Organisation for Economic Co-operation and Development

DAF/COMP/WD(2017)55

Unclassified

English - Or. English

14 February 2018

DIRECTORATE FOR FINANCIAL AND ENTERPRISE AFFAIRS
COMPETITION COMMITTEE

Chapter One: Introduction and Synthesis

Hearing on Rethinking the Use of Traditional Antitrust Enforcement Tools in Multi-sided Markets

22 June 2017

This paper by the Secretariat is the introductory chapter of an OECD publication entitled: Rethinking the Use of Traditional Antitrust Enforcement Tools in Multi-sided Markets. This publication collects 10 papers that experts submitted to a Hearing of the OECD Competition Committee on 22nd June 2017.

The opinions expressed and arguments employed herein do not necessarily reflect the official views of the Organisation or of the governments of its member countries. More documents related to this discussion can be found at www.oecd.org/daf/competition/rethinking-antitrust-enforcement-tools-in-multi-sided-markets.htm

Chris Pike, Competition Expert
Chris.Pike@oecd.org, +(33-1) 45 24 89 73

JT03426732

*Rethinking the Use of Traditional Antitrust Enforcement Tools in Multi-sided Markets**

1. Introduction

1. Since the turn of the century, economists have understood that multi-sided markets function in ways that are importantly different from standard markets. Since the ground-breaking work on the topic by Rochet & Tirole, huge progress has been made in modelling these markets and the way they work, and identifying the mistakes that can be made by treating them as traditional markets.[1] Naturally, this has consequences for the way in which competition agencies analyse these markets, and hence on whether, and if so how, they decide to intervene in these markets. The speed and extent of growth in the digital economy in over this same period has made this one of the most important, pressing and analytical challenges that competition agencies now face. This is because much of that digital growth has been driven by the appearance and expansion of globalised platforms that disintermediate standard markets and directly connect users, transforming them into more complex multisided markets.

2. In June 2017, the OECD Competition Committee held a Hearing that looked at whether the tools traditionally used to define markets, to assess market power and efficiencies, and to assess the effects of exclusionary conduct and vertical restraints, remain sufficient to address those questions in the context of multi-sided markets. It then invited practical methodological proposals from a range of expert economists from agencies, academia, and private practice on how these tools might need to be re-designed or re-interpreted in order to equip competition agencies with the analytical tools they require when analysing multi-sided markets.[2]

1.1. What are multi-sided markets? Why are they different?

3. While economists typically referred to "two-sided markets" to begin with, we here follow the recent trend by referring here to "multi-sided platforms".[3] We do so for two reasons. Firstly, it helpfully distinguishes between the product of the firm (the platform), and the relevant market, or markets, in which the platform operates. Secondly, it accounts for the fact that while the multi-dimensionality begins with two-sidedness (in which consumers and sellers meet on a platform), this is only the beginning, and many of

* This paper was prepared by Chris Pike of the OECD Competition Division with invaluable comments from Antonio Capobianco, Pedro Gonzaga and Antonio Gomes.

[1] Armstrong (2002), Evans (2003), Wright (2004).

[2] The experts were: Lapo Filistrucchi, Arno Rasek (with co-author Sebastian Wismer), Kurt Brekke, Kate Collyer (with co-authors Hugh Mullan and Natalie Timan), Michael Katz, Tommaso Valletti (with co-authors Andrea Amelio and Liliane Karlinger); Jorge Padilla (with co-author Enrique Andreu), Howard Shelanski (Samantha Knox and Arif Dhilla), Paul Johnson, and Cristina Caffarra (with co-author Kai-Uwe Kühn). Except where indicated, the conclusions reached in this paper do not necessarily reflect the views of these experts. The experts were provided with an opportunity to clarify any views that are attributed to them.

[3] See for example Evans & Schmalensee (2012).

these markets have three sides (consumers, content suppliers, and advertisers) and some even have four (for example in payment cards) or more.

4. Examples of multisided platforms abound: TV and newspapers that connect viewers and advertisers; payment cards that connect card holders, merchants, card-issuing banks and acquiring banks; stock exchanges that connect buyers and sellers; shopping centres that connect retailers with shoppers; digital platforms that connect users, content providers and advertisers; listings magazines/directories that connect businesses and customers; estate agents that connect house sellers and house buyers; and telecom networks that connect fixed and mobile phone users. They might also be thought to include hospitals that connect physician groups with health insurers (and even health insurers that connect hospitals and patients), banks that connect depositors and savers, and supermarkets that connect producers and shoppers.

5. There are various definitions of the multi-sided markets in which multi-sided platforms compete, however, most share the same basic elements, and can be captured as follows: *a market in which a firm acts as a platform and sells different products to different groups of consumers, while recognising that the demand from one group of customer depends on the demand from the other group(s)*.[4] Crucially, if this *cross-platform network externality* is present,[5] this implies that the structure of prices that the platform sets will determine volume, not just the level at which it sets the price across the different sides of the market.[6]

6. While the existence of a cross-platform network externality is binary, there was common agreement amongst experts at the Hearing that there is little value in using this as the distinguishing feature of a multisided platform for antitrust purposes. This is because it is the magnitude of the cross-platform network externality that determines how big a mistake it is to overlook it and treat the product as one-sided. Therefore, while a wider set of markets may exhibit small cross-platform network externalities, the externalities will only be large enough to be important for the analysis in a smaller set of markets.

7. Using a bright line to identify when to use a multi-sided approach therefore risks overcomplicating the assessment of what are, in effect, one-sided markets. However, the alternative conclusion that 'multi-sidedness matters when it matters' means that the multi-sidedness of a market may depend on the nature of the investigation. For example, the platform nature of a supermarket may not matter in the context of a local supermarket merger where the impact on suppliers might be minimal given the level at which supplier decisions are taken and simple quality measures such as the range of products that are offered to consumers may suffice. However, if the investigation is into the anticompetitive nature of 'slotting fees' charged by supermarkets to suppliers for greater prominence on its shelves, then a multi-sided perspective might help explain the rationale for the practice and hence be invaluable to the analysis. Therefore, where there is a cross-

[4] This is based upon Evans (2003) definition that Filistrucchi refers to.

[5] This is sometimes referred to as an indirect network externality.

[6] Rochet & Tirole (2006). Hermalin & Katz (2017) note that this focus on price should also be extended to terms and conditions since prices in these markets are often set at zero. Filistrucchi explains that price structure only affects volumes in transaction platforms if there is some limitation on the ability of one side to pass-through a price differential set by the platform to those on the other side of the market. Where there is no such limitation, the platform cannot control the structure of prices across the two-sides and hence their price structure cannot affect volumes.

platform network externality, the value of adopting a multi-sided approach should at least be considered, and the rationale for deciding not to do so explained.

8. There are also some important differences between different types of multi-sided platforms. The first is between those platforms that can observe when a transaction is taking place on the platform and those that cannot. Where the platform can observe a transaction, it may charge a price for it if the externality derives from additional *use* of the platform by other sides, rather than solely from additional *membership*. This might be instead of, or in addition to, any subscription fee that it sets for members.

9. Within the category of non-transaction platforms, we can think of there being non-transaction matching platforms, and non-transaction audience-providing platforms. For example, where the cross-platform network externality is positive on both sides and the objective of the platform and all users is to find the best possible match, Rasek & Wismer describe a platform as a matching platform (Shelanski, Knox & Dhilla refer to these as service-based platforms). A matching platform can be a transaction matching platform if the transaction is observable (e.g. uber, stock exchanges), but if it is not observable then it can be considered a non-transaction matching platform (e.g. dating apps, real estate platforms, Wikipedia).

10. If the externality runs in just one direction, Rasek & Wismer consider the platform an audience-providing platform (Shelanski, Knox & Dhilla identify these as subsidy-based platforms). We can think of these audience-providing platforms as being either transaction or non-transaction platforms depending on whether the transaction is observable or not. Typically, an advertising platform (e.g. newspapers) will not be able to observe the transaction (whether the advert resulted in a sale to a specific customer). However this is already changing in online advertising where a purchase can be traced using the trail that is created when a consumer clicks through from an advert and makes a purchase. In that case, the effect of the advert may become observable to the platform, which in turn allows it to charge for a commission on the follow-on transaction.

