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By
Lapo Filistrucchi, Damien Geradin, Eric van Damme

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Identifying Two-Sided Markets

Lapo Filistrucchi*
Department of Economics, CentER and TILEC, Tilburg University
Department of Economics, University of Florence

Damien Geradin
TILEC, Tilburg University

Eric van Damme
Department of Economics, CentER and TILEC, Tilburg University

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Abstract†

We review the burgeoning literature on two-sided markets focusing on the different definitions that have been proposed. In particular, we show that the well-known definition given by Evans is a particular case of the more general definition proposed by Rochet and Tirole. We then identify the crucial elements that make a market two-sided and, drawing from both theory and practice, derive suggestions for the identification of the two-sided nature of a market. Our suggestions are relevant not only for the analysis of traditional two-sided markets, such as newspapers and payment cards, but also for the analysis of many new markets, such as those for online social networks, online search engines and Internet news aggregators.

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* Corresponding author: Lapo Filistrucchi, Department of Economics, Tilburg University, P.O. Box 90153, 5000 LE Tilburg, The Netherlands, L.Filistrucchi@uvt.nl

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1. Introduction

The term “two-sided market” may seem quite odd to the uninitiated. All markets would at first sight appear to have two sides, namely buyers and sellers. In fact, the term “two-sided-market” refers to a specific type of market.

Put simply, a two-sided market is a market in which a firm sells two distinct products or services to two different groups of consumers (the two “sides”) and knows that selling more to one group affects the demand from the other group, and possibly *vice versa*. Thus, it is often said that a firm in a two-sided market needs to “get both sides on board” to do business.

A firm in a two-sided market is then said to act as a platform[1] and to somehow connect distinct but interdependent customer groups (the so-called “sides”) in a way that generates value for at least one of the two customer groups. Typically, these customers cannot obtain such value, or at least not to that extent, without the platform.

Prominent examples of two-sided markets include (i) media markets, where firms sell content and advertising space, (ii) payment cards markets, where firms sell the use of a card to buyers and the use of a point-of-sale terminal to shops, or (iii) traditional and online auction houses, which sell their services to buyers and sellers. In media markets, advertisers’ demand for ads on a media outlet increases with the number of consumers of content (viewers, readers, listeners…), while viewers, readers and listeners might also be, positively or negatively, affected by the quantity of advertising. This is well-known to the management of media outlets. Similarly in payment cards markets, the larger the number of cardholders, the higher the demand from shops and vice versa. Companies such as American Express or VISA are well aware of this relationship between the two demands they face. Also, auction houses, whether Christie’s, Sotheby’s or Ebay, know that the more buyers visit their auctions the more likely it is that some seller chooses to use their services and vice versa.

The reason why it matters to competition policy whether the market is two-sided or not is that many traditional results of economic analysis that lie at the basis of competition policy do not hold.

Indeed, following the growing theoretical work on two-sided markets, many papers, such as Evans (2003), Wright (2004), Evans and Noel (2005) and Evans and Schmalensee (2007, 2008), have focused on competition policy in two-sided markets.

They have, for instance, pointed out that selling a product for free can be a profit maximizing strategy rather than an attempt to predate.[2] More generally, the standard Lerner index does not hold for firms that compete in two-sided markets.[3] It has also been shown that increased competition does not necessarily lead to more efficient prices from the social point of view.[4] Thus, even a merger to monopoly might raise welfare and do so even in the absence of efficiency gains.[5] Also, defining the relevant market for antitrust purposes looking at only one side can lead to a market definition which is too narrow.[6]

[1] A “two-sided platform” is therefore a firm active in a “two-sided market”. We refer to “two-sided platforms” but the analysis can be extended to “multi-sided platforms”.
[2] See Wright (2004) and also Parker and van Alstyne (2005).
[3] See Rochet and Tirole (2006) and Evans (2003).
[4] See again Wright (2004).
[5] See Leonello (2010).
[6] See Evans (2003).

While the first policy contributions mainly criticized the application of standard competition policy to two-sided markets rather than suggesting an alternative approach, more recent work has also attempted to provide practical suggestions to practitioners. Some papers have focused on market definition[7], others on testing for collusion[8], others again on merger assessment[9] or on predation[10].

To sum up, there is a growing recognition that the two-sidedness of a market should matter for competition policy. But as the specificity of competition policy in two-sided markets is increasingly recognized, the question arises of which markets are in fact two-sided.[11]

Whereas it is by now generally accepted that media markets, payment cards and auction houses are two-sided markets, in other cases, such as supermarkets or airports[12], whether the market is two-sided is still in practice a debated issue. More generally, while the economic literature can contribute to drawing up a list of two-sided markets, this list is unlikely to be exhaustive and up-to-date in the face of continuous technological progress and product innovation. To see the point, just think of a social network like Facebook. It started catering to people wishing to connect to their friends, but it later started to sell advertising slots. As advertisers clearly attach a positive value to reaching more users (of their target group) on Facebook, the market for social networks has clearly become two-sided. This would probably have been difficult to predict before Facebook appeared.

The aim of this paper is therefore to explain what makes a market two-sided and how two-sidedness of a market can be identified. Thus, section 2 explains the distinctive features of two-sided markets while section 3 provides guidance on how competition authorities could proceed to identify two-sidedness; it also brings examples of how competition authorities did in fact proceed. Section 4 concludes.

2. Two-Sided Markets

Although studies on the media market, which is by now recognised to be a two-sided market, date back as far as Corden (1953), Reddaway (1963) and Rosse (1967)[13], the literature on two-sided markets itself has developed only in the last ten years, as economists became aware of the fact that other, apparently very different, markets share some basic features with media markets.

[7] Emch and Thomson(2006) and Alexandrov, Deltas and Spulber (2011) show how a "Small but Significant Non-transitory Increase in Price" (SSNIP) test should be performed in a two-sided non transaction market. Evans and Noel (2008) and Filistrucchi (2008) propose instead two different ways to perform the same test in two-sided non transaction markets. See Section 2 for a distinction between two sided transaction and non-transaction markets. See also Evans(2012) and Filistrucchi, Geradin, van Damme and Affeldt (2012) for a discussion of market definition in two-sided markets.

[8] Argentesi and Filistrucchi (2007) show how one can test for collusion using a structural econometric model in two-sided markets characterised by only one indirect network effects. Song (2011) extends their model two two-sided markets with a two indirect network effects. .

[9] Evans and Noel (2008) discuss how mergers should be assessed in two-sided markets. Fan (2010), Filistrucchi, Klein and Michielsen (2010, 2012), Jeziorski (2011) and van Cayselee and Vanormelingen (2010) propose different structural econometric models to perform merger simulation in different two-sided markets such as newspapers and radio. Filistrucchi, Klein and Michielsen (2011) also compare different methods to assess unilateral merger effects, namely a market concentration analysis, a SSNIP-type test, the measurement of UPP and a simple merger simulation.

[10] Behringer and Filistrucchi (2009) discuss how the Areeda-Turner rule should be extended to account for the two-sided nature of the market.

[11] See Filistrucchi (2010) for the related question of "How any markets are two-sided?"

[12] See Armstrong (2006) for the claim that supermarkets can be seen as two-sided markets; see instead Ivaldi, Sokullu and Toru (2011) for an econometric model of an airport as a two-sided platform.

[13] Rosse in particular devoted a lot of attention to the newspaper market. See also Rosse (1970, 1977, 1980), Rosse, Owen and Dertouzos (1975) and Rosse and Dertouzos (1978).

