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A FEW THOUGHTS ABOUT COMPETITION POLICY IN TWO-SIDED MARKETS

The paper reviews recent literature concerning two-sided markets or platforms. These markets are characterised by indirect externalities since the utility of users on one side of the market increases in the number of users on the other side of the market. There are many examples of two-sided markets, such as payment cards, newspapers, Internet advertising, search platforms for accommodations, software applications, etc. Competition policy has special features in two-sided markets, and the wisdom from standard markets may induce wrong decisions by competition authorities. Therefore, the paper discusses the definition of the relevant market in two-sided markets, when horizontal merger is beneficial to users, how predatory behaviour is defined, and other anti-competitive practices.

Key words: *Platforms. – Relevant market. – Horizontal mergers. – Predatory behaviour.*

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1. INTRODUCTION

Two-sided markets have imposed a necessity for reconsideration of competition policy that should be adapted to the special features of such markets. The European Commission (EC) proposed a Digital Markets Act (DMA)¹ with the aim of regulating competition in online two-sided markets. The DMA identifies ‘gatekeepers’ as online platforms that connect users on two sides of the market, and which sometimes also sell their own products. The European Parliament adopted this document on 15 December 2021, and gave its green light to begin negotiations with the member states. Once the document is adopted by the member states, it will be applied across the EU.² The EU legislation is based on one-sided markets, and the DMA is a supplement.

Two-sided markets (platforms) enable interaction between two groups of users that benefit from indirect externalities, which means that the utility of one group of users depends on the number of users on the other side of the market. For example, the utility of advertisers in newspapers depends on the number of newspaper readers. For this reason, a platform may set a price below the marginal cost on one side of the market, in order to attract users on the other side of the market. Newspapers create content that attracts readers, and readers attract advertisers. Readers can value advertisers positively if they are interested in advertisements but can also be indifferent to advertisements or annoyed by ads if they are primarily interested in the newspaper’s content. Some platforms are three-sided or even multi-sided. Moreover, platforms where content providers and content consumers meet, also attract advertisements (YouTube).

Payment cards are the second example of two-sided markets, with Visa and MasterCard being the most commonly used ones. There are four participants in the transaction: merchant, cardholder, card issuing bank, and merchant’s bank. The cardholder pays an annual or monthly membership fee to the bank that issued the card, which can also be negative if the cardholder receives coupons and refunds, depending on the volume of transactions. Merchants receive the amount of the transaction, minus the discount that

¹ <https://eur-lex.europa.eu/legal-content/en/TXT/?qid=1608116887159&uri=COM%3A2020%3A842%3AFIN> (last visited 13 May, 2022). The latest procedural developments as of 24 March 2020, available at: <https://www.jdsupra.com/legal-news/digital-markets-act-now-firmly-on-its-7932391/> (last visited 14 May, 2022).

² In the following text certain articles of this document will be commented on, bearing in mind that it is yet to be adopted by the EU member states.

represents the commission of the merchant's bank. The merchant's bank pays the interchange fee to the bank that issued the payment card to the cardholder.

Other examples of two-sided markets are Internet search engines, which connect users –who search for particular keywords – and advertisers; accommodation platforms, which connect people in search for accommodation and hotels and apartment owners; and software platforms, which connect developers and users of applications. Google Play is an example of a software platform. In the case of this platform, more applications attract more users, and more users attract more software application developers. Online shops, such as eBay, Amazon, Alibaba, and AliExpress, have become very popular, which is also the case with video streaming platforms: Netflix, HBO, Amazon Prime, and Disney+. Some of these platforms, in addition to connecting two sides of the market, offer their own products for sale. Amazon offers Kindle, and video streaming platforms provide their own movies and series.

According to Evans and Schmalensee (2011), users can use one platform (single-homing) or multiple platforms (multi-homing).³ For example, merchants accept different payment cards, while cardholders typically use one payment card, although some users hold different types of payment cards. Advertisers advertise in several daily newspapers, while readers typically buy one daily newspaper. In online versions of newspapers, both sides use several platforms.