11. While a two-sided market can be categorised using these distinctions, as Shelanski, Knox & Dhilla point out, many digital platforms are three-sided and so can be characterised both as matching two sides that each generate positive externalities (users and content providers), whilst also providing an audience for a third side that might not deliver positive externalities (advertisers). The transactions between these three sides may all be observable or none of them might be.

12. The nature and strength of the cross-platform network effects is therefore more important to the analysis than the category of platform. For example, the consequences of some platforms' actions can be much greater than they appear at first sight. For example, when a strong cross-platform network externality exists on more than one side of the market, this creates feedback loops. In these loops, an action can trigger a spiral of reactions, which, as in a multiplier effect, increase the magnitude of the consequences of the action. As an example, increasing the price that users pay might reduce the number of users, but this may also reduce the value of the platform to advertisers and hence reduce the amount that advertisers are willing to pay. In turn, this may reduce the return that content providers earn when their content is viewed on the platform, thereby reducing the amount or quality of content, which may reduce the number of users. Once again, this may then reduce the amount that advertisers are willing to pay, and so forth. Each action the platform takes can therefore create a series of reactions (a ripple effect). If these effects go far enough they may tip the firm towards failure on the one hand, or dominance (monopoly) on the other.

Box 1. Summary on the nature of multi-sided markets

1. There are various definitions of the multi-sided markets in which multi-sided platforms compete, however, most share the same basic elements, and can be captured as follows: a market in which a firm acts as a platform and sells different products to different groups of consumers, while recognising that the demand from one group of customer depends on the demand from the other group(s).
2. While the existence of a cross-platform network externality is binary, there is common agreement amongst experts at the Hearing that there is little value in using this as the distinguishing feature of a multisided platform for antitrust purposes. Nevertheless, where there is a cross-platform network externality, the value of adopting a multi-sided approach should at least be considered, and the rationale for deciding not to do so explained
3. There are differences between different types of multi-sided platforms. The first is between those platforms that can observe when a transaction is taking place on the platform and those that cannot. A further distinction is between non-transaction platforms that match users, and non-transaction platforms that provide content to some users and access to an audience for other users.
4. Despite the differences, the nature and strength of the cross-platform network effects is more important to the analysis than the category of platform. For example, a strong cross-platform network externality that exists on more than one side of the market creates feedback loops that can mean the consequences of the platforms' actions are much greater than they might appear at first sight.

2. Market Definition

13. A traditional starting point for framing an analysis of the competitive effects of a merger, an action or an agreement is to define the relevant market(s) that might be affected. This can help to identify demand and a set of relevant competitors. However, when a merger, action or agreement involves either a multi-sided platform, or a firm that trades with a multi-sided platform, there is a preliminary question of how many markets to define. For multi-product or multi-location firms, the answer is the result of the market definition exercise, which identifies the scope of the market, and hence whether those different products and locations fall within the same or different markets. In contrast, for multi-sided platforms, the product that a platform provides to one side of the market does not compete with the product it provides to another side. In the case of multi-sided markets the question of how many markets to define cannot be answered within a market definition exercise, instead it is a conceptual question that requires an answer before any exercise to define the scope of the market can be carried out.

2.1. How many markets to define?

14. Filistrucchi suggests that one multi-sided market should be defined only in the case of platforms that compete in 'transaction markets'. In these markets, a platform sells the ability to find a match and transact with another side of the market (e.g. Airbnb). The product is the transaction, and this is the same product offered to each side (and in fixed 1:1 proportions, so one side can only transact if someone on the other side transacts with

it). In cases where platforms compete in non-transaction markets, he suggests defining two 'interrelated' markets.

15. However, as noted by Rasek & Wismer and others, non-transaction markets include different types of multi-sided market. There appears, for example, to be agreement that in those types of markets where the cross-platform network externality is positive for just one side (e.g. media markets), it makes sense to define two 'interrelated' markets. In those cases, the product offered to each side is very different. For example, in newspapers this might be a market for printed content (a reader market), and a market for attention (an advertising market).

16. In addition, there are also non-transaction matching markets. These might be funded through advertising (effectively creating a third side to the market), or they might be funded through subscription fees. The product on offer to the two sides is the opportunity to find a match, though not to transact (see for example a dating application, a social network where different user groups interact, or a marketplace application like craigslist). In this case, the platform does not offer a transaction to either side as its product (since it cannot observe whether a transaction takes place or not and hence cannot charge for it). Instead the product that it offers to both sides is the opportunity to find a match (and hence to transact off-platform). In these cases it would appear that, if a market were to be defined, it would be a single two-sided market. However, where the matching platforms are funded by advertising, this third side (advertisers) might be identified as a distinct market that is interrelated with the two-sided matching market.

17. One might ask whether it really matters whether we define a two-sided market or two 'interrelated' markets, as long as we identify that these each require an analysis of the interrelationship, and hence recognise that each differs from a traditional one-sided market. For the purposes of a competitive assessment that is right.[7] Analysing the interrelationship is unavoidable since running a simple one-sided market definition analysis would ignore the fact that the profit the platform loses when a reader switches is magnified by the reaction of advertisers to that decision.[8] In contrast, market definition is often unnecessary and can be counterproductive.[9] Rasek & Wismer suggest that in multi-sided markets market definition in itself may be less informative than in one-sided markets. Therefore, provided the competitive effects analysis examines the interrelationship between the different *sides* or *markets*, the framing of the market definition as a multi-sided market or as multiple interrelated markets, or indeed the absence of a market definition, need not distort the conclusion.

18. However, whether the relevant market is two-sided or consists of two interrelated markets may make an important difference in a legal sense in some jurisdictions. For

[7] The economic distinction between these categories that we have highlighted above may of course be relevant in a different context.

[8] An exception which simplifies some cases is where users on other sides of the platform are indifferent to the use (or membership of) of the platform by another side. For example advertising markets might be analysed as one-sided if readers, viewers or listeners are indifferent to the quantity and nature of advertising on their product. There also remains of course the question of the scope of that one-sided advertising market: does it include television, radio, newspapers, social media and so on? Is it for ages 25-35 or 75+? And over which geographic area? However, these are traditional market definition questions, which can be answered using traditional tools.

[9] See for example, Kaplow (2010 and 2013). Rasek & Wismer and others suggest that it remains useful.

example, as Katz notes, in the US the question of whether or not efficiencies on one side of the market are weighed against an identified loss of competition on the other side might depend crucially on whether these are considered to be two sides of the *same* market, or interrelated but *distinct* markets. Where two interrelated markets are defined, efficiencies on either market would, if verified, be relevant to the economic assessment (since they would be expected to affect the other market). However, where two interrelated markets are identified, efficiencies would typically need to accrue within the same market as the loss of competition in order to affect the outcome of the case.[10] Therefore, where cross-platform network effects are important, and a market definition is required, defining a single two-sided market would ensure that the assessment as a whole is based on the full set of possible competitive and efficiency effects, and that no effect is arbitrarily excluded. Notably this would mean that non-transaction platforms would be defined as competing in a single two-sided market rather than two interrelated markets.

2.2. How to define the market(s)?

19. In principle, the framework of the hypothetical monopolist test can still be used in multi-sided markets. Filistrucchi explains that in many cases, this can still be framed as a SSNIP test (a Small but Significant Non-transitory Increase in Price).[11] For example, where a single multi-sided market for transactions is to be defined, a SSNIP test can be used to identify the scope of that market even if one side faces a zero price. This is because the zero price is just one element of a price structure that the platform sets for its single product (the transaction). A small but significant increase in the total price of the transaction is therefore still a meaningful concept (since such an increase is not infinite in the way that a lifting a zero price would be), and the profitability of such an increase can therefore still be examined.

20. Similarly, where two interrelated markets are to be defined, a zero price in one market does not prevent the other interrelated market being defined via a SSNIP test. It is true that the scope of the zero price market cannot itself be defined by a SSNIP since any change in price would be infinitely large. However, as Filistrucchi suggests, a SSNDQ test (Small but Significant Non-transitory Decrease in Quality) can still be applied, as indeed it might in any of the other scenarios where a SSNIP is the default tool. This is because the hypothetical monopolist test is a test of the profitability of a marginal degradation of value offered, and not of price alone.[12]

21. However, as is often the case in one-sided markets, the difficulty is in operationalising the SSNIP (or SSNDQ) test. In particular, Rasek & Wismer note that it may not be possible to implement the test due to reliable data being unavailable. Reformulated expressions for the SSNIP test have been developed by Filistrucchi et al (2014) to allow for application within multi-sided markets.