The seminal papers in the field are those by Caillaud and Jullien (2001, 2003), Rochet and Tirole (2002, 2003, 2006), Evans (2003), Parker and Van Alstyne (2005), and Armstrong (2006). In particular, whereas Caillaud and Jullien (2001, 2003) and Parker and Van Alstyne (2005) respectively talk about indirect network effects and two-sided network effects, the term two-sided market appears to have been used first by Rochet and Tirole (2002, 2003, 2006) as well as Armstrong (2006).[14] Evans (2003) instead always preferred to talk about markets with two-sided platforms. In fact he rightly pointed out that sometimes single-sided firms compete with one side of a two-sided platform. For instance advertising billboards may actually be competing with newspapers on the advertising market.

Evans (2003) summarizes the necessary conditions for the existence of a market with two-sided platforms as follows: Firstly, "a two-sided market requires two or more distinct groups of customers". For example, a producer of video-game consoles sells consoles to users and both licenses the right to develop software and sells software development kits to video game developers. Secondly, "a two-sided market exhibits externalities which are associated with two or more groups of customers being connected or coordinated in some fashion". For example, video-game developers value video-game consoles more when they have more users; and users value consoles that have more games. Lastly, for a two-sided market to exist, "an intermediary is required in order to internalise the externalities created by one group for the other group(s)". In our example, this is the producer of video-game consoles.

According to the economics literature, a two-sided market is a market in which a firm acts as a platform[15] and somehow connects distinct but interdependent customer groups (the so-called "sides") in a way that generates value for at least one of the two customer groups. Typically, these customers cannot obtain such value, or at least not to that extent, without the platform.

Two-sided markets exhibit indirect network effects between the various groups of customers. Positive indirect network effects occur when the value obtained by one group of customers increases with the number of customers (or, more generally, the demand) of the other group.[16] For instance, video game developers value video game consoles more if there are more video game players and *vice versa*. Similarly for men the value of a heterosexual dating club increases with the number of women in the club; *vice versa* for women. Cardholders value a payment card more the more merchants have a point-of-sale terminal that accepts that payment card and *vice versa*. Thus the markets for video consoles, heterosexual dating clubs, and payment cards are two-sided markets characterized by two positive indirect network effects.

Negative indirect network effects occur instead when the value obtained by one group of customers decreases with the number of customers (or, more generally, the demand) of the other group.[17] For instance, although advertisers are likely to value a TV channel more the more viewers it has, viewers are generally annoyed by TV advertising.[18] The TV market is,

[14] In the media literature, Chaundhri (1998) talks about "duality in the product space" of a newspaper publisher, as the publisher serves both advertisers and readers. Gabszewicz, Laussel and Sonnac (2001, 2002) discuss instead cross-market network effects when analysing pricing and political differentiation in the newspapers market.

[15] A "two-sided platform" is therefore a firm active in a "two-sided market". We refer to "two-sided platforms" but the analysis can be extended to "multi-sided platforms".

[16] Direct network effects occur instead when the value obtained by one group of customers changes with the number of customers who buy or use *the same product*.

[17] A two-sided market with two negative indirect network effects is not conceivable as it would imply that neither of the two customer groups would be interested in interacting with the other side, hence neither of them would be interested in joining the platform. A multi-sided market will thus be characterized by at least one positive indirect network effect.

[18] See Wilbur(2008).

thus, a two-sided market characterized by one positive and one negative indirect network effect.

It is not necessary for the existence of a two-sided market that two indirect network effects be present. One suffices. There is for instance some evidence that on average readers do not care about advertising on daily newspapers.[19] Nevertheless, a daily newspaper is a two-sided platform, as one would find it difficult to argue that advertisers do not care about the number of readers of the newspaper where their ad is going to be displayed.

A crucial feature of two-sided markets is that the two customer groups are not able to incorporate and appropriate these indirect network effects, which are therefore often referred to as externalities, i.e. external to or not accounted for in the individual decisions of the customers. For example, when a reader buys a newspaper she does not take into account that by buying the newspaper she will make the newspaper itself more attractive to advertisers and does not care about the price of an ad in that newspaper.

In any case, the existence of the interdependency between the two demands makes a two-sided platform a particular type of multi-product firm. The fact that buyers do not take into account the indirect network effect when deciding to join or use the platform distinguishes a two-sided platform from a firm selling complementary goods. Indeed, a firm selling two complementary goods faces two demands but from only one group of potential customers. However, as these customers need to buy both goods, they internalize the link between the two demands and base their buying decision on the prices of both goods. For instance the demand for ink cartridges depends on the number of inkjet printers. A non-naïve customer will also ask the price of the cartridge before buying an inkjet printer.

In a two-sided market the platform typically recognizes this interdependency between the demands it faces from the two groups of customers and has a strong incentive to “internalize” these externalities. Indeed, owing to the interdependency of the sides of a two-sided market, the platform knows that it needs to “get both sides on board” in order to operate. Without one side of the platform, the other side won’t join, and conversely. If one takes the example of a heterosexual dating club, no man will join unless women do and *vice versa*. It is also fundamental for the platform to attract the different sides in the right proportion. For example, a heterosexual dating club with too many men and few women will not be successful and *vice versa*. Similarly, a video game console without enough interesting games will not attract players and one without enough players will not attract game developers. One way for the platform to get the balance right is by setting the right prices on the two sides.

By lowering the price on one side of the market, demand on that side will increase. In the case of a positive externality, the increase in demand on that side has the effect of increasing demand, for any given price, on the other side (which will in turn, in the case of two positive network effects, increase demand on the starting side, and so on). For instance, by lowering the cover price of a newspaper, more readers are likely to buy this newspaper. Because the readership will increase, more companies will be willing to advertise in this newspaper for any given advertising tariff. A newspaper platform may then find it profit maximizing to lower the price charged to readers and increase the price to advertisers. At the extreme a platform might choose not to charge one side of the market and make the other side pay for the interaction. An example of this is the free press. In some cases a platform might even find it optimal to “pay” one of the two sides to get it on board. It is the case, for example, of payment

[19] See for instance Argentesi and Filistrucchi(2007) for daily newspapers in Italy, Fan (2010) for daily newspapers in the US and van Cayseele and Vanormelingen (2010) for Belgian daily newspapers.

cards, when cardholders gain bonus points by using their card.[20] Most of the results of the theory of two-sided markets which question the validity of the standard competition policy approach are based on the recognition that firms in these markets set prices in a different way than in standard industrial organization models.

The definition discussed so far is what Rochet and Tirole (2006) call the "cross-group externalities definition". They claim such a definition is "under-inclusive" [21] and prefer instead to define two-sided markets as markets where "the platform can affect the volume of transactions by charging more to one side of the market and reducing the price paid by the other side by an equal amount; in other words, the price structure matters, and the platforms must design it so as to bring both sides on board" [22].

Thus, for Rochet and Tirole (2006) a fundamental feature of a two-sided market is that, by keeping fixed the sum of the prices charged to the two sides (the so called price level), the platform can indeed affect the volume of interactions (and therefore its profits) by charging more to one side and less to the other, i.e. by adapting the price structure. For instance in a heterosexual disco, for a given price per couple, success and therefore profits depend on the allocation of this price between the man and the woman, i.e. on who pays more and by how much within the couple. In a payment cards market, given the price of a transaction between a cardholder and a merchant (i.e. given the price level), the amount of transactions and the profits will depend on the relative size of the prices paid by the two parties for the transaction (i.e. on the price structure).