Two-sided markets can be non-transactional markets, where there is no direct transaction between platform users on the two sides of the market. For example, newspapers do not have a direct transaction between readers and advertisers, although advertisers benefit from the increasing the number of readers. Newspapers charge readers only for membership, but not for use, since readers paying for the print version of the newspaper pay a fixed sum, regardless of how many members of their households will read the newspaper. In two-sided transactional markets, there is a direct transaction between platform users on two sides of the market, as in the case of payment cards. Another example of a transaction market are mobile network operators. On one side of the platform is a user who makes a call, and on the other side of the platform is a user who receives the call. In this case, the platform (mobile network operator) charges the user making the call for membership (monthly subscription) and for using the platform (the platform deduces minutes within the monthly package). Hence, Rochet and Tirole (2008) distinguish between membership indirect externalities

³ The rest of this section is based on Evans and Schmalensee (2011).

(*ex ante* externalities) and usage indirect externalities (*ex post* externalities) on a platform. Platforms can charge an access fee, usage fee or both. In the case of payment card platforms, users pay an access fee in the form of a monthly membership fee and no usage fee, and merchants pay a discount on each transaction (usage fee, but no membership fee). In some cases, there is no fee for one side of the market. For example, this is the case with clients who search for accommodation on Booking.com who do not pay an access or usage fee.

In two-sided markets, there is a distinction between the price level, which is the sum of prices paid by both sides of the market, and the price structure, which represents the ratio of the prices paid by the two sides. For example, if one weekly business journal that it is printed in 100.000 copies per week demands EUR 10.000 for the advertisement on the front page, the price of the advertisement per copy is EUR 0.10. This business journal can be bought by readers for a price of EUR 2. The price level is the sum of the two prices, $2 + 0.1 = 2.1$, and the price structure is the ratio of the prices, $2/0.1=20$. If users on one side of the market can transfer part of the price they pay to users on the other side, the price structure is irrelevant, and the platform would have no control over it. For example, if stores could charge higher prices for clients who pay by card than in cash, the platform would not have control over the price structure. Due to the competition from other sellers, an individual seller cannot transfer the merchant's discount to consumers. This kind of transfer is certainly not possible in non-transactional markets, and partial transfer is possible in transactional markets.

Due to the indirect externalities in two-sided markets, when the platform increases the price on one side of the market, it reduces the number of users on that side of the market, but it also reduces the number of users on the other side of the market. Furthermore, the reduction of the number of users on the other side of the market reduces the number of users on the first side of the market.

The DMA has defined 'gatekeepers' as platforms that provides online intermediation services, online search engines, social networks, video-sharing platforms, operating systems, cloud computing services and Internet advertising (Article 2). A gatekeeper must have annual turnover of at least EUR 7.5 billion, a market capitalisation of at least EUR 75 billion, more than 45 million personal users in the EU, and more than 10.000 active business users in the last fiscal year. The DMA can identify a platform as a gatekeeper even if it does not meet the previous thresholds, but if it estimates that its size, turnover, market capitalisation, number of users, entry barriers, and network effects make it a dominant player in a particular market (Article 3).

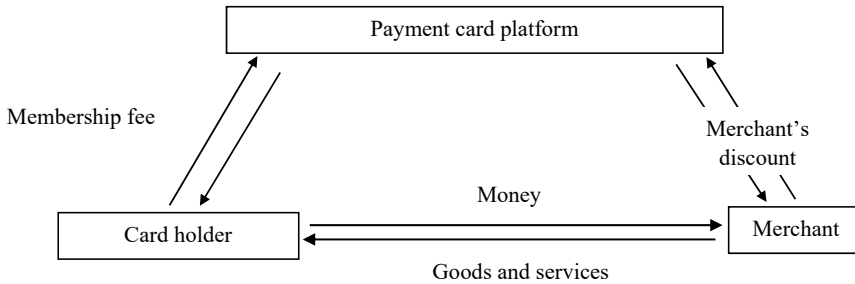
The aim of this paper is to emphasise differences in the competition policy in two-sided and one-sided markets by reviewing the literature on two-sided markets. The paper will discuss some competition policy issues in two-sided markets through the lens of the DMA. The rest of the paper is organised as follows. In the second part, some conducted cases in two-sided markets are considered, followed by an explanation of special features of the relevant market definition and mergers in two-sided markets. Predatory behaviour is also defined differently in two-sided markets than in standard markets. Finally, other anti-competitive practices in these markets will be analysed. The last section concludes the discussion.