[10] Another example is the Vertical Block Exemption Regulation in the EU, where satisfaction of the 30 per cent market share threshold may hinge on whether one single or two interrelated markets are defined.

[11] In a SSNIP test, the profitability of a small but significant non-transitory increase in price is examined for each candidate market. If a SSNIP would not be profitable then the scope of the candidate market is expanded, and the test is re-run on this next iteration of the candidate market. When a SSNIP is profitable the candidate market is identified as the relevant market.

[12] A firm can reduce value and capture surplus by either increasing price, or reducing its costs by investing less in quality.

22. While these expressions appear more complex, the required inputs are in fact largely the same as those required to implement a standard SSNIP test. The additional requirement is an estimate of the cross-platform network effects[13], which is in any case required in the subsequent assessment of market power.

23. This effect cannot be ignored because it changes the profitability of the price increase, and can therefore change the conclusion of the SSNIP test on the scope of the relevant market. This is the case both for positive and negative cross-platform network effects. For example, if readers dislike adverts, then a price increase by a hypothetical monopolist might reduce readership and make the newspaper less attractive to advertisers, but less adverts would attract additional readers. The price increase would therefore be more profitable than if the reader were indifferent to adverts. Furthermore, even if readers are entirely indifferent to adverts, the impact that increasing the cover price and reducing readership has on profits from advertising, as well as on sales of the newspaper, need to be taken into account when the SSNIP test is applied.[14]

24. One important additional difficulty that is specific to multi-sided platforms is identified by Filistrucchi. This is the need to re-optimise the balance of prices across the sides of the market after the profitability of a SSNIP has been tested on each iterated candidate market. In a traditional one-sided market, the issue does not arise, as there is only one price. In contrast, on a multi-sided platform, there are at least two prices that might be changed in order to increase profitability. A hypothetical monopolist might therefore increase one and leave one unchanged (or vice-versa), it might increase one and reduce the other (or vice-versa), or it might increase both.

25. The need to re-optimise means firstly that each iteration of the test on a candidate market needs to be repeated for each of the ways in which the price(s) might be raised to increase profitability. Furthermore, the optimal balance of prices might change as the scope of the candidate market is expanded so the same three options might need to be tested at each iteration.[15] This introduces considerable additional complexity, and, if not tackled, would lead, as Filistrucchi explains, to a bias that overestimates the size of the market that is defined, thereby potentially underestimating the market shares of firms within that market.

26. It may therefore be the case that the complexities of applying the hypothetical monopolist test are insurmountable, while the alternatives are undesirable. The first best

[13] As Rasek & Wismer point out there is likely to be significant heterogeneity in the cross-platform network externality for different users and consumers. However, unless the platform can price discriminate it will need to optimise based on the overall elasticity. If price discrimination is possible, this might indicate the existence of distinct markets (based on the ability to price discriminate).

[14] Equally, an increase in the price of advertising would reduce demand for advertising in the newspaper, which may lead to fewer adverts. This, in turn, may increase readership, which would increase demand for advertising. This feedback effect means that the price increase for advertising is more profitable than would appear if the impact on readers (and how that in turn affects advertising demand) were ignored.

[15] Note this is different from the cellophane fallacy, which is a problem in one-sided markets that remains in multi-sided markets. This is the possibility that the market price from which the test begins is in fact already a monopoly price and hence any increase will not be profitable and so further increases to the price will not identify a profitable SSNIP since each iteration brings the price further away from its optimal level.

solution in such cases would be to leave the market undefined where possible. However, if defining a market is unavoidable, and as is often the case, the SSNIP/SSNDQ test cannot be operationalised, the best option is to use the hypothetical monopolist test as a framework (or thought experiment) onto which qualitative evidence is applied (for example views on substitutability from consumer groups, industry analysts or firms that are informed by verified observations on previous experience). This prevents the exercise from slipping into a characteristics-based process, which takes no account of substitutability.

Box 2. Summary of key considerations for market definition

1. There might be little value in carrying out a market definition exercise in markets involving multi-sided platforms. Therefore, consider carefully whether a market definition exercise is a necessary and proportionate use of resources.
2. When defining markets is an unavoidable requirement, first decide how many markets to define;
   a. An assessment of the significance of the cross-platform network effect should be used to identify those markets that should not be treated as traditional one-sided markets.
   b. For the purposes of a competitive assessment there is little meaningful distinction between defining a two-sided market and defining two interrelated markets, as long as the effect of the cross-platform network effect is recognised and analysed. However, in some jurisdictions the choice may have an important effect on which efficiencies the legal analysis allows to be weighed against any loss of competition that is identified. Therefore, where cross-platform network effects are important, and a market definition is required, defining a single two-sided market ensures that the assessment as a whole is based on the full set of possible competitive and efficiency effects, and no effect is arbitrarily excluded. Notably this means that non-transaction platforms would be defined as competing in a single two-sided market rather than two interrelated markets.
3. When defining the scope of the market(s);
   a. The framework of the hypothetical monopolist test provides a discipline that helps guard against the adoption of a characteristics-based approach to market definition.
   b. A SSNIP test should check the profitability of an increase in price on each side of the market, as well as on the total price. Care must be taken to avoid (or at least to identify) potential bias towards overly broad markets that may arise if the hypothetical monopolist does not ensure it is setting the optimal price structure at each iteration of the test.
   c. Where a platform operates in a single multi-sided market and sets a zero price on one side of the market, a SSNIP test can be used (either as a conceptual tool or in some cases as a test using the reformulated expressions for the SSNIP test that have been developed).
   d. Where a platform operates in markets that are defined as interrelated and sets a zero price in one market, a SSNIP test would involve an infinite price increase and so a SSNDQ test can be used instead.

3. Market power

27. When measuring the market power held by a multi-sided platform, it is important to recognise that cross-platform network effects can magnify the competitive constraints that exist, while also raising a barrier to entry by potential rivals and restricting the

emergence of new competitive constraints.[16] Consequently, as both Brekke and Collyer, Mullan & Timan explain, those tools that seek to measure market power or changes in market power by looking at consumer responsiveness (e.g. using tools based on elasticities or diversion ratios), need to ensure they collect or estimate all the relevant elasticities and diversion ratios. For example, this would need to include consumers' response to changes in participation on the other side of the market. In contrast, other tools that do not look at consumer responsiveness (for example market shares), do not in themselves require an estimate of cross-platform network effects, though they are likely to require some other adjustment or reinterpretation in order to reflect the existence of an interrelated market or another side to the market. Moreover, an assessment that relies on tools that do not look at consumer responsiveness will also need, at some stage, to reflect on the impact that strong cross-platform network effects would have on the conclusions that it draws from these tools. In any case, the interrelationship of pricing across the platform, and the need to reflect this in whichever tools are used, means that is not possible for a multi-sided platform to have market power on only one side of the market. Either it has a degree of market power as a platform, or it does not.[17] It is therefore not meaningful to conclude that a platform has market power on one-side of the platform.

3.1. Tools based on the responsiveness of demand

28. In a modern competitive effects analysis market power is typically assessed by looking at the responsiveness of demand. For instance the size of the competitive constraint that is lost from a merger can be seen in the strength of the cross elasticity of demand between the merging firms' products. Similarly, the own-price elasticity of demand helps inform a view of the degree of market power that a particularly product holds. Where market power is measured using tools that look at the responsiveness of demand, these will need to be adjusted to reflect the impact of cross-platform network effects. This is because, as noted, strong cross-platform network effects and feedback loops change the responsiveness of demand. Failing to account for this change may therefore lead to a misunderstanding as to the closeness of competition between two firms. Where cross-platform network effects are strong, they therefore need to be estimated and then reflected in the assessment of market power.[18] For other types of tool, including market shares, profitability measures, and event studies, this estimation is not part of the tool, though multi-sidedness matters in other ways (see below). Instead, the cross-platform network effects might be reflected in the assessment after a preliminary analysis that recognises these other aspects of multi-sidedness has been conducted, as Collyer, Mullan & Timan suggest. In contrast, for tools based on the responsiveness of demand the estimation needs to be integrated within the analysis from the beginning.