The two definitions however are not perfectly identical. For the price level to be "non-neutral" in the sense of Rochet and Tirole (2006), it is also necessary that it is impossible for the side that pays more to pass through the difference in his cost of interacting to the other side. Clearly such a pass-through is not possible if there is no transaction between customers on the two sides of the market. Indeed, Rochet and Tirole (2006) explain that the failure of the Coase theorem[23] is a necessary, albeit not sufficient, condition for the existence of a two-sided market.

The existence of a transaction between end-users appears therefore crucial for the possibility of a complete pass-through and, as a result, for the market to be defined as two-sided. Hence, the distinction first proposed in Filistrucchi (2008) between two-sided markets of the "media type" (or two-sided non-transaction markets) and two-sided markets of the "payment card type" (or two-sided transaction markets). [24] Two-sided markets of "the media type" are characterized by the absence of a transaction between the two sides of the market and, even though an interaction is present, it is usually not observable, so that a per-transaction fee or per-interaction fee or a two-part tariff is not possible. Thus these markets can be referred to as two-sided non-transaction markets[25]. Two-sided markets of "the payment cards type"[26] are

[20] Ceteris paribus, the side that attaches a higher positive value to the other one is going to pay more. One could argue for instance that this is the reason behind heterosexual nightclubs charging a higher price to men than to women or behind the observation that in most countries merchants pay for card transactions whereas cardholders do not.
[21] Rochet and Tirole (2006), page 657.
[22] Rochet and Tirole (2006), page 664-664.
[23] See Coase (1960). As reminded by Rochet & Tirole (2006) "the Coase Theorem states that if property rights are clearly established and tradable, and if there are no transaction costs nor asymmetric information between the two parties, the outcome of the negotiation between two (or several) parties will be Pareto efficient, even in the presence of externalities". Asymmetric information refers to a situation where one of the parties has more information than the other(s). A market situation is instead efficient, according to Pareto if there is no other situation, which would make at least one of the parties better off and the other parties not worse off.
[24] Whereas Filistrucchi (2008) uses the terms "media type" and "payment card type", Damme et al. (2010) use the terms "non-transaction" and "transaction".
[25] In fact,

instead characterized by the presence and observability of a transaction between the two groups of platform users. As a result, the platform is able to charge not only a price for joining the platform but also one for using it, i.e. it can ask a two-part tariff. Hence hese markets can be referred to as two-sided transaction markets. Examples include, apart from payment card schemes, also virtual marketplaces, auction houses and operating systems.

In fact, it would seem that the definition proposed by Evans (2003) better adapts to two-sided markets of the "media type" whereas the one proposed by Rochet and Tirole (2006) comes from the analysis of a two-sided market of the "payment card type".

Rochet and Tirole (2006) state that "factors making a market two-sided include a) transaction costs among end-users or, more generally, the absence of, or limits on the bilateral setting of prices between buyer and seller b) platform-imposed constraints on pricing between end-users c) membership fixed costs or fixed fees".

In particular, Rochet and Tirole (2003) identify three types of transaction costs in this setting. A first type of transaction cost is associated with thinking, writing, advertising and enforcing the pass-through in the transaction. Consider for instance the case of a merchant that would need to specify a price tag with different prices according to which payment card the customer uses to pay and would also face the risk of some customers deciding not to purchase because of price discrimination. "A second type of transaction cost is due to the absence of a low-cost billing system." [27] In such a case the cost of billing can be higher than the difference in price to be passed through to the other side. "A third type of transaction cost is the impossibility of monitoring or recording the actual transaction or interaction."[28]

The latter case is indeed the case of markets of the "media type" [29] (or non-transaction markets), which shows that the definition of Rochet and Tirole (2003, 2006) is broader than the one of Evans (2003).

Note that, whereas transaction costs among end users are often independent of its will, the platform can strategically affect the pass-through by imposing constraints on pricing between end-users[30]. In fact, in doing so, it makes the market two-sided.

Interestingly, Rochet and Tirole (2003) also point out that, if the two sides can coordinate their purchases from the platform, then the market ceases to be two-sided. In such a case, where the end-users internalise the indirect network externality, in practice, what fails is the first condition proposed by Evans (2003), namely the presence of two groups of customers. Indeed, when the two sides can coordinate to internalise the indirect network effect, then the latter ceases to be an externality and the case is reduced to the well-known one of a firm selling complement goods[31].

To visualise, one could say that, on an ideal line representing from left to right increasing degrees of pass-through, two-sided non-transaction markets lie at the extreme left while at the extreme right lie one-sided markets where two groups of buyers exist but where they

[26] The distinction between these two types of markets has first been used by Filistrucchi (2008), using the terms "media type" and "payment card type". Damme et al. (2010) proposed instead the terms "transaction market" and "non-transaction market".
[27] Rochet and Tirole(2003), page 1019.
[28] Rochet and Tirole(2003), page 1019.
[29] Note that in most traditional media it was not possible to charge the advertisers based on the number of people reached by an advertisement. It could be done, but only imperfectly, distributing for instance coupons with a newspaper. Only in the last years, on the Internet, charging per interaction has become in part feasible as it is possible to record clicks on ads and make advertisers pay per click.
[30] That is the case for instance of the no-surcharge rule, infra note 36.
[31] Think for example of an already established couple that decides to enter a nightclub. They will buy the two tickets but they may then split the total amount in equal parts. Then only the price level (i.e. the sum of the two prices) matters, while the price structure (i.e. the ratio of the two prices) doesn't.

perfectly coordinate their decisions; in the middle are instead a variety of two-sided transaction markets where the pass through is, at different levels, incomplete.

As transaction costs similar to those described above appear to be relatively common, Rochet and Tirole (2003) claim that "many (probably most) markets with network externalities are two- (multiple-) sided markets".

In fact, this observation seems to suggest that the distinction between the definitions of Evans (2003) and Rochet and Tirole (2006) might not be that relevant in practice. Yet, as recently discussed by Weyl (2010), understanding the role of the pass-through is crucial in the analysis of a two-sided market.

At this point, one could get the idea that all intermediaries, if not all firms, are two-sided platforms. After all, they connect producers to consumers.

Hagiu (2007) highlights the difference between the two polar strategies for market intermediation: the "merchant mode" and the "two-sided platform mode". In the latter case, the intermediary simply facilitates the transaction between the buyer and the seller. It does not alleviate the risk of either of the two sides caused by the transaction not taking place. In the former case instead, the merchant buys the product from the producer and sells the product to the consumer. Once the product is bought by the intermediary, the seller is no longer interested in the number of buyers the intermediary has on the other side. Moreover, the intermediary is not offering anymore a service to the seller. It is selling only one product to the buyer. Thus the merchant mode implies that there are no indirect network effects. "The distinguishing feature", as argued by Rysman (2009), is whether the seller is paid based on the success of the platform with the buying side."

As discussed in Armstrong (2006) a particular case is that of supermarkets. Arguably, people who shop value a supermarket more the higher the number of products on stock. In addition, a supermarket often sells shelf space and visibility to producers. For that reason, a supermarket may be regarded as a two-sided platform.[32]

However, as recognised by Hagiu (2007), the "merchant mode" and the "two-sided platform mode" are two extreme cases. A variety of contractual arrangements between the intermediary and the two parties lie in the middle. To some extent one can therefore say that not all intermediaries are two-sided platforms, but indeed they could be. Two-sided markets may not be such by nature but simply due to firms' decisions. According to Rysman (2009), "[a]s this distinction often depends on the decisions of the intermediary rather than on purely technological features of the market, it may be better to use the term `two-sided strategies` rather than `two-sided markets`."