2. SOME CONDUCTED CASES IN TWO-SIDED MARKETS

In this part, the nature of two-sided markets will be explained through the example of payment cards, accommodation platforms, and Internet advertising. Some anti-competitive practices of these platforms will also be illustrated.

2.1. Payment Cards

According to Schmalensee and Evans (2011), in 1950 Diners Club was the first payment card platform, which charged cardholders an annual membership fee of USD 3 at the time, while the cost of a transaction for cardholders was negative due to various bonuses based on the volume of transactions. Sellers paid a discount of 7% of the transaction value. This platform generated 70% of its total revenue from sellers' discounts. American Express card appeared in 1958 and had a slightly higher membership fee and a lower amount of seller's discount. This platform generated 65% of its revenue from seller's discounts.

Figure 1. Payment card platform with 3 participants

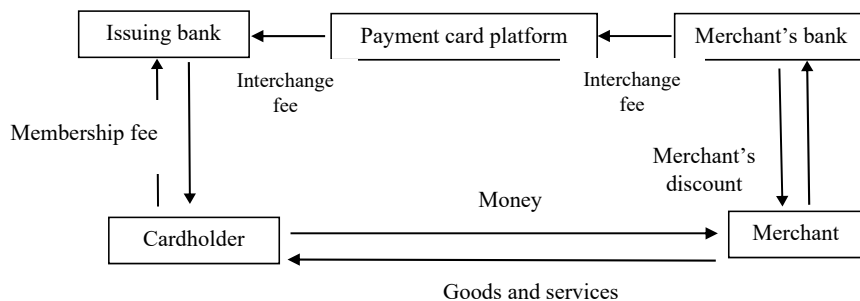
Source: Filistrucchi *et al.* (2014)

In 1958, Bank of America launched its payment card platform where cardholders did not pay a membership fee, while the seller's discount was 5%.⁴ Bank of America was both the issuer of payment cards and the bank that processed transactions for the seller, which determined the level and structure of prices. This system can be shown with three participants in Figure 1, based on Filistrucchi *et al.* (2014). In 1966, Bank of America began selling franchises to other banks for issuing payment cards, which independently determined the fees for the two sides of the market. If a buyer owned a card issued by bank α , while merchant's bank was β , bank β was obliged to transfer the entire amount of the merchant's discount to bank α . Therefore, bank β had an incentive to show that it collected a smaller amount of merchant's discount than the amount it actually collected. Consequently, banks were demotivated to represent merchants because they had zero profit from that business if they transferred the entire collected discount to the card-issuing bank. The problem was overcome in 1970 when the interchange fee was introduced,⁵ which the bank processing the transaction for the merchant paid to the bank issuing the card to the cardholder. This fee was set at 1.95% of the value of the transaction independently of the amount of merchant's discount. To make some profit, the merchant's bank charged a higher discount than the amount of interchange fee it paid to the bank issuing the card. This system with 5 participants is shown in Figure 2, based on Filistrucchi *et al.* (2014).

⁴ This part is based on Schmalensee and Evans (2011), and Filistrucchi *et al.* (2014).

⁵ Baxter (1983) has shown that interchange fees can increase the volume of card transactions as well as total welfare. Carlton and Frankel (1994) claim that the application of interchange fee is isomorphic to the situation when merchants charge higher prices for card transactions than for cash transactions. However, due to the competition between merchants, this type of price discrimination, based on the payment method, is unlikely to be seen in practice.

Figure 2. *Payment card platform with 4 participants*



Source: Filistrucchi *et al.* (2014)

In the payment card system, there is an inter-brand competition between different payment card platforms (Visa, Master Card, American Express, etc.). In addition, there is an intra-brand competition between banks that represent one payment card company to issue cards to as many clients as possible. In the latter form of competition, banks offer different benefits to users to differentiate their offers from competitors. Banks may offer travel insurance, discounts in some stores, free coupons for purchasing in some stores, etc. Banks add these benefits to make their offer more attractive to clients, and these benefits do not stem from card companies.