[16] Strictly, however it is worth observing that the barrier to entry is not the cross-platform network effect itself, but rather the inability of users to coordinate their response to that effect. This means for example, that where users have effective coordination mechanisms available to them, this may remove the barrier to entry, even if the cross-platform network effect remains. This makes collective switching schemes a potential model for improving the way that these markets work for users.

[17] However, the substitutability of demand might still be different on different sides of the market.

[18] This remains the case whether a multi-sided market has been defined, or whether two interrelated markets have been defined. Though of course, strictly, we do not know if these cross-platform network effects are strong or not until they have been estimated.

29. For instance, Brekke identifies that for merger analysis, adjusted versions of the upward pricing pressure (UPP) index and generalised upward pricing pressure indicator (GUPPI) tools have been developed and are available for Competition Authorities to use.[19] These can be straightforward to use if estimates of elasticities and the cross-platform network effects are available. However, the difficulty is in obtaining such estimates.

30. It is worth noting that obtaining estimates of cross-platform network effects is a challenge that arises in both the market power and efficiencies assessments. It may therefore make sense in multi-sided platform cases to consider collapsing the market power and efficiencies assessments into a single exercise in which both the agency and the firm(s) seek to quantify these cross-platform network effects.

31. Brekke explains that to calculate the adjusted UPP indices requires an understanding of the full impact that a price rise on side A of the platform will have. This can be separated into three effects: 1) the effect on *demand from users on side A*; 2) the effect on *demand from users on side B*; and, 3) the effect on *the price on side B*. In each case the reverse is also required, meaning there are six key inputs required for calculating the adjusted indices.

- The first effect of a price rise on side A is that demand for A will fall. This effect is simply the elasticity of side A's demand with respect to the price of A, and so this first effect is likely to be negative.
- The second effect of a price rise on side A is that demand for B will fall (as those on side B respond to the reduced demand on side A). This effect is the elasticity of side B's demand with respect to the price of A. If the cross-platform network externality is positive (e.g. buyers like there to be more sellers), this second effect is likely to be negative.
- The third effect of a price rise on side A is that the price on side B will fall, which increases demand for B and hence will also increase demand for A. The reason that the price on side B falls, is that increasing the margin on side A increases the incentive to raise participation on side B, since this extra participation attracts more high-margin sales on side A. This effect is the elasticity of B's price with respect to the price of A (the rebalancing effect).[20] If the cross-platform network externality is positive, this third effect is likely to be positive, and therefore to somewhat counteract the first and second effect. Overlooking this third effect may therefore lead to overestimating the negative impact on volume of a price rise on side A.

32. Where data (and time) permits, the relevant elasticities can be calculated through demand estimation that looks at diversion ratios in response to small changes in price, quantity or quality.[21] The data requirements for such exercises are however, challenging,

[19] See paragraphs 23 to 26 of Brekke, and previously in Affeldt et al. (2013) and Cosnita-Langlais et al. (2018)

[20] Brekke refers to this as a "feedback effect" but we refer to it here as a "rebalancing effect" in order to distinguish it from the simple feedback loops identified in para 9. It reflects the fact that the increase in price has a rebalancing effect on the prices set across the different sides of the market (not only a direct effect on demand on each side).

[21] Whilst most practical in longer investigations of unilateral conduct or in the context of market studies, these estimations are now being used in mergers within sectors that provide both data and a continuous stream of

and so as Collyer, Mullan & Timan suggest, the use of surveys might present a more realistic option than demand estimation in many contexts.

33. However, there are also challenges to using surveys, since identifying particular effects while holding everything else constant may not be straightforward. For example, we would need to assess the three effects set out by Brekke above. To assess the first effect, Filistrucchi suggests that sellers (e.g. hotels) might be able to tell us how a change in commission would affect their demand for the platform. However, consumers are unlikely to be able to tell us how a change in the commission that sellers pay the platform would affect their demand for the platform. In order to assess this second effect, we might therefore need to ask how consumers' demand for the platform would react to the change in the number of sellers on the platform (or any change in sellers' prices that is passed through) when the commission increases. Fortunately, we should know this change from the sellers' response that we obtained when quantifying the first effect.

34. To estimate the third term (the rebalancing effect), a survey would also need to ask the platform how it would change the price it charges consumers (or the quality it sets), if its commission on sellers were to increase. However, there might be a question mark over the platform's incentive to provide a genuine estimate of this figure. It might therefore be necessary to validate the figure without input from the platform itself. This might be possible, but would not be straightforward. We would need, for example, to know the change in the quantity of sellers (or sales) that would maximise profits for the platform if it were charging a higher commission. We could then identify the change in consumer demand that would trigger that size of increase in the quantity of sellers. Finally, we would need to know how much lower the price to consumers would need to be to trigger the increase in consumer demand that would set this chain in action.

35. Where these methods are effective and elasticities are successfully estimated, these estimates can be plugged into the reformulated UPP and GUPPI expressions that Brekke identifies. However, in a non-merger context in which the authority wants to understand the level rather than the change in market power, they can also be plugged into an adjusted Lerner index to provide a measure of a platform's market power. Where these estimates are not available, a potential short-cut set out by Tremblay (2017) is to compute this adjusted Lerner index using administrative data on profits, fixed costs and revenues. Where this administrative data is available, an adjusted Lerner index can be calculated as: the total profit of the platform, plus the fixed costs of the platform, all divided by the total revenue of the platform.

3.2. Other tools

36. Market shares, barriers to entry and exit, measures of concentration or profitability, and patterns of use (e.g. single or multi-homing) are each also used to help assess market power. However, the traditional problems of these types of tools that are not based on consumer responsiveness, are exacerbated in a multi-sided context. Firstly, as Brekke explains, some of these tools may assume no product differentiation, while platforms are highly differentiated (e.g. strengths in different geographic areas, or amongst different types of user), and the network effects themselves drive much of this differentiation. Secondly, as Collyer, Mullan & Timan identify, a meaningful unit of measurement is not always straightforward; for example, value, capacity, volume, or

merger inquiries. For example, both the Netherlands and the UK have constructed demand models for hospital services, which can be applied in the context of individual mergers.

volume of full priced sales might each make sense in different circumstances. In non-transaction multi-sided platforms this can be further complicated if there is no common unit that can be used across both sides, since this makes it unclear how to synthesize the two. Thirdly, these tools provide no information on substitutability, and so give no sense of how (in)vulnerable a given market share is. This is particularly problematic in multi-sided markets since the cross-platform network effects also provide scope for the observed market shares to quickly and radically change (tip).

37. As Collyer, Mullan & Timan suggest, market share tools are therefore of most value when looked at over a period of time, since this indicates a degree of durability. They can be of particular value when observed over a period of time during which there was a change in the relative value of the products (e.g. a price increase). Effectively this introduces consumer responsiveness into the tool. Of course, where such observations can be identified in data, they can be turned into event studies, a more sophisticated tool that can provide insight in a multi-sided context, provided the necessary adjustments are made. For example, event studies of two-sided platforms need to consider what is happening on the other side of the market, since the consequences of a reduction in the value offered by the platform might be clear on one side but not the other.

38. Another tool that does not require information on responsiveness is to proceed directly to measure the platform's profitability and to compare that to a counterfactual of what a competitive return would be. Collyer, Mullan & Timan point out that in a multi-sided context this would need to recognise that costs incurred, and profits/losses on the other side of the market, are part of the profitability of the platform, and need to be assessed together. Many of the challenges faced in one-sided markets re-surface here. For example, the difficulty in accurately measuring economic profit as opposed to accounting profit, and the identification of the relevant counterfactual.