Hagiu (2007) also discusses when each of the two modes is more profitable for the intermediary and should therefore be expected to be observed. [33]

It is then an empirical issue which of the two modes prevails. This will in the end be related to the presence and size of the indirect network effects.

According to the definition of Rochet and Tirole (2006) discussed above, many markets are two-sided. Indeed, in addition to the two-sided markets mentioned above (those for video game consoles, heterosexual dating clubs, TVs, payment cards), yellow pages, all

[32] Indeed, Armstrong (2006) uses the supermarket case to bring an example of competitive bottleneck.
[33] Rysman (2007) also notes that "[s]strikingly, one-sided and two-sided selling strategies exist side-by-side at Amazon.com. For some products, like certain new books, Amazon (basically) buys at a wholesale price and sells for a retail price, which is a one-sided model. But for many other products, Amazon provides a web portal for a producer that sets the retail price that a consumer would see."

advertising-supported Internet websites and, more generally, all media markets are two-sided markets. Additionally auction houses, virtual marketplaces such as E-bay, firms selling operating systems and stock exchanges are two-sided platforms.

Yet Rochet and Tirole (2006) themselves recognise that in some cases, although the market is two-sided in theory, in practice the two-sided nature of the market might be irrelevant. Also, Evans and Schmalensee (2007) and Rysman (2009) agree that two-sidedness is a matter of degree.

In our opinion, although at first sight there are appears to be still some debate on the exact definition of a two-sided market, the different definitions proposed appear consistent enough to allow the practical identification of two-sided markets, i.e. of those markets where two-sidedness might matter. The identifying features are the existence of a firm selling more than one product or service, the presence of two distinct groups of buyers, each buying different products or services, the interdependency between their demands and the lack of a complete pass-through in case of transaction markets.

As argued above, the identification of two-sidedness, albeit not always easy in practice, is crucial for competition policy. Indeed, one can claim that two-sidedness affects not only firms' behaviour but also the social desirability of such a behaviour. For instance, in the case of a merger, two-sidedness affects both the prices charged pre and post merger and the benefit or damage deriving from the merger to the merging parties, their rivals and their customers[34]. Similarly, in a case of abuse of dominance, two-sidedness influences the incentives of firms to engage in "suspect" behaviours, such as for instance pricing below marginal cost or tying, but also changes the welfare consequences of such behaviour.[35]

Hence, the following section discusses how two-sidedness of a market can be assessed.

3. Assessment of the Two-Sided Nature of the Market

In order to assess the two-sided nature of the market, it is first crucial to identify and characterize the indirect network effects that link the demands on the two sides of the market. One might therefore ask whether such indirect network effects exist, whether they are one or two, whether they are both positive, or one is positive and one negative and, finally, how significant they are.

For instance, when analysing a merger in the TV market, one might want to know whether a larger audience of a TV channel *ceteris paribus* (i.e. holding constant also prices) implies a higher demand to advertise on that channel, whether viewers dislike advertising and, if so, whether advertisers like viewers more than viewers dislike advertising. Similarly for a merger among newspapers.

Unfortunately, in many cases, Competition Authorities failed to take into account both indirect network effects. It is the case for instance of *News Corporation and BskyB*, a merger between media conglomerates cleared by the European Commission in 2010[36]. In the decision, in

[34] See Filistrucchi, Geradin and van Damme (2012) for a discussion of how the two-sided nature of the market should affect merger evaluation in theory and how it has influenced it so far in practice. See instead Filistrucchi, Klein and Michielsen (2012) for an example of how different methods to assess unilateral effects can be applied in two-sided markets. In particular, Affeldt and Filistrucchi (2012a) show how the upward pricing pressure test can be extended to two-sided markets.

[35] See Affeldt and Filistrucchi (2012b) for a survey on tying in two-sided markets.

[36] The case concerned the acquisition of British Sky Broadcasting Group (BSkyB) by News Corporation. News Corporation would thus take sole control of BSkyB, while prior to the merger it already held approximately 40 per cent of the shares. News Corporation is a diversified global media company active in the production and distribution of

addition to a market for TV broadcasting and a market for advertising on TV, also a market for readers of newspapers and a market for advertising on newspapers were distinguished. The newspaper market was described as a two-sided market but the issue of whether readers like, dislike or are indifferent to advertising was not addressed. Similarly, in *Springer and ProSieben/Sat1* [37] *,* another merger between media conglomerates in Germany, the Bundeskartellamt did not discuss readers or viewers attitudes towards advertising but only recognized that, in the market for TV advertising as well as in the market for advertising on newspapers, the number of viewers and readers are important determinants of the demand from advertisers.

If a market is a non-transaction market, looking at externalities is sufficient. If instead the market is a transaction market, then one should also check if there are transaction costs or, more generally, limits to the bilateral setting of prices among buyers and sellers or if there are platform constraints on pricing between customers on the two sides. In payment cards markets, for instance, this could be the case not only of the no-surcharge rule[38] but also of menu costs for a shop that wishes to set a different price for its products depending on whether the buyer pays by cash, by VISA debit, VISA credit or AMEX.[39] But it could also be the case of a shop that faces a lot of competition from shops nearby and therefore has a high probability of losing a customer when attempting to surcharge.[40]

If these constraints exist then the market is two-sided, because the side charged the higher price would be unable to pass-on perfectly the difference in prices to the other side, so that only then the price structure would not be neutral.

Indeed, the lower the pass-through among the parties which transact, the more important the two-sided nature of the market.[41]

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films and TV programs, in broadcasting of satellite and cable TV, in the development of conditional access and subscriber management systems and in the creation and distribution of online programs. In the United Kingdom and Ireland, News Corporation is active in the licensing of feature films and TV programs, the wholesale supply of TV channels, the publishing of print and online newspapers, book publishing, advertising on TV channels, websites and printed press and the provision of Pay-TV technical services. News Corp is also one of the leading Pay-TV operators in Italy (Sky Italia) and in Germany and Austria (Sky Deutschland). BSkyB is, via a number of subsidiaries, active in various sectors in the UK and Ireland. These activities include the creation and wholesale supply of TV channels, retail distribution of Pay-TV channels, the provision of Pay-TV technical services, advertising on BSkyB and third party TV channels and on BSkyB's online media properties, the provision of retail telephony and broadband services and of enhanced and interactive services, of gaming and betting. The European Commission cleared the merger in 2010. An additional UK investigation on media plurality grounds also cleared the acquisition in 2011, under the condition that the merged entity would spin off Sky News.

[37] The case concerned the takeover of ProSieben/Sat1 by Axel Springer. ProSieben and SAT1 are two of the biggest German private TV channels and the group further owns the TV stations N24 (news) and Kabel1. Axel Springer is the biggest German newspaper and magazine publisher, which owns among others BILD and WELT. The Bundeskartellamt blocked the merger in 2006 because of concerns of coordinated effects in the market as Axel Springer/ProSieben/Sat1 and Bertelsmann (RTL), the two main media groups in Germany, would, as a result of the merger, share interests in a higher number of product markets and increase their joint dominance in the market for TV advertising.