NaBanco filed a lawsuit against VISA to the court in 1984, accusing the banks of collusive behaviour due to the collectively determined amount of the interchange fee. However, the court determined that bilateral bargaining between banks would lead to high transaction costs, which would jeopardise the existence of a payment card system. In addition, buyers and sellers would need to know whether their banks have a bilateral agreement before attempting to make a payment. The lawsuit ignored the two-sided structure of the market and the need to balance the number of users on both sides of the market through the amount of the interchange fee. In a recent case *Ohio v. American Express Co.*, the US Supreme Court decided that it is not sufficient to show that only one side of the market is harmed by a platform; it must be shown that both sides are harmed.⁶

One of the concerns for EC was the decision of the National Bank of Serbia to require all banks in Serbia to issue Dina cards free of charge to all their clients. The concern of EC was that this measure of the Serbian central bank was anti-competitive, since banks' clients would have to pay

⁶ For more details about this case, see Wright, & Yun, (2019). The author is grateful to the referee for pointing out to this case.

monthly membership fees for competing payment cards, such as Visa and Mastercard.⁷ It should be noted that competition in the financial sector in Serbia is supervised by the central bank as the sectoral regulator.

2.2. Platforms for Accommodation: The Case of Booking.com

Platforms that offer hotel or apartment accommodation are also two-sided markets. On one side of the market are users who search for accommodation, and on the other side of the market are hotels and apartment owners who offer accommodation. On these kinds of platforms, both sides of the market have positive indirect externalities from a number of users on the opposite side of the market. The search for users is free, and on some platforms, such as Booking.com, the search is even subsidised since Genius level 3 users obtain up to 20% discount on hotel reservations, free breakfasts or free upgrades to a better hotel room. Platforms obtain revenue from hotels and apartment owners who pay 10%–30% of the hotel reservation to platforms. In addition to prices for accommodation, guest reviews are a very important factor for owners, and in general, accommodations with higher ratings from guests can charge higher prices. These platforms offer additional services such as transfers between airport and hotel or car rental services.

The anticompetitive behaviour investigation details against Booking.com are provided by Caccinelli and Toledano (2018). To prevent the free-rider effect, when a platform user finds accommodation on the platform and then goes to the hotel site and pays a lower price, Booking.com has introduced a clause that prevents hotels from offering accommodation at a lower price than on the platform, through any online or offline sales channel in travel agencies (broader clause). The national competition authorities (NCA) of France, Italy, Germany and Sweden have launched investigations to determine whether such behaviour is against competition rules, and only the French NCA recognised the two-sided nature of this market. In response to the launching of the investigations, Booking.com amended the disputed clause on 1 July 2015, to allow hotels to offer a lower price on other platforms or in offline sales through travel agencies, but they were not allowed to offer a lower price on the hotels' websites (narrower clause). The NCAs have accepted amendments to this clause in France, Italy and Sweden. The German NCA considered even the amended clause to be restrictive.

⁷ <https://www.istinomer.rs/analize/dina-kartica-pod-skenerom-brisela/> (last visited 14 May, 2022).

The NCAs in France, Italy and Sweden have defined the relevant market as the market for online accommodation search. Consequently, the broader clause reduced competition between accommodation search platforms and prevented new platforms from entering the market. In addition, Booking.com was able to use its market power and increase the commission it charges to hotels. Concerning the narrower clause, the NCAs in these countries have determined that it is not restrictive since the offer of accommodation on the hotel's site belongs to another relevant market, and the narrower clause has no impact on the competition between platforms. In contrast, the German NCA determined even the narrower clause to be problematic due to the dominant position of Booking.com in the accommodation search market in Germany (50%–55% market share). In addition, the German NCA concluded that the narrower clause has an adverse consequence on the upstream price competition between hotels. Article 10 of the DMA prohibits the practices that restrict the market's contestability, and the broader clause used by this platform violates this act.