39. With regard to single-homing or multi-homing, both Collyer, Mullan & Timan and Rasek & Wismer suggest that it can be useful for agencies to examine patterns of use and establish whether users on one side of the market tend to single-home or multi-home on different platforms. This can be important for understanding the nature of competition in the market, for example, whether firms compete to sell each unit, or instead compete for exclusive relationships with customers. However, as Rasek & Wismer note, it is not clear whether the predominance of single or multi-homing suggests in and of itself that the platform has market power. Widespread single-homing or exclusive use might, for example, be taken to suggest that consumers do not see other platforms as good substitutes (if we were to assume that consumers would sometimes use these other platforms if they considered them a good alternative). However, it does not actually tell us anything about consumers' views on the potential substitutability of the platform; in particular, it might be expensive to multi-home and there might be fierce competition amongst platforms to be the exclusive platform used by each consumer, or at least by the marginal consumers.[22]

[22] For example, rival mobile phone networks might compete to be contracted by handset owners, and would then match those handset owners with those that want to call them (from fixed or mobiles lines). The networks would then set their price for calling the consumer knowing that the caller had few good alternative options. However, it would be inaccurate to describe this as market power without reference to the intensity of competition to contract with the handset owner. Therefore, the habit of single-homing (having one mobile phone rather than two) might not tell us much about the market power of the mobile phone network. As discussed in OECD (2017) a competitive market might be followed by an uncompetitive aftermarket if consumers do not anticipate future costs (e.g. printer cartridges) or do not incur them (e.g. mobile phone termination charges under a calling party pays system).

40. There is also an ambiguity to multi-homing (non-exclusive use of a platform). This might be interpreted as evidence of users switching their demand between platforms (e.g. using different supermarkets, search platforms, dating applications or advertising routes), thereby implying strong substitutability and close competition. However, it might also be interpreted as evidence that the platforms are complementary, thereby implying little competition (e.g. using two search engines but using them to search for different things, or using different advertising routes to reach different single-homing groups of users).[23]

41. It is also possible to take a narrower definition of multi-homing as the use of multiple platforms when making a *single* decision. For example, the use of a single platform when looking to order a takeaway pizza on a Saturday evening might be defined as single-homing, despite the fact that the consumer uses multiple platforms for food delivery over the course of a month. Adopting this narrower definition makes multi-homing a closer approximation of substitutability since it eliminates the possibility that the different platforms were being used when making slightly different types of decision. However, information on when multiple platforms are used within the same decision is often more difficult to obtain.[24] Furthermore, even if multi-homing is common on one-side, it might not indicate that the multi-sided market itself is highly competitive. For example, it is often noted that surplus built up from multi-homing users (e.g. advertisers or callers to mobile phones) can then be competed away on attracting single-homing users (e.g. readers or mobile phone contract holders). However, if there are constraints that prevent the platform offering negative prices to single-homing users, then the platform might be able to limit the extent to which it competes away the surplus that it extracts on the other side of the market.[25]

42. Where tools are not based on consumer responsiveness, care is needed in interpreting what an observed pattern of use says about substitutability on that side of the market, and more generally what substitutability on one side of the market implies for the platform's market power, which needs to be judged across all sides of the market.[26] Nevertheless, these tools might, as Collyer, Mullan & Timan suggest, be used to conduct a preliminary analysis that considers the difficulties that arise as a result of the multi-sided nature of the market (see above), and which is then adjusted in a second stage of the assessment to reflect the impact of any cross-platform network effects. Where the cross-platform network effects are one-way, the preliminary analysis can be sufficient to conclude on the degree of market-power held by the platform in the provision of a product that generates no cross-platform network effects for the other side of the market.

[23] For example, users might use a second platform in addition to their usual platform. For example house renting/sales platforms and general search; or different estate agent platforms for searching in different geographic areas (or at different price levels). Alternatively, sellers might use a second platform to reach buyers that single home on that platform (this is the competitive bottleneck).

[24] This narrower definition of multi-homing as the use of multiple platforms in the course of a single purchasing decision is for example used in the CMA's analysis of the Just Eat / HungryHouse merger.

[25] For example, investments might be required to facilitate paying negative prices and contracting for exclusive use of a platform.

[26] For example, if multi-homing on one-side is interpreted as reflecting complementarity and not substitutability and hence indicates a lack of market power on that particular side, this might indicate smaller competitive incentives to compete for consumers to 'sell' to the other side.

However, where products generate two-way cross-platform network effects, the preliminary view on the market power of the platform will need to be revised. This revision requires an assessment of whether the cross-platform network effects increase or decrease the degree of market power identified in the preliminary assessment, and by how much.[27]

[27] For example, a one-sided assessment might suggest that platform X has a large share of sellers/advertisers but a small share of buyers. The cross-platform network effects might then reveal that buyers are relatively insensitive to the range of sellers, while sellers care a lot about the number of buyers on the platform. This might suggest that another platform with a small share of suppliers or more consumers might be a stronger constraint than first thought. Alternatively, a one-sided assessment might suggest that platform Z is in a relatively vulnerable position (e.g. low barriers to entry, low switching costs, and a small share of users). However, the cross-platform network effects might reveal that users are very sensitive to the participation of certain sellers (e.g. important brands), and the platform has a strong position in relation to those sellers (e.g. a high share or exclusive contracts). This might suggest that the platform has more market power than first thought.

Box 3. Summary of key considerations for market power

1. Where strong cross-platform network effects run in both directions, it is not possible for a multisided platform to have market power on one side of the market. Either it has a degree of market power as a platform, or it does not. Substitutability of demand might be different on either side, but given the interrelationship of pricing across the platform, it is not meaningful to conclude that a platform has market power on one-side of the platform.
2. For those tools that measure market power based on the responsiveness of demand, cross-platform network effects need to be integrated within the analysis from the start.
    a. There are at least six effects that need to be estimated in order to apply the UPP indices (or GUPPI) that have been adjusted for use in multi-sided markets. These include the full impact that a price rise on side A will have: 1) the effect on demand from users on side A; 2) the effect on demand from users on side B; and, 3) the effect on the price on side B. They also include the same three impacts that a price rise on side B would have. These six effects can be estimated by surveying users on each side of the platform, though the questions will need testing with the relevant audience.
    b. Where data and time permits, estimates of these effects can also be obtained from demand estimations that can be used to simulate the effects of a merger or to estimate an adjusted Lerner index.
    c. In cases where estimates of diversion ratios and elasticities are unavailable, it may be that there is adequate administrative data to compute the adjusted Lerner index using data on profits, fixed costs and revenues. Where this data is available, a generalised Lerner index can be calculated as: the total profit of the platform, plus the fixed costs of the platform, all divided by the total revenue of the platform.
    d. Since quantifying cross-platform network effects is a key task for the assessment of both competitive effects and efficiency effects in multi-sided platform cases, it may be worth collapsing these two stages into a single exercise in which both the agency and the firm(s) seek to quantify the cross-platform network effects.
3. For other tools that measure market power without reference to the responsiveness of demand, for example those that measure concentration or profitability, the impact of cross-platform network effects might be reflected in a second stage of the assessment, after a preliminary analysis has been conducted.
    a. The preliminary analysis might use standard tools to identify: the percentage of users that use the platform; barriers to entry and exit; and profits. It might also look at the patterns of single and multi-homing behaviour by users since these can be helpful for understanding the nature of competition in the market. Taken together, these analyses might allow a preliminary view on the market power of the platform.
    b. However, care is needed in interpreting what an observed pattern of use (e.g. single-homing) says about substitutability on that side of the market, and more generally what substitutability on one side of the market implies for the platform's market power, which needs to be judged across all sides of the market.
    c. Where cross-platform network effects are one-way, this preliminary analysis can be sufficient to conclude on the degree of market-power held by the platform in the

provision of a product that generates no cross-platform network effects for the other side of the market.

d. Where products generate two-way cross-platform network effects, the preliminary view on the market power of the platform then needs adjusting to reflect these cross-platform network effects. This requires an assessment of whether these effects increase or decrease the degree of market power identified in the preliminary assessment, and by how much.

4. Exclusionary conduct

43. It might be argued that multi-sided markets require less scrutiny from antitrust authorities and should be treated more leniently. This is because cross-platform network effects magnify competitive constraints suggesting that these platforms have less market power than first appears and because there are clear pro-competitive rationales for building volume at the expense of rivals to take advantage of network effects.

44. However, both Katz and Valletti, Amelio & Karlinger emphatically disagree that greater leniency is required. Katz concludes that the markets in which multi-sided platforms operate may provide particularly fertile ground for exclusionary conduct, while Valletti, Amelio & Karlinger suggest that exclusionary practices are more likely in these markets, rather than less likely.[28] In each case, the conclusion is that examination of exclusionary unilateral conduct in multi-sided markets should be a greater priority for agencies than it is in traditional markets.