[38] The no-surcharge rule has often been imposed by payment cards companies or even by law. As reported in Carlton and Frankel (1995), US Federal law once prohibited merchants from surcharging credit card transactions (*See* 15 U.S.C. § 1666f(9)(2) (1982)). In the early 1980s Congress allowed discounts for cash transactions but still prohibited surcharges for credit card transactions. Today still, in US 10 states it is prohibited by law for retailers to charge consumers a fee for using a credit card (California, Colorado, Connecticut, Florida, Kansas, Maine, Massachusetts, New York, Oklahoma and Texas). In some cases credit card companies terminated retailers that encouraged consumers to use a different credit card through non-price means: for example *American Express Keeps the Heat on Its Merchants,* CREDIT CARD NEWS**,** Feb. 1, 1992**;** *Escalating: American Express Company,* CARDFAX (Faulkner & Gray, Inc., Jan. 24, 1992); *The Other Check: American Express Co.,* CARDFAX (Faulkner & Gray, Inc., Jan. 28, 1992). In other countries, such as the United Kingdom, the no-surcharge rule has been sanctioned or declared void.

[39] Note that it is relatively more common to observe surcharges on Internet purchases than in a shop, consistently with an environment where menu costs are lower.

[40] Interestingly, wherever the no-surcharge rule has been lifted, still very few shops have decided to surcharge for the use of payment cards. See for example Katz (2001) for a survey of the credit and charge card industry in Australia. Note however that low cost airlines such as RyanAir, which face lower competition, do as a rule surcharge.

[41] In fact, non-transaction markets could be seen as a market where the pass-through between the two sides is zero.

Interestingly, even when the two-sided nature of the market has been recognized by Competition Authorities, not always they have clarified how this feature of the market has been identified.

For instance in *Google/DoubleClick*[42], a merger between intermediaries in the online advertising market, which was cleared in 2008, the European Commission identified intermediation services to be of a two-sided nature, as it argued that "[a]n ad network is a two-sided platform serving (i) publishers (websites) that want to host advertisements, and (ii) advertisers that want to run ads on those sites. Ad networks aggregate ad space inventory thus maximizing revenue opportunities and minimizing administrative costs of selling the ad space for the publisher. From an advertiser's point of view, an ad network can be considered as a "single buying point" for online inventory which often also provides handling and performance monitoring of online advertising campaigns." [43] Later on it acknowledged that:"The presence of strong indirect network effects lies at the core of most third party complainants' theories of harm. These network effects are such that an ad network becomes more attractive to advertisers as the number of publishers increases (and vice versa). The reason put forward is that liquidity is key to success in online ad intermediation and more liquidity is achieved through scale. With a higher number of publishers and advertisers participating in an ad network, the probability and expected value of a match increases."[44] However, the European Commission concludes that: "While the presence of these network effects is theoretically compelling, the evidence gathered during the investigation suggests that these may not be as strong."[45] Unfortunately, the type of investigation carried out to identify the presence and extent of two-sidedness in the market is not reported.

We argue that different approaches to the assessment of the two-sided nature of the market are possible. They are to some extent substitutes, but they can also be conceived as complements, as discussed in the next sections.

3.1 The qualitative approach

A qualitative approach to the assessment of the two-sided nature of the market would focus on checking whether there are indirect network effects and, if so, what their sign is, i.e. whether these effects are both positive or one is negative. For instance, one might want to know not only whether advertisers base their decisions on which newspaper to place their ads on the number of readers and whether indeed they attach positive value to a higher readership, but also whether readers like, dislike or are indifferent to advertising.

This qualitative approach is often relatively easy and not particularly time consuming, but it is unable to produce any conclusion on the size of the indirect network effects.

Given these features, a qualitative approach might be for instance preferred in the first phase of the evaluation of a merger. The aim would then be to check whether indirect network effects are present or not.

If they are not present, one could then proceed to clear the merger if the usual conditions for proceeding to phase two in a single-sided market are met.

If instead two indirect network effects are present, it would, in general, seem necessary to proceed to measure them.

[42] The merger between Google and DoubleClick was approved in 2008.
[43] *Google/DoubleClick*, at para 20.
[44] *Google/DoubleClick*, at para 304.
[45] *Google/DoubleClick*, at para 304.

However, if the market is a transaction one, one could first check to what extent transaction costs, or constraints set by the platform, limit the possibility of pass-through between the two sides. If there is scope to believe that the pass-through is high, then one could come to the conclusion, that although the market is two-sided, the two-sided nature of the market might not play a great role in practice.

Clearly, in the case of a non-transaction market, the pass-through between end-users is by definition zero, so that one has no other option than to try and measure the size of the indirect network effects.

In the case in which only one indirect network effect is present, it would appear that the two-sided nature of the market plays a role only to some extent. For instance, in a two-sided non-transaction market, market definition on the side that does not exert an externality on the other one could be performed disregarding the other side.[46]

Most competition authorities seem to adopt a qualitative approach to assess whether the market in a given case is two-sided or not.

An example of such an approach can be found in the argument put forward by the Dutch Competition Authority in *Bloemveiling Aalsmeer/FloraHolland,* a merger between flower auction houses cleared in 2007. In the decision the Dutch competition authority NMa concluded that the market was two-sided since: "[a]fter all, if there is no demand from buyers for auction services for ornamental horticultural products, the growers cannot sell ornamental horticultural products and if growers do not wish to supply auctions, buyers cannot purchase such services for ornamental horticultural products".[47]

We now discuss two different qualitative approaches: the deductive approach and the interview approach.

3.1.1 The deductive approach

The simplest way to assess the two-sided nature of a market could in some cases be a logical argument. For instance, in the case of newspapers or TV, it would appear evident even at first sight that advertisers value positively the number of readers of a newspaper or the number of viewers of a TV channel. Indeed, the only reason advertisers advertise in a newspaper or on TV is that they aim to reach readers or viewers with their message. If needed, one could use as supporting evidence to this regard business practices or contracts linking the price paid by advertisers to the number of readers or viewers.

Unfortunately this approach cannot always be followed, as in some cases it is not clear whether one side cares about the other and *a fortiori* whether it values the other side positively or negatively. For instance, despite some econometric evidence for some specific countries[48], it is not clear what the attitude of readers is towards advertising in different media.

[46] Consider for instance market definition in the newspaper market, in case readers were not affected by advertising in newspapers. In such a case, the presence of a readers' side does not constrain a firm's ability to raise advertising prices. If the instead for instance readers disliked advertising on a newspaper, the incentives to raise prices on the advertising side after the proposed merger would need to take into account that a higher ad price is likely to lead to fewer ads and thus more readers, which in turn would lead to more ads and so on and so forth.

[47] Bloemveiling Aalsmeer/FloraHolland, at para 29.

[48] For instance, while Argentesi and Filistrucchi (2007) and Fan (2010) find no effect of advertising on the number of readers of daily newspapers in Italy and in the US, Kaiser and Wright (2006) and Kaiser and Song (2009) find that advertising increases readers' demand for magazines in Germany. Wilbur(2008) find instead that viewers dislke advertising in the US and so does Jeziorski(2011) for.radio listeners in the US. Evidence on the effect of advertising on internet users is more mixed.

In the *Holtzbrinck*[49] case, for example, the Bundeskartellamt defined two different markets, one for readers and one for advertisers, and considered both indirect network externalities to be positive. The Bundeskartellamt assumed that more advertising enhances readership and argued that readers value advertisers because more advertising leads to higher revenues for the newspaper, which in turn allows the newspaper to offer higher quality journalism.[50] Well before the theory of two-sided markets was formulated, in *US vs. Donrey Media Group*[51], both a market for readers and a market for advertisers were distinguished. It was also recognized that the markets were interdependent. Similarly to *Holzbrink*, readers were assumed to attach a positive value to advertising.

