, as well as identifying areas where further research would be valuable, and discussing how authorities might start to deal with these issues.

2. What is an ‘ecosystem?’

4. It is useful to define terms upfront. As recently noted by Jacobides et al (2020), the concept of ‘ecosystem’ tends to be used in two distinct ways in the digital sphere:
 1. **Multi-actor ecosystems:** Formally, and drawing on the term’s ecological foundations, an ecosystem is a community of independent parties. In economic terms, this could apply to any situation where there is ‘joint value creation’, such that firms effectively work together to create value that no single firm could have created alone. Much of the academic work on ecosystems in the business strategy arena focuses on this definition.
 2. **Multi-product ecosystems:** In the digital context, however, the term ecosystem is often used to relate to the collection of products and services offered by a single corporate organisation, often through a variety of separate divisions or businesses. This is important because there are typically economic links between these products and services. On the demand side, they can be substitutes (such as Facebook Messenger and Whatsapp), complements (such as Apple devices and the iCloud) or even effectively inseparable (such as Android and Google Play). There can also be important supply side synergies.
5. Digital platforms are almost inherently *multi-actor* ecosystems, in that they create value by allowing communities of actors to engage in some way via the platform. For this dimension of ecosystems, the economic theory of multi-sided markets is highly relevant. This literature is by now fairly advanced and considers both the nature of platform incentives, for example as regards pricing, and implications for assessing anticompetitive conduct.
6. However, the biggest digital companies also offer *multi-product* ecosystems. Think of the Google ecosystem, for example, which includes Android, Google Search, Chrome,

Google Docs, Google Play, Google Drive, Google Translate, Gmail, Google Maps, Google Shopping, Google Home, YouTube, etc.

7. This note considers first the key economic lessons from the literature on multi-sided platforms. This is applicable to digital platforms in their core role as multi-actor ecosystems. It then turns to the more complex question: what additional issues arise for conglomerate digital platform companies that offer multi-product ecosystems?

3. The economic theory of multi-sided platforms

8. There is by now a fairly well-developed literature on the competition economics associated with multi-sided platforms.¹ This literature is complex and nuanced, but in simple terms the three key factors driving market outcomes are:

- the nature and extent of network effects (which mean that the value of the platform to any given user increases with the number of other users);
- the extent to which users are single-homing or multi-homing;
- the value of user data for the service provided.

9. The key implications of these factors are somewhat different, albeit they are linked.

10. *Network effects* create a tendency for platform markets to ‘tip’ towards being concentrated, potentially even to monopoly. The firms that gain or retain a strong position in such ‘winner takes all’ markets are not necessarily the best or most efficient. For example, user expectations can matter. A platform can win a market if it can create an expectation amongst users that it will be the winner, since users want to be sure of choosing the same platform as other users do.

11. Moreover, whether or not the right firm ‘wins’ the platform initially, the resulting market concentration will tend to dampen its competitive incentives over time unless the platform market remains contestable. Such contestability may again be limited by user expectations; once a platform has gained a strong market position, it can be hard to supplant, since this would require many users shifting at once. Factors which make switching unattractive, or which lead to staggered switching decisions (such as staggered fixed term contracts, see Cabral, 2017) can likewise limit contestability.

12. Whether users are ‘*single-homing*’ (use a single platform for a particular activity) or ‘*multi-homing*’ is important for two key reasons.

- First, it affects the impact of network effects. In general, the more multi-homing users there are, the easier it will be for multiple platforms to co-exist in a market, and the less ‘tippy’ the market will be.
- Second, where a platform has substantial numbers of single-homing users, on at least one side of the market, a new issue arises. That platform will effectively become a ‘gatekeeper’ to accessing that set of single-homing users (Armstrong and Wright, 2007). Network effects inherently affect a platform’s pricing incentives, but the impact is greatest in the context of such ‘gatekeeper’ platforms. They will be in a position to charge users on the other side of platform high prices to access the single homing users. This is sometimes known as ‘bottleneck’ power.

¹ This brief discussion does not seek to provide a complete set of references. An excellent recent summary of the relevant literature is provided at Jullien and Sand-Zantman (2020).