4.1. Why is exclusion a greater concern?

45. As standard amongst economists, both authors take the position that the effects of potentially exclusionary conduct, such as exclusivity clauses or predatory prices, should be assessed on a case-by-case basis. The question is whether the incentive or ability for firms to use these practices in ways that generate anti-competitive effects is greater or lesser in multi-sided markets than in traditional one-sided markets.

46. In the case of exclusivity contracts, the risk is greater because these contracts may affect users on side B of the market who are not party to a contract agreed between the platform and users on side A, and whose interests may differ. In contrast, in one-sided markets it is sometimes suggested that exclusivity agreements are not likely to harm consumers because it is not in the interests of competing retailers to make exclusivity agreements with manufacturers if the effect is to increase the price that they have to pay. However, in a multi-sided market it cannot be assumed that users on side B will consider the impact on users on side A and refuse to participate in an exclusivity agreement with a platform that excludes other platforms and harms users on side A (but not those on side B).[29]

[28] He also notes recent work suggesting that in markets with zero-price (which is not uncommon in platform markets), anti-competitive tying strategies can be substitutes for predatory strategies.

[29] If the cross platform network effect is strong enough, then harm to side A would also harm side B by reducing participation on side A. However, this may not be the case if these effects are weaker and in any case users on side B might not foresee the third order effects of their actions.

47. A second factor is that cross-platform network effects may create economies of scale since platforms with more users on one side are more attractive to potential users on other sides (everything else being equal). In the presence of economies of scale an incumbent may use exclusivity contracts to shift the nature of competition from competing to sell units to competing for an exclusive relationship with the consumer, and thereby raise rivals' costs. For example, instead of allowing users to multi-home and hence to cautiously transition away from an incumbent by exploring and testing alternatives without losing membership of the established network,[30] the incumbent can make this an all-or-nothing choice between an emerging platform with few single-homing consumers and an established one with many. This can mean user expectations on the platforms future success play a key role.

48. In the case of predatory pricing, Valletti, Amelio & Karlinger suggest that the incentive for the incumbent to exclude is larger, the stronger the cross-platform network externality. Indeed, this holds even in markets in which a user on one side is indifferent to the number of advertisers on the second side of the market. Katz also sees greater risks from predation in multi-sided markets due to the opportunities for platforms to predate by sacrificing profit on one-side while in parallel recouping by setting a high price on the other side.

4.2. How do the tools need to change?

49. When assessing alleged exclusionary conduct in multi-sided markets it is inevitably a challenge to distinguish between pro-competitive efforts to capture additional benefits of network effects, and efforts to deny rivals access to these same effects. Though the benefits are likely to be exhausted at a certain point, it is unclear at which point we might suspect that such practices are less likely to reflect competition to obtain marginal benefits, and more likely to reflect an effort to deny others the opportunity to generate their own cross-platform network effects.[31] An understanding of the value of cross-platform network effects at different output levels can therefore be helpful.

50. To assess the effects of *exclusivity clauses* involves following a framework of inquiry that explores the impact of the clauses on rivals' costs, and then on the intensity of competition.[32] This broad framework remains applicable for cases involving multi-sided platforms. In contrast, the more specific price-cost tests and recoupment tests often used in *predatory pricing* cases no longer appear reliable.[33] A point that was made early in the development of the multi-sided platform literature was that below cost pricing on one side is more likely to be pro-competitive in a multi-sided market since it may help the platform internalise cross platform network externalities. However, both Katz and Valletti, Amelio & Karlinger here make the distinct point that not only can a platform predate by reducing its total price to unsustainable levels, but that it can also do so by changing the balance of prices across the different sides of the market. The implication is

[30] Shapiro (1999).

[31] For example, going from 91 to 93 percent of web searches might be unlikely to improve a platform's algorithms in the same way that going from one to 3 percent might do.

[32] See OECD Fidelity Rebates (2016) for details of this framework.

[33] See Wright (2004).

that even adjusting price-cost tests to focus on net price is insufficient.[34] Instead, these tests remain potentially misleading in multi-sided markets and should not be relied upon.

51. Katz also argues that the recoupment test needs to be interpreted with care. For example, he urges agencies not to interpret this as a test of the rationality of below-cost pricing. Instead, he argues that agencies should ask firstly whether below-cost pricing is profitable because it makes the platform a stronger competitor by building up its base; and secondly whether below-cost pricing is profitable because it weakens competition by preventing rivals building their own user bases. This requires an understanding of whether the below-cost pricing would have been profitable in a counterfactual world in which that pricing did not weaken its rivals (for example by reducing its volume), allowing them to continue to offer the same value product that they would have offered absent the below cost pricing.

52. This 'no economic sense' test would identify clearly those exclusionary cases where allegedly exclusionary conduct is harmful in multi-sided markets (while leaving a grey area for those cases where there is an efficiency rationale but also an anti-competitive effect). Unlike the as-efficient competitor test, this has the distinct advantage of protecting consumers when a more efficient platform engages in conduct that excludes a less efficient platform and reduces competition. As Katz says, there are cases where competition between an incumbent and a less efficient rival is better for consumers than facing a monopolist (even one with low costs), and this is true in both one-sided and multi-sided markets. As such, requiring an investigating competition agency to show that a firm's conduct fails the as-efficient-competitor test is inconsistent with an effects-based approach.

53. An additional proposal made by Katz is that the tools used to test for recoupment should consider not only future recoupment opportunities, but the prospects of simultaneous recoupment, for example on the other side of the market, or in an aftermarket.

[34] See Behringer and Filistrucchi (2015).

Box 4. Summary of key considerations for exclusionary conduct

1. As in one-sided markets, the effects of potentially exclusionary conduct, such as exclusivity clauses or predatory prices, should be assessed on a case-by-case basis.
2. However, multi-sided platforms may require more scrutiny from antitrust authorities than one-sided markets, and should certainly not be treated more leniently since they may provide particularly fertile ground for exclusionary behaviour.
3. Assessing the effects of exclusivity clauses requires a framework of inquiry that explores the impact of the clauses on rivals' costs, and then on the intensity of competition. This broad framework remains applicable in multi-sided market setting.
4. Assessing the effects of predatory pricing typically involves the use of specific tools such as price-cost tests. These tests should not be relied upon in multi-sided markets.
5. Recoupment tests should also be interpreted with care, since simultaneous recoupment is possible in multi-sided markets.
6. Assessing predatory pricing therefore needs a framework that asks firstly whether the allegedly predatory price would have been profitable in a counterfactual world in which that pricing did not weaken its rivals. This counterfactual might be constructed by estimating elasticities (or diversion ratios) and then removing any substitution effects from the platform's optimal price setting problem.

5. Efficiencies

54. As with competitive effects, there is a risk that efficiencies generated on another side of the market will be missed if the multi-sided nature of the platform is not recognised. Alternatively, such efficiencies might be identified but ruled to be out-of-market efficiencies and hence not relevant for the legal assessment. However, as touched upon in the market definition discussion, efficiencies or anticompetitive effects on other sides of the market will be relevant whenever cross-platform network effects are significant.

5.1. Why are efficiencies more likely in multi-sided markets?

55. There is a broad consensus that there is scope for efficiencies in platform mergers. This is because, as Padilla & Andreu explains, mergers between platforms might be expected to combine separate user bases, and to increase interoperability. Indeed, Chandra and Collard-Wexler (2009) have shown that under certain conditions a merged platform might better internalise the various cross-platform network externalities and therefore set lower prices to both sides of the market in order to increase participation on both sides and expand the market. Secondly, as Padilla & Andreu emphasise, where these conditions do not apply, and prices do increase, this may nevertheless reflect a better product that captures more externalities and hence delivers better value, thereby increasing consumer surplus even while the price increases. For example, a merger that better internalises externalities and builds the user base may increase prices for advertisers, however if this reflects a larger audience this might nevertheless increase the advertisers welfare.

56. Given the broad agreement that there is scope for efficiencies in multi-sided markets where cross-platform network effects are significant and the separate platforms are incompatible, it is perhaps surprising that there are no cases in which efficiencies have been accepted. One answer might be that while efficiencies are more likely to be generated in multi-sided markets, there often may remain less anti-competitive ways of achieving the same efficiencies, for example by allowing interoperability or adopting shared standards. In any case, as Johnson suggests, it would appear that agencies should give particularly careful consideration to the scope for efficiency defences in multi-sided markets.