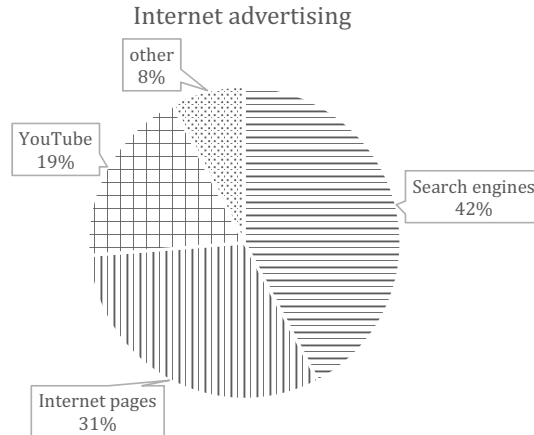
2.3. Internet Advertising

Internet advertising has taken a dominant position compared to traditional advertising. In the US, the total expenditure for Internet advertising has increased from USD 31.7 billion in 2011 (USD 36.4 billion in 2020 USD) to USD 139.8 billion in 2020. Internet advertising can take different forms: advertising on websites (for example, online versions of newspapers or social networks), in software applications, in Internet search engines, video advertising (on YouTube), email advertising, etc. These types of advertising (with the exception of email) represent two-sided markets. One side of the market are users (readers of online newspapers, users of software applications, users of Internet search engines and YouTube), and on the other side of the market are the advertisers. There is also an increasing trend of expenditures on mobile device advertising, compared to computer advertising. In 2011, total expenditures on mobile device advertising were only USD 1.6 billion in the US, and total expenditures on computer advertising were USD 30.1 billion. After only 9 years, in 2020, total expenditures on mobile device advertising were USD 98.3 billion in the US, while total expenditures on computer advertising were USD 41.5 billion⁸.

⁸ These data were collected from <https://s3.amazonaws.com/media.mediapost.com/uploads/InternetAdvertisingRevenueReportApril2021.pdf>. (last visited 21 January 2022).

The share of different types of Internet advertising in 2020 in the US is presented in Figure 3.

Figure 3. *Internet advertising by type in the US, in 2020*



Source: <https://s3.amazonaws.com/media.mediapost.com/uploads/InternetAdvertisingRevenueReportApril2021.pdf> (last visited 21 January 2022).

Advertisements on websites are published based on the user's IP address, search history, web browser history, etc. Hence, this advertising is more effective than traditional advertising, since advertisers target individuals with some interest in buying their products. In Internet advertising, user data is an essential element of competition. A platform with a more considerable accumulated amount of user data⁹ has a significant advantage over competing platforms entering the industry, which is a substantial barrier to entry, according to Katz (2019). These advertisements are on a per-impression base, which means that advertisers have to pay each time the ad is displayed to users. Typically, an advertiser pays for 1,000 impressions. The price depends on the advertisement's position, and the top right corner of the page is more expensive than the bottom left corner.

The website (social network) can negotiate the terms of advertising directly with the advertiser. The other possibility is indirectly through the network of advertisers. Small platforms (websites) use the indirect method because it is expensive to hire additional employees for direct negotiations.

⁹ Article 5a of the DMA prohibits a platform from using data collected on other platforms provided by the same gatekeeper or data collected from third-party services.

Large platforms sell the most requested space in direct negotiations, and less sought-after space on the page by indirect method. For large platforms, 70% of advertising revenue is generated in direct sales and 30% in indirect sales.

As explained above, when users type a certain keyword into a search engine, they receive two kinds of results: organic search results – which stem from the search engine’s algorithm – and advertisements. In this type of advertising, the advertiser pays only if the user clicks on the ad. The advertiser should have his ad in the highest position on the screen because he can receive more clicks. The order of advertisers is determined in a position auction. The advertiser with the highest pay-per-click bid gets the first position, the advertiser with the second-highest bid the second position, etc. Each advertiser pays the amount offered by the advertiser in the position below him, and this mechanism is called generalised second-price auction (GSP). At the present, Google weighs the bidder’s bid with an estimated click-through rate and advertiser’s quality to maximise its advertising revenue, and bidders are ranked according to these weighted bids. This market is highly concentrated, with Google having a global market share of 91.54% in 2020, Bing 2.44%, Yahoo 1.64%, Baidu 1.08%, Yandex 0.54%, DuckDuckGo 0.45%, etc. Cabral (2011) discusses the effects that lead to market concentration in two-sided markets. Search users will find more useful ads on a large search engine than on a small search engine, especially for keywords that are not searched often. Also, advertisers prefer to advertise on large platforms due to more clicks and more purchases after clicking on an ad. These indirect network externalities cause further concentration in the search engine market, which is evident when the constant increase in Google’s market share is observed. Halaburda *et al.* (2020) explains the factors that might work in the opposite direction, such as diversification, congestion, and interoperability. Article 6g of the DMA states that Internet advertising platforms should provide advertisers with the data necessary to evaluate the effects of online advertising.