13. It should be noted that such a gatekeeper position can occur even in markets where there are multiple platforms, so long as users on one side of the market (often consumers) are single-homing. In such circumstances, users on the other side of the market (often business users) will need to multi-home if they are to access the full market. Where platforms have a role in steering consumer choices, for example through ranking options or offering prominence, this can enhance their ability to exploit their gatekeeper position (Hagiu and Jullien, 2011).

14. The margins from the high prices charged by ‘gatekeeper’ platforms to users on one side of a platform may potentially be passed on – at least partially – to the users on the other side of the platform. This is why a number of digital services – such search and social media – are provided free to consumers. The services are effectively paid for by business users who seek the attention of the consumers on the other side of the platform. One reason why margins may not be competed away fully is that ‘zero price’ acts as a lower bound on what a platform can charge to a relatively fragmented consumer base.

15. The value of *user data* for the service provided has been less fully analysed in the economic literature on two-sided markets but is clearly important for digital platforms. It is useful to distinguish two different effects (Hagiu and Wright, 2020):

- For some services, such as targeted advertising, it is within-user data (ie data on individual users) that primarily provides value. If such data builds up over time, this can in itself create an incumbency advantage for established platforms, which in turn generates market power and high margins. As discussed above, this potential for future gain can in turn provide an incentive for firms to offer a service at a loss for an initial period, to build up this within-user data asset.
- For other services, such as Google Maps and Waze, it is across-user data (ie data from multiple users) that primarily provides value. Where this is the case, it effectively creates cross-market network effects, in that the value of the service to any given user increases, the more users provide their data.

16. Of course, for many digital services, data plays both roles. For example, Facebook uses data on individual users to build up a picture of that user’s interests, but also analyses data across users to better understand the types of things that interest different types of users. This combination of factors can again result in users receiving good value during the early days of a platform’s development but can create strongly entrenched market positions over the longer term.

17. As well as multi-homing, there are a number of other factors that may tend to limit the power of network effects, such as:

- *Platform differentiation*: provides an additional reason for choosing one platform over another, beyond simply the number of users, and also enhances the likelihood of multi-homing.
- *Interoperability*: can make it easier for users on one platform to engage with users on other platforms, which in turn reduces the benefit of all users being on the same platform.
- *Congestion*: can occur where there are so many users on a platform that it starts to become unwieldy, too busy and less attractive.

18. This means that conduct which limits multi-homing or interoperability has the potential to be highly anti-competitive in a platform context.

4. The economics of multi-product conglomerate platforms

19. As well as being multi-actor ecosystems, many of the biggest digital platform companies also offer multi-product ecosystems. What are the implications of this for the economics of such companies? It is useful to distinguish inherent factors underpinning multi-market activity from strategic leverage across markets.

4.1. Inherent factors driving multi-market activity

20. There are a number of factors – many of which are relevant to digital companies – which might inherently tend to facilitate such extension of business across multiple product markets, even absent any strategic anticompetitive intention.

21. First, there are number of *supply-side* factors:

- **Economies of scale and scope across markets:** Many multi-product corporations have costs that can be shared across markets, such that the incremental cost of a particular line of business is lower than its stand-alone cost. For digital platforms, these supply-side synergies are likely to be especially strong, given the cost structure and scalability of digital platforms (with high fixed and low marginal costs), and the potential for the same core infrastructure to be used across a range of different markets. For example, if Amazon has established an online infrastructure for delivering ebooks, the incremental cost of using this to deliver digital audio and video may be substantially lower than would be the stand-alone cost of this activity.
- **Competencies applicable across markets:** If two firms have relatively differentiated competencies across adjacent markets, they are more likely to seek to work with each other than to seek to be active across markets. This benefit of specialisation may partly explain why the Apple and Google app stores offer a wide range of third-party Apps, for example. However, many of the core competencies of the major digital platforms, such as skills in platform design and machine learning, are applicable across a range of different product markets, encouraging the development of multi-product ecosystems.
- **Data synergies across markets:** Data gleaned from one market can help to improve the product offered in another market. If Google learns more about its customers through tracking them across their activities within the Google ecosystem, this can be used both to provide better search services for its users and higher quality (better targeted) advertising for its advertisers. Data can potentially even be used in new markets – think of the potential use of language data extracted from Siri for the next steps in AI.
- **Enhanced interoperability:** By controlling different elements of an ecosystem, it can be easier for a firm to ensure effective and stable interoperability between these elements, while at the same time continuing to upgrade the system and innovate. Where different elements of a system are operated separately, there are more likely to be failures of interoperability, especially at key upgrade points, even where this not intended. Note that such failures of interoperability can include situations where products do functionality work with each other, but don't do so seamlessly, leading consumers to prefer the proprietary option.