5.2. How do the tools need to change?

57. There is broad agreement that that the standard econometric tools for assessing efficiencies do not need to change and the existing tools can continue to be used in multi-sided markets. As an example of how these standard tools can be applied to a multi-sided market Padilla & Andreu provide a post-mortem analysis of previous mergers in the stock exchange market. This demonstrates the type of efficiency analysis that might be expected. The analysis takes data on previous mergers of stock exchanges and tests for evidence of efficiencies in the post-integration period. For example, it confronts questions over the relevant counterfactual using a placebo test, it considers alternative integration milestones and different measures of liquidity, and the possibility of an omitted trend. There remain questions over how to extrapolate the results of past mergers onto new mergers that involve firms of different sizes and of different natures, particularly where we might expect the gains to diminish as scale increases. However, where analysis of this depth can be performed within the timeframes of an investigation it would appear to provide useful insight on the likely effects of the merger.

58. In addition, a range of other tools also exists, for example demand modelling techniques and user surveys. These take data on either the revealed or stated choices of users on each side of the market and seek to estimate demand in order to identify the benefits to users from accessing a larger platform. Notably when using these tools the key variable to estimate is the cross-platform network effect, which as we have noted was also the focus of the market power assessment. This (again) begs the question of whether these market power and efficiency assessments might not be run as a single effects assessment in cases where the market is indisputably multi-sided.

59. However even a combined assessment would encounter the challenge of operationalising these tools in practice. As Shelanski, Knox & Dhilla note, while economists do have tools available for assessing the effects of conduct or mergers of platforms, all of those tools take resources, personnel, and in many cases data which can be hard to come by. He therefore suggests that a useful operational step is to prioritise analytical efforts based on the nature of relationships in multi-sided markets. The two types of relationship he identifies, service-based, and subsidy-based, are comparable to the concepts of matching and audience providing platforms that Rasek & Wismer put forward. As described earlier, Rasek & Wismer use the term matching platform to refer to a platform in which the cross-platform network externality is positive on both sides and the objective of the platform and all users is to find the best possible match. While platforms in which the externality runs in just one direction are considered to be an audience-providing platform.

60. The suggestion by Shelanski, Knox & Dhilla is that where conduct is targeted at a supplier or an end-user in a matching (or service-based) platform, there is likely to be a

magnification of harm or of efficiencies as a result of the cross-platform network effects. In such cases, efficiencies may arise on all sides of the market and so agencies need to consider all sides. In contrast, in an audience providing (or subsidy-based) relationship any efficiencies that accrue to advertisers are unlikely to benefit users. This means any harm to users is unlikely to be counterbalanced by efficiencies to advertisers. Agencies may therefore focus on evaluating the existence of efficiencies for advertisers in such cases – for example on efficiencies to users when users are harmed, and on efficiencies for advertisers when advertisers are harmed.

Box 5. Summary of key considerations for efficiencies

1. Where cross-platform network effects are strong, mergers of multi-sided platforms might be expected to generate efficiencies if they combine separate user bases and increase interoperability. There would therefore appear to be significant scope for efficiencies to arise in platform mergers.
2. Agencies should give careful consideration to the scope for efficiency defences in multi-sided markets. Focusing analysis on the magnitude and merger specificity of such effects, rather than their existence may therefore provide better analytical value for agencies.
3. Standard econometric tools such as event studies can sometimes be used to assess the efficiencies that have previously been generated by greater scale. These do not require estimates of the cross-platform network effects.
4. To use simulation tools to understand the likely efficiencies of a merger for users on each side of the market, agencies will need an estimate of the cross-platform network effects. Surveys or demand estimations can be used to generate these estimates, as they were in the competitive effects assessment.
5. Operationally there may be advantages to running the competitive effects and efficiencies assessments as a single effects assessment in those cases where the multi-sided nature of the market is undisputed.
6. It may also be a useful operational step to prioritise analytical efforts based on the nature of relationships in multisided markets. For example, in an audience providing (or subsidy-based) platform, agencies might focus on efficiencies to users when they expect users to be harmed, and on efficiencies for advertisers when they expect advertisers are harmed. In contrast, in a matching (or service-based) platform, agencies will need to consider all sides of the market.

6. Vertical restraints

61. Vertical restraints in multi-sided markets can be imposed either by platforms on users (e.g. across platform parity agreements), or alternatively by users on platforms (e.g. selective distribution systems that threaten to delist platforms that do not comply). In multi-sided markets they can include: internet minimum advertised prices; resale price maintenance; across platform parity agreements, most favoured nation clauses; online sales bans, exclusive distribution systems; selective distribution systems; and exclusive supply agreements. These can all generate pro-competitive efficiencies, however concerns can also arise that they may exclude rivals (as discussed in section 4 above in relation to exclusivity clauses), soften competition, or facilitate collusion. Notably

restraints agreed between platforms and users may not always be only vertical in nature if the user is also operating a traditional business model that sells directly to consumers and hence competes with the platform. This may create some challenges as to whether a case involves price fixing amongst rivals or a vertical restraint.

6.1. Are vertical agreements a greater concern in multi-sided markets?

62. The assumption that downstream firms will not sign agreements with upstream firm that lead to them paying higher prices is sometimes used to dismiss concerns with exclusionary vertical restraints (this is known as the *efficiency of bilateral bargaining* that Chicago school thinkers have referred to). A key point made by Katz is that this may not apply in multi-sided markets. While it has long been understood that there are circumstances in which anticompetitive outcomes can result despite bilaterally efficient bargaining in traditional markets,[35] these circumstances might be expected to be significantly larger in multi-sided markets. This is because the bilateral bargaining does not include one or more sides of the market that might be harmed by restraints that are agreed and which mutually benefit the negotiating parties. This is true in both traditional and multi-sided platform markets. The difference is that sellers and the platform will have their incentives aligned if the platform earns a fixed commission on sales made by sellers, and so, unlike in a traditional wholesale market, the intermediary would not protect consumers by refusing to sign up to bilateral agreements that would increase the wholesale price that they pay.

63. For example, across platform parity agreements between a platform and a group of sellers that pay the platform commission on their sales might ensure that no rival platform can be offered a better price, thereby removing the ability for sellers to undercut the platform if it increases the commission that it charges. However if the increase in commission paid by sellers can be passed onto consumers who are not party to the vertical restraint then the agreement may still benefit the sellers.

64. As a result, there may be less scope for consumers to be protected by the efficiency of bilateral bargaining when a platform acts an agent for sellers on one-side of the market. This might suggest that vertical restraints in multi-sided markets may require a little more scrutiny from agencies than similar agreements in one-sided markets, and as in the case of exclusionary conduct, should not be treated more leniently.[36]

65. Both Johnson and Caffarra & Kühn make a plea for competition agencies to make a real effort to understand the potential efficiency rationales for such restraints. Caffarra & Kühn suggest for example that in many cases what firms are really trying to deal with is contractual incompleteness (rather than looking for ways to increase price). Johnson gives the risk of free-riding as an example. He follows Rochet & Tirole in identifying, as an example, the investments that credit card companies make in building customer loyalty through reward systems or good customer service. He notes that some of these investments might be put at risk if a merchant is able to steer consumers that are attracted by the merchant's membership of the platform to then bypass the platform and transact on a cheaper platform.

[35] See Valletti, Amelio & Karlinger citing Segal and Winston (2000) on divide and conquer strategies, Katz citing Calzolari and Denicolò (2015), and Farrell (2016) on vertical collusion.

[36] Johnson is agnostic on the issue of whether restraints are more or less likely to be anticompetitive in multi-sided markets.

66. Of course, these complaints are also common in one-sided markets. However, a case can be made that efficiency rationales for vertical restraints are particularly strong in multi-sided platforms. After all, if platforms can be easily bypassed after matching buyers and sellers, then they are unlikely to be viable. For example if Airbnb does not restrict property owners from providing contact information to tenants then it will not have any transactions taking place on the platform, it will earn no commission and the platform would not be viable. More problematic however is the nature of the investments that platforms can make viable through such restraints. For example, heavy investment in advertising may indeed no longer be viable if sellers are able to offer cheaper prices on their own website than on a platform website. However it is unclear what value consumers place on these investments (provided the platform itself remains viable), and hence how much these investments would be missed if the business case for them no longer made sense. This is particularly problematic if the restraints are at the same time likely to soften competitive incentives and lead to higher prices.