In the latest relations between Microsoft and Google, MS Edge can use Google’s algorithm. When installing Windows, users are informed that they will not lose any of the benefits of Google Chrome by choosing MS Edge. It seems that through this relation, Microsoft is strengthening its dominant position in the OS market, and Google is strengthening its dominant position in the search market. In this relationship, Microsoft is sacrificing its search engine, Bing (which is rarely used outside the US).

Google has a widely used horizontal keyword two-sided search platform. In addition, Google has a specialised platform, Google Shopping (vertical search).¹⁰ In its results for a horizontal search of specialised shopping platforms, Google placed its specialised platform in the first position and other competing specialised platforms in lower positions. This case is described extensively by Iacobucci and Ducci (2019). The European Commission has fined Google EUR 2.42 billion for abusing its dominant position in the horizontal search market. The Commission concluded that biased horizontal search results favouring Google Shopping prevented new competitors from entering the specialised search market, put existing competitors in the specialised search market at a disadvantage, and harmed search users and advertisers. Google should treat all specialised search engines in the same way in horizontal search results. In order to prevent such behaviour, Article 6d of the DMA defines that search engines should not prioritise their own additional services in search results.

3. DEFINITION OF THE RELEVANT MARKET

The relevant market definition is quite different in two-sided markets than in standard markets, and this section follows Evans (2011) and Fillistrucchi *et al.* (2014) concerning this definition. The example of the print version of newspapers is illustrative for this purpose. Daily newspapers and TV may be in the same relevant market on the side of advertisers but not on the side of the audience. If audience members read the newspaper in the morning and watch TV in the evening, these two media types are not substitutes for each other. On the other hand, if advertisers want their ads to reach readers only once a day, these two media types are substitutes for each other. TV and daily newspapers will be in the same relevant market on the side of advertising, but not on the side of the audience. In the case of mergers of daily newspaper publishers, it should be borne in mind that TV competes with daily newspapers on the side of advertising but not on the side of content creation.

In two-sided markets, it is possible that one side of the market does not pay anything (free newspaper or TV channel) and that the platform generates revenue only from the other side of the market – advertisers. Access is free for customers (or even subsidised if free parking is taken

¹⁰ Vertical search is related to a particular area of interest (specific parts of the Internet). Google Images or Google Shopping search engines are examples of vertical search. Horizontal search is performed over the entire Internet.

into account) at a shopping mall, while the shopping mall charges rent to tenants. However, shopping malls are also competing for customers because reducing the number of customers reduces merchant interest in renting, and the shopping mall must reduce the rental price. In this case, the rule applicable to standard markets – stating that where there is no price, there is no market – does not apply in the case of two-sided markets.

Therefore, in non-transactional two-sided markets, two interconnected markets should be defined, while in transactional two-sided markets, only one market should be defined. Namely, in two-sided transactional markets, the platform generates revenues on both sides of the market, and there is no point in considering two separate markets.

The critical loss analysis considers whether an increase in the price of a hypothetical monopolist selling one product is profitable.¹¹ If the price increase is not profitable, it means that there is a product that is a substitute for the product sold by the hypothetical monopolist, and this product should be added to the analysis. This procedure is repeated by adding substitute products until the price increase becomes profitable in some iteration. This group of products makes up the relevant market. Thus, the relevant market is the smallest set of substitutes for which the monopolist can profitably increase the price from the initial price level.

In the case of the hypothetical monopolist test in two-sided markets, the possibility for a profitable price increase is more limited than in standard markets due to the presence of indirect externalities, and the platform must balance the number of users on both sides of the market. If the increase in the price reduces the number of users on one side of the market, it will reduce the number of users on the other side of the market. Moreover, due to the feedback effect, a reduction in the number of users on the other side of the market leads to a further decline in the number of users on the first side of the market. Thus, the probability of anti-competitive effects of mergers in two-sided markets is smaller.

Newspapers are differentiated vertically,¹² according to the number of readers. If daily newspapers with a larger readership increase the price of advertising (in the hypothetical monopolist test), the number of advertisements in these daily newspapers will be reduced to a lesser extent than in the case of newspapers with a lower readership.

¹¹ See, for example Harris and Simmons (1991).