Surprisingly, in *Archant/Independent News and Media*[52], the UK Competition Commission did not identify two distinct markets, namely a readership market and a market for the sale of advertising space. In fact, it did not define any readership market but focused solely on defining a market from the perspective of advertisers. [53] This implicitly assumed that readers do not care about the quantity (or concentration) of advertising in the newspaper, as otherwise the decision to raise prices on the advertising side after the proposed merger would need to take into account that a higher ad price would lead to fewer ads and this would affect the number readers, which in turn would affect again the number ads and so on and so forth.[54] Overall the incentives to raise advertising prices might be lower or higher if readers were not indifferent to ads in the newspaper. Also, if the impact of advertising on readers were not zero, the welfare effects of the merger would not be limited to the advertising side only, even if readers did not pay for their newspaper and were not expected to do so after the merger.

These examples show that one of the drawbacks of the deductive approach is that it may lead to different conclusions on the existence and, more importantly, the sign of the network effects. The other disadvantage is of course that, as any qualitative approach, it does not allow one to say anything about the size of the indirect network effects.

3.1.2 The interview approach

A slightly more refined way to assess the two-sided nature of a market could be interviewing agents in the market (i.e. business people but also consumers) or making them fill-in a questionnaire with the aim of assessing whether they value, positively or negatively, the presence of more customers on the other side.

For instance, in the case of newspapers, one could ask advertisers whether they value the number of readers of a newspaper on which they place an ad. One could also ask readers

[49] This merger case was decided by the Bundeskartellamt in 2002 and concerned three different products: regional daily subscription newspapers, city magazines and online city portals in Berlin. The decision focused on the market for regional daily newspapers.
[50] Indeed, that more advertising implies a higher ability to invest in quality and therefore higher quality is the less common interpretation of the indirect network effect from advertisers to readers in the newspaper market. It is mentioned for instance in Gabszewicz, Garella and Sonnac (2007) as one of the determinants of the circulation spiral for newspapers: more readers lead to more advertising which leads to higher quality which in turn leads to more readers and so on and so forth.
[51] The case, decided in 1995, concerned the purchase of a local daily newspaper, the Northwest Arkansas Times, by NAT, L.C. Both the government and private plaintiffs contended that this purchase would substantially lessen competition, since NAT, L.C., had significant shareholders in common with defendant D.R. Partners d/b/a Donrey Media Group, which owned a competing local daily newspaper, the Morning News of Northwest Arkansas. The court concluded that the acquisition was unlawful and having considered all alternatives, concluded that rescission was the appropriate remedy.
[52] This merger between newspapers was cleared in 2004.
[53] Archant/Independent News and Media, at paras 4.1 and 4.2.
[54] Similarly, in News Corporation and BskyB, the European Commission failed to consider a market for TV viewers. As again this implicitly assumed that viewers are not affected by advertising, it is, if possible, even more surprising than in Archant/Independent News and Media. In fact, it is a widespread view that advertising on TV annoys readers and such a view is supported also by empirical studies of the TV market, e.g. Wilbur (2008).

whether they like advertising on the newspaper, whether they are annoyed by it or whether they are indifferent to it.

In some cases such surveys might indeed already exist. This is the case, for instance, in many countries where communication or social scholars run surveys with regard to the use and the perception of media.[55]

An example of a case in which the competition authority adopted an interview approach is *Travelport/Worldspan.* [56] The European Commission stated that "GDS providers act as intermediaries in a market of a two-sided nature, connecting two separate customer categories. In the upstream market (the TSP side of the market), TSPs offer GDSs information on their booking inventory and the content, while the GDSs offer TSPs booking capabilities and a distribution channel to TAs. In the downstream market[57] (the TA side of the market), GDSs offer TAs reservation, booking and ticketing services by means of a comprehensive tool which allows comparison of prices and conditions from hundreds of TSPs."[58] According to the European Commission, this conclusion was supported by a market investigation in which "the Commission sent detailed questionnaires to full service airlines, low cost carriers ("LCCs"), car rental firms, hotel companies, travel agencies, associations of travel agencies, competing GDS providers and companies operating alternative distribution channels of travel content. Certain groups of respondents received several questionnaires. In addition, a number of in-depth interviews were conducted with airlines, airline alliances, competing GDS providers, travel agencies, associations of travel agencies and associations of business travellers." [59] The market investigation allowed the European Commission to aknowledge that indirect network effects play a role:" The larger the number of "reachable" TAs, the higher the positive network externalities (in terms of volumes of bookings) generated via a given GDS." [60] It also led the European Commission to the conclusion that there were "asymmetries in network effects (network externalities are generated mainly on the TA side and GDS providers have to create demand on that side in order to have demand on the TSP side)".

The main drawback of the interview approach is that, as any qualitative approach, it does not allow one to say anything about the size of the indirect network effects. Yet the latter is crucial to establish to what extent indirect network effects play a role in market definition, in merger evaluation, in the assessment of dominance and in establishing abuses by a dominant firm in a two-sided market. The quantitative approach

A quantitative approach to the assessment of the two-sided nature of the market would focus on checking not only whether there are indirect network effects and whether they are positive or negative but also on measuring their size. For instance, in a case involving newspapers,

[55] See for instance for Italy the "Rapporto sulla Comunicazione in Italia" published by the research Institute Censis.
[56] The merger, cleared in 2007, concerned a concentration between two providers of electronic travel distribution services via so-called global distribution systems (GDSs). A GDS is a tool provided to travel agents (TAs) in order to allow them to get information and make reservations for mostly airlines, cars and hotels from travel service providers (TSPs).
[57] With regard to the identification of two-sided markets, it is interesting to note that the European Commission identifies one-side of the market with the upstream market and the other side of the market with the downstream market. In fact this might generate some confusion. Indeed TSPs are the upstream firms and TAs are the downstream firms in the market for travel services. However these are not the two-sides of the two-sided market. In reality, the two-sided market is the one for intermediation services to TSPs on one side and to TAs on the other side. One can better see the distinction by realizing that the market for travel services could exist also if the intermediaries were not present.. Similarly to the case of a payment card company which provides the services of a POS terminal to merchants (the sellers) and those of a card to cardholders (the buyers). In that case clearly the market where the card holder and the merchant transact, for instance when the former buys a pair of shoes and pays by card, is not a two-sided market.
[58] *Travelport/Worldspan*, at para. 11.
[59] *Travelport/Worldspan*, footnote 11.
[60] *Travelport/Worldspan*, at para. 19.

one might want to know how much advertisers value an additional reader or, in a case involving payment cards, one might want to check whether merchants care more about one additional cardholder than a cardholder cares about one additional merchant having a point-of-sale terminal.

In order to answer these questions one can follow two different quantitative approaches: the stated preference approach and the revealed preference approach.

Both are often more time consuming than a qualitative approach as they require the collection and analysis of data. They would thus seem more applicable in a second phase of analysis.

In fact, having already identified two-sidedness using a qualitative approach might help in figuring out which are the relevant questions to formulate and the relevant data to collect.