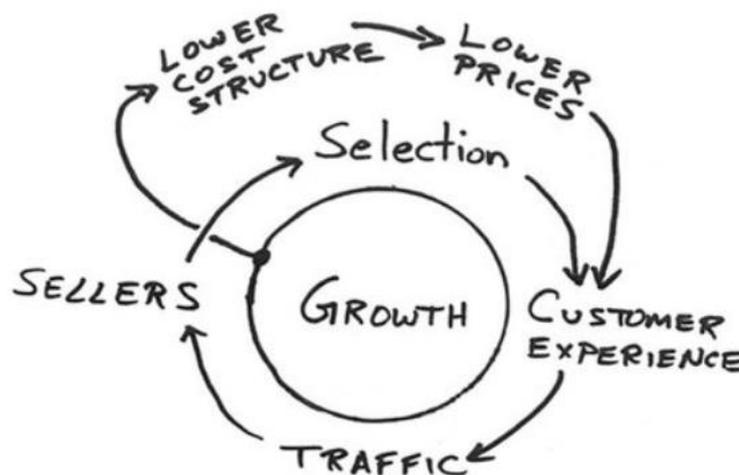
22. Second, there are also *demand-side* factors:

- **Across-market network effects:** Facebook may have started by linking up friends, and allowing access to them by advertisers, but consumers now value it for its communication tools, information about events, its marketplace, etc. The greater the range of services that Facebook offers within its ecosystem, the more consumers it attracts, and this in turn attracts an ever greater range of business users, across ever more markets, to wish to use Facebook.
 - **Barriers to multi-homing across markets:** Users may have a preference to using a single operator across a range of different services. This tendency may be strengthened by issues of Digital ID and consumer trust. In a world where consumers struggle to recall all their usernames and passwords, and worry about their online security, they value the ability to access a range of different products using a single Digital ID with a single trusted firm. Indeed, some ecosystems exploit this preference for a single digital ID by offering consumers the opportunity to use their proprietary digital ID on third party sites (typically in return for their data, see next bullet).
 - **Barriers to switching across multiple markets:** Once a customer is using a range of different services from an ecosystem provider, it can become harder to switch away if that customer needs to switch away for all of its activities. This means that barriers to switching in one part of ecosystem can potentially limit switching more widely. For example, I am wedded to the whole Apple ecosystem partly by the fact that I don't want to think about how to shift my photo storage over from the iCloud.
 - **Gateway role:** Certain products act as a gateway to further products, for example due to consumers making a series of nested decisions. Consumers choose between an iPhone or an Android on the basis of a variety of factors. Having done so, however, their follow-on choices are then nested within that initial choice. Behavioural considerations such as status quo bias or default bias play a role in this nesting. So, once I have bought an Android, I am highly likely to use the Google Play app store, even though there are other options theoretically open to me. The extent to which choices are restricted is under the control of the gateway product supplier. Choices will tend to be made more open where consumers place value on having access to a wide range of options; and conversely, they will tend to be made more restricted where consumers primarily want a product that works and care less about choice.
23. Finally, the impact of firm structure on *pricing and competition* can be relevant:
- **Coherent pricing:** Where there is interrelated demand across the products within an ecosystem, there can be value in coordinating the pricing across them, potentially even offering bundled prices. Where the products are complements, a coherent approach to pricing can even lead to overall prices being lower, effectively because a single provider can avoid the double-marginalisation problem.
 - **Impact on competition intensity:** A firm's decision as to whether to provide a bundle of products across markets or to focus on a single market can affect the intensity of competition in the market. The nature of this impact is likely to depend on the extent to which these markets are complements or (partial) substitutes; whether the platform has a role in facilitating competition between its business users (as in an online marketplace, for instance); and the choices of others in the market.
24. There are links here to the economic literature on system versus component competition, on competitive bundling, on shopping malls and on delegated decision-

making. These various areas of literature are extensive and complex, but a couple of relevant results include that: firms may well prefer closed system even when an open system is socially more desirable (Farrell et al, 1998); and while pure bundling can intensify competition, since it makes any price reduction doubly profitable, it can also relax competition by changing the shape of the demand curve each firm faces (Zhou, 2017).