67. Johnson also identifies an interesting efficiency defence that might arise particularly in multi-sided platforms. He cites a paper by Lee (2013) which identifies the importance of exclusivity clauses for smaller videogame platforms that were seeking to enter into the videogame market. These platforms were able to use the restraints to counteract the strong cross-platform network effects that incumbents enjoyed which might otherwise have prevented them from entering and competing on the market.[37] While such entrants would not hold market power at the time they agreed these clauses, they may later grow into stronger positions. Therefore, the case-specific context in which the agreements apply will matter and a form-based approach will be an unreliable indicator of the effect of the restraint on consumers.

6.2. How do the tools need to change?

68. Assessing the effects of vertical restraints requires a framework of inquiry that:

- identifies the nature and scope of the restraint (and whether in practice it is binding);
- explores the effect of the restraint on the incentives of the firms involved (and those that are not);[38]
- considers the potential responses to any change in behaviour that do occur (e.g. defensive actions by buyers);
- tests whether these effects have been observed;
- looks at the rationale for participation by each side; and
- identifies the likely counterfactual.

69. Since this framework is a broad one, and each analysis should be tailored to facts of the case, it remains applicable in a multi-sided market setting. Therefore, in principle the tools that are used do not need to change. However, in practice the use of these tools to analyse the effects of a restraint is rarely conducted. Therefore, one proposal from Caffarra & Kühn was to help simplify the analysis in cases when the product on one side of the market is free, by interpreting a multi-sided market within a standard vertical framework in order to help agencies think through the standard foreclosure concerns when vertically integrated and vertically disintegrated supply chains compete with each

[37] Lee (2013)

[38] Including for example any contracting externality

other. For example, under this proposal the number of users on one side might be thought of as an input that is used to produce a downstream product that is sold to the users on other side of the market. The platform then decides how much to invest in increasing the quality of this input by expanding its user base on that side of the market.

70. By design this approach takes no account of the strong cross-platform network effects and so contrasts with the view that when analysing multi-sided markets competition agencies should recognise these effects and the difference that they can make to the analysis. For example, if users prefer a variety of sellers then treating the user base simply as an input, and ignoring the impact that feedback loops have on demand can lead to mistakes.

71. In the case of Across-Platform-Parity-Agreements (APPAs) for instance, it is sometimes argued, often by platforms, that sellers can choose to delist from platforms that impose such restraints, and that this preserves a competitive constraint on the commission that is charged by the platform. If this argument is valid, it suggests that APPAs are mutually beneficial and hence more likely to exist for efficiency reasons. If however, the number of users is treated as an input into the product, then the analysis would miss the fact that users are likely to switch away from platforms if sellers choose to delist. The potential competitive threat posed by the option to delist would then be missed, and the competitive constraint on the platform's commission underestimated. As a result, the conclusions reached on the effect of the vertical restraint might be different (it might be judged harmful when it is not). This suggests that while it is certainly true that parallels can helpfully be drawn between analysis in one-sided and multi-sided markets in order to explain certain theories of harm, the analysis itself requires a recognition and understanding of the difference that cross-platform network effects make.

Box 6. Summary of key considerations for vertical restraints

1. As in one-sided markets, the effects of vertical restraints need to be assessed on a case-by-case basis. However, agreements in multi-sided markets may require more scrutiny from agencies than similar agreements in one-sided markets, and should certainly not be treated more leniently.
2. The broad framework of inquiry for assessing the effects of vertical restraints remains applicable in a multi-sided market setting.
3. Where cross-platform network effects are strong, use of vertical restraints by multisided platforms might in some cases be necessary to prevent free-riding and hence the bypass of the platform.
4. Where free-riding poses a threat to the viability of the platform there would appear to be significant scope for vertical restraints to generate efficiencies (though this may not be the case for other investments that might be viable as a result of the restraint).
5. Competition agencies should therefore give careful consideration to the scope for efficiency defences in multi-sided markets.

Bibliography

Affeldt, Filistrucchi, and Klein (2013), "Upward pricing pressure in two-sided markets" The Economic Journal, 123(572), 505-523

Armstrong (2002) "Competition in two-sided markets" Mimeo, August 2002

Armstrong (2006), "Competition in two-sided markets" RAND Journal of Economics, 37(3), 668-91.

Behringer and Filistrucchi (2015), "Areeda-turner in two-sided markets" Review of Industrial Organization, 46(3), 287-306.

Calzolari and Denicolò (2015), "Exclusive contracts and market dominance" The American Economic Review, 105(11), 3321-3351.

Chandra and Collard-Wexler (2009), "Mergers in two-sided markets: an application to the Canadian newspaper industry" Journal of Economics and Management Strategy, 18(1), 1045- 1070.

Cosnita-Langlais, Johansen and Sorgard (2018), "Upward Price Pressure in Two-Sided Markets: Incorporating Feedback Effects," EconomiX Working Papers 2018-3, University of Paris Nanterre, EconomiX.

Evans (2003), "The antitrust economics of multi-sided platform markets" Yale Journal on Regulation, 20, 325–382.

Evans and Schmalensee (2012), "The Antitrust Analysis of Multi-Sided Platform Businesses" Coase-Sandor Institute for Law & Economics Working Paper No. 623, 2012.

Farrell (2016), "Fidelity Rebates" OECD Roundtable, June 2016.

Filistrucchi, Geradin, Van Damme and Affeldt (2014). "Market definition in two-sided markets: Theory and practice" Journal of Competition Law and Economics, 10(2), 293-339.

Filistrucchi, Klein and Michielsen (2012), "Assessing unilateral merger effects in a two-sided market: an application to the dutch daily newspaper market" Journal of Competition Law and Economics, 8(2), 297-329.

Fletcher (2007), "Predatory pricing in two-sided markets: A brief comment" Competition Policy International, 3(1), 221–224.

Hermalin and Katz (forthcoming), "What's So Special about Two-Sided Markets?"In Economic Theory and Public Policies: Joseph Stiglitz and the Teaching of Economics, New York: Columbia University Press.

Kaplow, (2010), "Why (Ever) Define Markets" Harvard Law Review, 124, 438.

Kaplow (2013), "Market Definition: Impossible and Counterproductive" Antitrust Law Journal , Vol. 79, No. 1 (2013).

Lee (2013), "Vertical Integration and Exclusivity in Platform and Two-Sided Markets" American Economic Review, 103(7), 2960–3000.

OECD (2015), "Across Platform Parity Agreements" OECD Hearing, October 2015.

OECD (2016) "Fidelity Rebates" OECD Roundtable, June 2016.

OECD (2017) "Competition issues in Aftermarkets" OECD Roundtable, June 2017.

Rysman (2004), "Competition between networks: A study of the market for yellow pages" The Review of Economic Studies, 71(2), 483-512.

Rochet and Tirole (2002), "Cooperation among competitors: Some economics of payment card associations" RAND Journal of Economics, 33(4), 549–570.

Rochet and Tirole (2003), "Platform competition in two-sided markets" Journal of the European Economic Association, 1(4), 990-1029.

Rochet and Tirole (2006), "Two-sided markets: A progress report" RAND Journal of Economics, 37(3), 645-67.

Segal and Whinston (2000), "Exclusive Contracts and Protection of Investments" The RAND Journal of Economics, 31(4), 603-633.

Segal and Whinston (2000), "Naked Exclusion: Comment" American Economic Review, 90(1), 296-309.
Song (2015), “Estimating platform market power in two-sided markets with an application to magazine advertising.” Working Paper.
Shapiro, C. (1999). “Exclusivity in Network Industries” George Mason Law Review, 7(3), 673–83.
Tremblay (2017), “Market Power and Mergers in Multi-Sided Markets”, Working Paper June 2017.
Weyl (2010), “A price theory of multi-sided platforms” American Economic Review, 100, 1642-72.
Wright (2004), “One-sided logic in two-sided markets” Review of Network Economics, 3(1), 44–64.