3.1.3 The stated preferences approach

A stated preferences approach to assessing the two-sided nature of a market would imply surveying agents in the market (i.e. business people but also consumers), interviewing them in person, by phone or through the internet, with the aim of assessing not only whether they value, positively or negatively, the presence of more customers on the other side, but also how much they value them.[61]

Clearly, the design of the survey and, in particular, the formulation of the questions is crucial to the quality of the data.

More precisely, in addition to measuring how demand reacts to changes in prices, one should aim at measuring how demand on one side depends on the number of customers (or more generally, demand) on the other side, keeping all else, including prices, equal. Hence, when asking whether one would buy the product if customers on the other side diminished by some percentage, one should be clear in saying that the price of the product on the side of the respondent should be thought of as fixed. For instance, when asking advertisers who advertise in a phone directory whether they would still place an ad in a directory if the number of users dropped by 5%, one should be clear that the price of placing the ad in the directory would not be changing. If respondents expected a downward adjustment in the price of the ads, the reported effect would be smaller than the real one.

In this regard, conjoint analysis[62] can be a good instrument as it confronts respondents with hypothetical choices among differentiated products, which are carefully made different on specific aspects while keeping constant the others. For instance, a conjoint analysis might ask advertisers which phone directory they would choose if faced with two phone directories with the same advertising price but a different number of users, or when faced with two phone directories with the same number of users but a different price.

One has to be careful however in that conjoint analysis does not allow respondents to be faced with too many different hypothetical situations, while indeed in a two-sided market more comparisons might be necessary than in a single-sided market. That is because in a single-sided market conjoint analysis could for instance be used to estimate the responsiveness of demand to prices, while here it should also be used to measure responsiveness of demand on one side to changes in demand on the other side. A careful selection of the relevant variables, which are designed to change from one product to another, is therefore necessary.

[61] The use of surveys is quite common in competition policy cases. For instance, Reynolds and Walters (2008) describe the use of surveys by the UK Competition Commission.
[62] Conjoint analysis is particularly popular in marketing. The seminal papers for conjoint analysis are Green and Srinivasan (1978) and Green, Carroll and Goldberg (1981). For a recent explanation, see Orme (2005).

These variables would include at least the price faced by the customers, the number of customers on the other side of the market and the most (other) relevant elements of product differentiation. For advertisers in a newspaper not only the number of readers might for instance be relevant, but also the percentage of readers in a specific socio-demographic group, as these readers might be more likely to buy the product once they have seen the ad (either because they are more interested or because they are more easily persuaded).

An example of a case in which a stated preference approach was used is the Bloemenveiling Aalsmeer/FloraHolland, a merger between flower auction houses in the Netherlands cleared by the Dutch Competition Authority (NMa) in 2007[63]. Through the consultancy EIM, the NMa ran a survey of buyers and sellers of flowers and plants at the auction houses in which it asked how they would react to a "deterioration of various parameters of competition". The NMa discussed the results of the survey extensively[64] in its decision:" In the quantitative market research, various types of parameters of competition were taken into account. In addition to the price for services (commission), attention was given to the quality of the services provided by the parties. It emerged from the research that the financial settlement by the auctions on behalf of growers is an important quality factor. In addition, other factors also play a role with regard to growers, such as the duration of physical clearing by the auction. With regard to buyers, the duration of the physical clearing by the auction is a very important quality factor. In the case of buyers which procure through the auctions, the quality of the ornamental horticultural products offered and the composition of the assortment also play a role."[65] The survey included questions on whether they would still sell (buy) at the auction if buyers (sellers) dropped by 5 percent. "In the quantitative market research, two types of parameters of competition were also taken into account which are not determined directly by the auctions. However, they are indirectly influenced by the parties and play a role in the choice of sales channel by growers and buyers. These types of parameters of competition relate to the two-sided character of the market. With regard to both sides of the market, this relates to the price of the ornamental horticultural products, for growers this relates to the volume of demand and for buyers this relates to the volume of supply."[66] 21.3 per cent of the growers surveyed answered they would have switched from the parties to an alternative channel in case of a 5 per cent fall in the demand for products on the auction[67], while 17.9 per cent of the buyers claimed they would have switched from the parties to an alternative channel in case of a 5 per cent fall in the supply for products on the auction. [68] This allowed the NMa to claim that "[t]he parties operate as a marketplace for ornamental horticultural products on a two-sided market"[69] and to discuss at length the implications of two-sidedness for market definition and merger assessment.

A drawback of the survey approach is that people might not state their true preferences and that even truthfully stated preferences might not correspond to actual behaviour when the hypothetical situation becomes real. [70] One should note that, although this is a general finding, the bias, i.e. the distance between stated preferences and the actual behaviour, often depends on the type of question asked and on whether the survey is undertaken by interviewing in person, on the phone or on the internet.[71]

[63] NMa, Case 5901 Bloemenveiling Aalsmeer – FloraHolland, Decision of 21 August 2007.
[64] *Bloemenveiling Aalsmeer/FloraHolland*, at para 46-62.
[65] *Bloemenveiling Aalsmeer/FloraHolland*, at para 58-59.
[66] *Bloemenveiling Aalsmeer/FloraHolland*, at para 60.
[67] *Bloemenveiling Aalsmeer/FloraHolland*, at para 67, Table 2.
[68] *Bloemenveiling Aalsmeer/FloraHolland*, at para 67, Table 3.
[69] *Bloemenveiling Aalsmeer/FloraHolland*, at para 27.
[70] See for instance Diamond and Hausman (1996) for a critique to the stated preference approach to the evaluation of the willingness to pay for a public good.
[71] See Accent and Rand (2010).

For these reasons one might prefer to follow the revealed preferences approach.

3.1.4 The revealed preferences approach

The data approach (or revealed preference) approach would require the collection of data on the actual behaviour of market participants as well as the estimation of demand for the two sides of the market.[72] The data could be market level data and/or consumer level data.

Market level data are sales, prices and characteristics of products on each side of the market. In a case regarding newspapers, on the readers' side of the market, one would need to collect data on the number of readers or copies sold of a given newspaper, the cover or subscription price and characteristics such as the owner, the editor, percentage of space dedicated to the different types of content, including the percentage of space devoted to advertising; on the advertisers side one would need to collect data on the quantity of advertising, on advertising rates and on demographic characteristics of readers for each newspaper.[73] In the case of two-sided markets where a transaction among end users of the platform is present, one should also collect market level data on the number of transactions, characteristics of the transactions and the prices charged for the transaction by the platform to the two sides. In the case of payment cards one should not only gather information on the number of cardholders and shops with a POS terminal as well as the annual fees of each payment card but also in the number of transactions, the objects and value of the goods sold and in the fees paid per transaction. Similarly for auction houses.

Consumer level data would provide a record of the individuals' actual choices. For instance, it would provide information on which newspapers a given person buys or reads. They would therefore allow the choices of products to be related to the individual characteristics of the market agents. For example, such data would allow one to determine whether readers with a higher education tend to be less inclined to read free newspapers or tend to buy more than one newspaper.

Although more rare than market level data, consumer level data are becoming more and more available thanks to technological progress.

By allowing individual characteristics to be related to choices, consumer level data would allow the estimation of different indirect network effects based on the characteristics of the individual. For instance, the data would make it possible to say whether people with a higher education are more annoyed by advertising than less educated people or whether small shops advertising in a directory value additional users less than large stores.

This could turn out to be useful later when evaluating the merger as one could assess its impact on the different subgroups of customers on each side. One might for instance assess whether the merger among phone directories would hurt small shops while it would benefit bigger ones.