25. These various factors may also be mutually reinforcing. An interesting and relevant concept from the value creation literature of business strategy is the ‘flywheel’ concept. The original insight behind this concept (Jim Collins, 2001) was that several small nudges of a flywheel can create something big that then runs on its own momentum.

26. Jeff Bezos famously scribbled an early Amazon version on a napkin, as pictured below. However, this picture is a misleadingly simple depiction of the idea. In practice, one would expect there to be a whole series of causal loops that interact to drive the ‘flywheel’, including economies of scope and scale, network effects, brand effects, interoperability benefits, etc. While economics tends to analyse these various factors separately, the business strategy literature is more inclined to emphasise how they can all work together, and how the causal loops can be powerfully exploited across markets as well as within them.



27. A key lesson from a value creation perspective is that firms should use their activity in every market to help them in every other market. Where this is true, applying a flywheel strategy can drive the development of multi-market ecosystems. This is arguably what took Amazon from being a simple online bookseller to becoming retail marketplace for pretty much everything, and lately a video entertainment company.

4.2. Leverage across markets

28. While the factors discussed above are likely to enhance a platform’s position *across* product markets, they are not necessarily bad for competition. For example, in many (non-digital) markets we see robust competition between corporations which are active across multiple markets. Moreover, these factors can potentially facilitate entry across markets, which could even enhance competition. Activity across multiple markets can arguably also sharpen firms’ incentives to offer consumers good value for money, since a consumer that chooses to switch away to a new provider in any one product market may end up switching away across all markets.

29. However, it is clear that they can also be bad for competition. Many of the factors which apply across parts of a multi-product ecosystem – such as interoperability and data sharing – could potentially be made available to third parties too. This has the potential to be highly pro-competitive.

30. By contrast, denying such elements to third parties, by taking a more proprietary and closed system approach, can make it difficult for them to compete effectively. This is likely to be especially true for competitors that are active only in a single market, rather than across markets. Examples of behaviour which has the potential to be anti-competitive in this way include:

- degrading third party interoperability to favour their own interoperable products,
- sharing data across their own divisions, but not making it available to third parties,
- using a gateway position to give prominence to their own products over those of third parties (as in the EC Google Shopping case, 2017).

31. There is to date limited economic literature on strategic leverage across multi-sided platform markets. Key findings from the existing papers include the following:

- Platforms with gatekeeper power can engage in ‘self-preferencing’ to leverage their position into vertically related markets (De Cornière and Taylor, 2019). Their ability to do this may be enhanced by consumer behavioural biases, which increase the ability of platforms to guide their activity towards their own vertically related services, through carefully designed choice architecture.
- If the user data that can be gained in a new market can be valuably monetized in a core market, this can provide a rationale for a platform that is active in the core market to enter new markets at a loss. Platforms that are not active in the core market cannot gain the same data advantage from the new market, and may not be able to compete effectively, potentially even if their product is better. (Condorelli and Padilla, 2020)
- Tying by a platform with market power can be more effective in leveraging into new markets when prices are constrained from falling below zero, as this limits the countervailing strategies open to competitors (Choi and Jeon, 2020). Against this, it has also been pointed out that bundling additional services can be one way of increasing value for consumers in the context of a zero-price constraint (Amelio and Jullien, 2012), albeit this is most likely to happen where there is strong inter-platform competition.

32. A key factor in some of the recent economic literature (and cases) has been the growing acceptance of consumer behavioural biases, such as saliency bias (which means prominence matters) or default bias. For example, the 2018 EC Google Android case was based on the existence and impact of default bias: Consumers who received Google as their default search engine were more likely to use Google Search than they would have been with either no default or an alternative default.

33. The implications of behavioural biases for leverage is likely to be a growth area in the economic literature. The role of choice architecture in user steering is likely to come under greater scrutiny. In markets which are highly reliant on consumer data, this may include behavioural biases in relation to privacy consents, as is discussed in the recent (2020) CMA market study on Digital Advertising.

4.3. Additional insights from the business strategy literature

34. When thinking about the potential for anticompetitive conduct in multi-product ecosystems, there are again potential insights to be gained from the value creation literature taught within business strategy. Three concepts are of particular relevance.

4.3.1. Platform envelopment

35. The concept of platform envelopment (Eisenmann et al, 2011) in fact underpins the Padilla and Condorelli (2020) paper described above. The key insight is that there are a number of factors (including some of those discussed above) which make platform markets easiest to enter from other platform markets.

36. This is important because network effects can make established platform markets hard to enter *de novo*. But established platforms in other markets can make strategic use of their existing customer base by bundling services into the new market. This can in turn foreclose the incumbent in that market from access to users and harnesses the network effects that originally protected the incumbent in order to compete with it and potentially displace it.

37. Such platform envelopment through bundling can be positive in that it facilitates entry into markets that were previously monopolised. However, it can also be negative if it allows market power to be extended from one market to another to create a monopolistic ecosystem. As is shown by Iossa, Rey and Waterson (2019) – albeit in a very different context – the threat of entry by one monopolist in one market into a nearby monopolised market can act as a surprisingly important competitive constraint. This is lost if the same company monopolises both markets.

4.3.2. Moats

38. The ‘moat’ concept (popularised by Warren Buffett) describes a key competitive advantage that sets a company apart from its competitors on a long-term basis. Warren Buffett is famed for focusing his investments on companies that he saw as having good moats. Moats are closely linked to the other concepts above. Indeed, a ‘flywheel’ that is at the point of turning powerfully, under its own steam, might be automatically described as having created its own moat.

39. However, the moat concept can potentially drive business strategy in its own right. In particular, if platforms perceive a risk of platform envelopment from nearby platform markets, they may have an incentive to monopolise – or alternatively prevent monopolisation of – a nearby platform market, not for its own sake but to limit the risk of an envelopment attack on its core market. This desire to create a moat around the core platform is a well understood rationale for tying complementary products across markets (Choi and Stefanadis, 2003).

40. Another rationale for creating a moat is that, where consumers switch to alternative suppliers for some elements of an ecosystem, such partial user defection could eventually lead to their defection from the ecosystem as a whole, which would be costly for the firm. In such circumstances, the ecosystem may prefer to build a moat and keep them fully within the ecosystem. The desire to build such moats may help to explain certain acquisitions too, including of relatively small start-ups.

4.3.3. Ecosystem architecture

41. A third useful insight from the business strategy literature is that *multi-actor* ecosystems inherently require some sort of coordinating ecosystem architecture if they are to enable multiple, dispersed and *ex ante* uncoordinated actors to interact smoothly (Alstyne et al, 2016). This will be truer still if the ecosystem extends over multiple product markets.

42. Any such architecture will typically involve both technical elements, such as interoperability requirements, and also process elements, such as terms of engagement, platform access (who to let onto the platform) requirements and platform governance (what users are allowed to do there).

43. In terms of *technical elements*, there is a reasonably well-established economic literature around interoperability and competition, including around standard-setting processes. As discussed briefly above, a key issue in the digital ecosystem environment relates to the extent to which standards should be open, and agreed in a coordinated way across industry participants, or proprietary and chosen by a specific ecosystem firm. Especially important in this context are Application Programming Interfaces (APIs) which allow different services and organisations to interact. While there are a variety of factors that may influence these decisions, it is clear that anticompetitive aims could also play a role; proprietary standards and APIs can potentially drive faster innovation and higher quality, but also create a greater risk of exclusion.

44. An interoperability issue that is perhaps more novel in a digital ecosystem context is the role of data and the potential pro-competitive effects of systems which allow smooth data sharing between elements in the ecosystem, and across parties, potentially including in the form of consumer-driven data portability. In terms of consumer data, there have been calls for the development of personal information management systems (PIMS), which would give consumers far greater control over their data and privacy. It is likely that this would involve a major standards-setting exercise and strong interoperability requirements.

45. Turning now to *the process elements*, effectively the ‘rule-setting’ role of platforms, there is an emerging economic literature in this area too.