Recent econometric models would also allow one to estimate individual specific indirect network effects using market level data.[74] As the models exploit variation across markets in the socio-demographic characteristics of potential customers, their use thus requires that one would be able to collect market level data and socio-demographic characteristics for many

[72] As done for instance by Rysman (2004) and Kaiser and Wright (2006).
[73] This is done for instance in Argentesi and Filistrucchi (2007).
[74] See Ackerberg *et al* (2007).

different markets. In addition, the estimation procedure is quite complex and time consuming, although advances in computing are making it increasingly feasible as time passes[75].

Whether one is using market level or consumer level data, whenever possible, one should aim to collect these data for several periods in time. This would allow better control of unobserved product or individual characteristics in the estimation. This is important because it is unlikely that a researcher will be able to collect data on all the factors, which affect the choice of a given product by an individual.

Indeed, this is one of the advantages of the revealed preference approach with respect to the survey approach, at least in as much as data on past behaviour can be collected more easily than surveyed.

The other main advantage is that it enables the measurement of the size of the actual indirect network effects, rather than not measuring it as in the case of a qualitative approach or just measuring the size of hypothetical indirect network effects as in the survey approach.

An example of the revealed preference approach was proposed by the merging parties in *European Directories – Truvo Nederland,* a merger between phone directories cleared in 2008 by the NMa. On behalf of the merging parties, Van Cayseele and De Smet (2008) submitted a structural econometric model of the market attempting to replicating Rysman's (2004) model for the US yellow pages market.[76]

Unfortunately, the conclusion of Van Cayseele and De Smet (2008) that the merging parties sold complementary products rather than substitute products took the centre of the debate. A second opinion by Filistrucchi et al. (2008) showed that this finding was not robust to the inclusion of a flexible time trend. As a result, the NMa concluded that: "In view of the problems in the underlying data, which are reflected in the Van Cayseele and Tilec surveys, the Board regards the (individual) evidentiary power of both studies as limited."[77]

However, both studies found empirical evidence that the market was indeed two-sided. Such a finding was fully embraced by the NMa: "With regard to the parties' directories, two sorts of clients can be distinguished: users of the directories (persons and/or companies searching for [information on] companies in a particular location or region) and companies wishing to advertise. The success of a directory depends partly on its success in attracting both users and advertisers. The willingness of advertisers to pay for advertisements in a directory depends partly on the number of users that the directory attracts. At the same time, the use of a directory depends on the directory's information value (a reasonably full list of the names and addresses of Dutch companies and institutions). In this way, the provision of such directories is distinguished by two-sidedness."[78]. The NMa also noted that the finding of two-sidedness was backed up by external findings: "The dual character of directories is also noted in other studies. A report by Europe Economics, commissioned by the European Commission, points out that markets in the media sector, such as the parties' directories, often serve different types of clients, such as advertisers and readers. The Competition Commission (one of the British competition authorities) concludes in a decision relating to print directories that the market for classified directory advertising services in the UK has a dual character, in which advertisers and users influence each other".[79] The NMa thus

[75] See Nevo (2000) for a basic explanation of the estimation procedure.
[76] NMa case 6246, European Directories – Truvo Nederland, Decided on 28August 2008
[77] European Directories – Truvo Nederland at para.80
[78] European Directories – Truvo Nederland at para.105-106.
[79] European Directories – Truvo Nederland at para.107.

concludes that: “Provision of directories is therefore marked by two-sidedness.” [80] Possibly based also on survey evidence to this regard[81], the NMa concludes that: “It can be assumed that this two-sidedness can have a certain impact. Although a reduction by a small number of users will not lead to a similar reduction in the price of an advertisement[82], the Board does consider it reasonable to assume that advertisers value use and that a sharp increase or decrease in use will (in any event, ultimately) lead to a response from advertisers.” [83]Indeed, the two-sided nature of the market plays a crucial role in the assessment of the unilateral effects of the merger.[84]

As shown by the example of the revealed preference approach in *European Directories – Truvo Nederland*, a drawback of the data approach is that, although a carefully designed econometric analysis may indeed provide fundamental answers, specifying and estimating the correct econometric model of demand for membership or transactions on the two sides may not be easy and will surely be time consuming, as the econometric model needs to be fitted to the market. Moreover, it might be the case that the best econometric model would require data that are not available. In both cases, simplifications are possible only in as much as one can convincingly justify the assumptions made.

Given its characteristics, using a revealed preference approach for the assessment of the two-sided nature of the market is probably most useful in a second phase of the analysis. The estimated size of the network effect can then be used to estimate the relevant market or the unilateral effects to be expected from a merger.

4. Conclusion

Many traditional results of economic analysis that lie at the basis of competition policy do not hold in two-sided markets. It is therefore important in competition policy analysis to identify whether the markets concerned are two-sided or not. The question is relevant not only for the analysis of traditional markets, such as newspapers or payment cards, but also for the analysis of many new and emerging markets, such as those for online social networks, online search engines and Internet news aggregator.

From the definitions of two-sided markets proposed in the literature it appears that the identifying features are the existence of a firm selling more than one product or service, the presence of two distinct groups of buyers, each buying different products or services, the interdependency between their demands and the lack of a complete pass-through in case of transaction markets. These identifying features naturally extend to multi-sided platforms.

[80] European Directories – Truvo Nederland at para.108.
[81] The NMa followed also a stated preference approach and commissioned to the market research agency Stratus surveys of companies that advertise in at least one of the parties’ print directories, of advertisers that advertise online, of switchers between the Telefoongids and the Gouden Gids, of companies with (only) a free listing in directories and of users of directories (European Directories – Truvo Nederland at para.70). Also in this case, as in *Bloemenveiling Aalsmeer/FloraHolland,* it was asked how advertisers would react to a (10-15 per cent) reduction in the use of the directories. 26 per cent of the interviewees answered that they would have stopped advertising, while 10 per cent said they would have put a smaller ad on the directory (Stratus (2008a), page 36, table 32). However, on the users’ side, the survey was less informative on the size of the network effect as users were asked only whether they wanted to find all companies listed in the directory or only a selection. Unsurprisingly, 62 per cent of the interviewees said they wanted to find all companies listed in the directory and only 16 per cent said that they just needed to find a selection, while 18 per cent claimed that it did not matter to them (Stratus(2008b), page 16, table 11). In any case, from this evidence the NMa concludes only that “Incomplete lists could therefore lead to a decline in use, making the directory less attractive to advertisers”.
[82] This would seem to suggest that a decrease of 1 per cent in the number of users would lead to a decline in equilibrium advertising prices lower than 1 per cent.
[83] European Directories – Truvo Nederland at para.108.
[84] European Directories – Truvo Nederland at para.108.

The first objective of a quest for two-sidedness in the market should thus be to identify whether there are indirect network externalities, whether they are both positive, or whether one is positive and the other is negative. This can be done using one of the qualitative approaches discussed above.

In most cases however, knowing that one or more network effects exist as well as knowing their sign would not be enough to derive conclusions on for example the effects of a merger. In this case a quantitative approach, which allows the measurement of the size of these externalities, is crucial. Such an approach should also allow the measurement of the price elasticities (or diversion ratios) on each side of the market.

Whereas a qualitative approach might therefore be useful, for instance, in the first phase of a merger investigation, a quantitative one might be better suited for a second phase analysis. Given the time constraints antitrust authorities face, unless parties actively collaborate to the set-up of an econometric model, we would expect most quantitative approaches to take the form of a well-designed survey of customers on both side of the markets.

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