46. While keeping access as high as possible will generally tend to be important for generating network effects, Evans (2020) discusses how platform operators have private incentives to limit bad behaviour by platform users, in order to ensure that their platforms are fair and safe environments for their users. They set rules and monitoring mechanism to achieve this, and typically employ a ‘bouncer’s right’ to refuse access in case of rule breach, or upfront if certain conditions are not met.

47. However, these private incentives may not be sufficient to limit harmful behaviour to a socially optimal extent, and that this can provide a rationale for public regulation around online harms. Moreover, while this ‘bouncer’s right’ to exclude market participants that do not ‘play by the rules’ can play a valuable role and can clearly be pro-competitive, there is also a risk that such rule-setting can be used anti-competitively (Teh, 2020).

48. Leyden (2020) shows how the ratings process on the Apple app store that was in place prior to 2017, acted to delay innovation by good third-party developers, since upgrading involved lowering the existing positive rating that the app had built up. This effect was possibly inadvertent, and the process has now been revised. However, it shows that rules could clearly also be used strategically, for example if a platform imposes differential rules on third party users to those it applies to its own business in competition with those users. Indeed, Facebook’s concerns about Apple’s policy and enforcement decisions

relating to its app store lie at the heart of the former's recent antitrust complaint to the EU Commission.

5. Conclusions

49. The discussion above highlights the importance, but also the complexities, of assessing the conduct of the largest digital ecosystem firms, which are not only multi-sided platforms but also active across multiple product/platform markets. This is an important area, and one in which the economic literature is still emerging.

50. It is clear that there are a number of inherent factors driving multi-product ecosystem development. These factors also need not imply deliberately harmful anti-competitive conduct. However, in a digital platform context, they create a risk not only that individual platform markets tip to being highly concentrated but also that we observe whole ecosystems of markets within which there are very few active players.

51. Of course, we often observe vigorous competition in oligopolistic markets with few players, and there is certainly significant head-to-head competition occurring between the major big tech firms (including those in China) in newer areas such as wearable devices, virtual reality, and digital assistants.

52. On the other hand, this is an environment which may inherently create negative outcomes for consumers, especially if the huge benefits of being an ecosystem player create barriers to entry and expansion which limit the potential for future disruptive innovation, or otherwise reduce the innovation incentives of the incumbent firms. We could even expect to see a degree of 'cosy' coordination developing between this limited set of players, whereby they effectively share out markets between them rather than competing head to head in every market. After all, we know that multi-market contact is a good facilitator of tacit coordination.

53. Moreover, such an environment may also be conducive to strategic leverage behaviour, and acquisitions (including 'acqui-hires') which support this. A particular concern for competition policy will be disentangling benign rationales for the building of ecosystems from anticompetitive ones and adjudicating between them.

54. As an example, the recent CMA report into Digital Advertising mentions Google's effective requirement that content publishers use the Accelerated Mobile Pages (AMP) publication format, so that they can be cached within the Google ecosystem. On the positive side, this allows Google to reduce time lags associated with page loading and so offer users a higher quality search experience. On the negative side, publishers are concerned that this further reduces their control over their own content and user data.

55. It is far from obvious that standard antitrust, with its threat of high sanctions for breach, is the right way to handle these complex and non-obvious questions. They are arguably better suited to being addressed through *ex ante* digital regulation. Indeed, the concern that the inherent dynamics of these markets can generate competition concerns, even absent strategic anticompetitive behaviour, is a key rationale for potential EC and UK pro-competitive regulation that goes beyond standard antitrust.

56. Finally, a key challenge for both antitrust and regulation in this area will be how to intervene, and how best to justify any intervention, given that the economic literature is still relatively nascent. In a perfect world, it might seem sensible to wait to intervene until we understand more. However, given the discussion above, it should be apparent that there is also a serious risk of delaying intervention. The digital platform environment that we observe in a decade's time may, if nothing is done soon, be far more embedded and harder

to rectify. In any case, as discussed above, there already an emerging literature, while relevant thinking in other parts of the academic literature –both economic and business strategy – could usefully be mined for additional insights.

57. Finally, we know from antitrust experience that the economic understanding develops quickly once cases and regulatory interventions are considered. I have every expectation that a 2020 OECD session on the economics of digital ecosystems will have a far more extensive literature to draw on, as well as greater practical understanding of these digital ecosystems.

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