¹² Horizontal differentiation refers to differentiation of the product according to the consumer's preferences. For example, some consumers prefer coffee with a small amount of sugar, while others prefer coffee with large amount of sugar.

In the hypothetical monopolist test in two-sided markets, the question arises on which side of the market the increase of price should be considered and whether profits on only one side of the market or on both sides of the market should be taken into account. If only the impact of an increase in price on one side of the market on the profit of a hypothetical monopolist is considered, the fact that an increase in the price on that side of the market leads to the reduction in the number of users on the other side of the market should be ignored. Thus, if only one side of the market is considered, the reduction in profits of the hypothetical monopolist would be underestimated.

The hypothetical monopolist test should be conducted in two-sided transactional markets by increasing the price level (the sum of prices on both sides of the market). There are different opinions regarding the change in the price structure in this test.¹³ However, the prevailing opinion is that the hypothetical monopolist should be allowed to optimally adjust the price structure because if the price structure cannot be adjusted, the reduction of the hypothetical monopolist's profit would be overestimated. Thus, the hypothetical monopolist test in which monopolists would not be allowed to change the price structure would estimate the upper limit of the relevant market. In non-transactional markets, the price should be increased first on one side of the market and then on the other, allowing the hypothetical monopolist to optimally adjust the price structure.¹⁴

4. HORIZONTAL MERGERS IN TWO-SIDED MARKETS

The merger of platforms in two-sided markets affects the level and structure of prices. In addition, the merger of platforms increases indirect externalities, as users on one side of the market can interact with more users on the other side of the market. This effect is specific to two-sided markets. Competition commissions have often neglected these specificities in the past, e.g. the British NCA in the case of the merger of Archant and Independent News, when it considered the impact of the merger only on advertisers and not on readers.

Vertical differentiation refers to differentiation in the quality space and this is objectively measurable.

¹³ See more on this discussion in Filistrucchi (2011), Emch & Thompson (2006), and Evans & Noel (2008).

¹⁴ Formal analysis of the hypothetical monopolist test in two-sided markets is presented in Ribeiro & Golovanova (2020).

The method used to analyse the effects of platform mergers, proposed in Correia-da-Silva *et al.* (2019), compares prices adjusted for indirect externalities on each side of the market with marginal costs on each side of the market. Consider the case of newspapers, and denote the readers' side of the market as R and advertisers' side of the market as A; the price on the market side R is p_R and that on this side of the market there are n_R users. On the market side A, the price is p_A and on this market side, there are n_A users. The price adjusted for externalities on market side A is:

$$p_A - \alpha_A n_R \quad (1)$$

where α_A measures the effect of indirect externalities that advertisers have (market side A) from a certain number of readers on market side R. Here, the effect of indirect externalities that advertisers have is deducted from the price advertisers pay to newspapers.

The price adjusted for externalities on the market side R is defined in the same way:

$$p_R - \alpha_R n_A \quad (2)$$

where α_R measures the effect of indirect externalities that readers have (market side R) from a certain number of advertisers on market side A. Here, the indirect externalities that readers have are deducted from the price readers pay to newspapers. Suppose readers are interested in advertisements, the level of positive indirect externalities increases in the number of advertisers. In empirical studies,¹⁵ it is assumed that readers either have positive indirect externalities from advertisements or that readers are indifferent to the level of advertising.

If the price adjusted for externalities is higher than the marginal cost on a particular market side, after the merger, the effect of higher market power will dominate the effect of higher indirect externalities. The explanation of this result lies in the context of the strength of indirect externalities. Based on the previous expressions, it is evident that as the strength of indirect externalities increases, the price adjusted for indirect externalities decreases, with other unchanged circumstances. Therefore, when indirect externalities are strong on both sides of the market (the adjusted prices are low and probably lower than the marginal costs on the respective sides of the market), there is a higher probability that the merger will be beneficial to users on both sides of the market. If indirect externalities are weak on both sides of the market (the adjusted prices are high and probably higher

¹⁵ E.g. Van Cayseele & Vanormelingen (2019) that will be discussed later on. It is true that some consumers dislike advertisements, but not all of them.

than the marginal costs on respective sides of the market), the merger will harm users on both sides of the market. Finally, if indirect externalities are strong on the A-side of the market (advertisers have strong positive indirect externalities from readers) and weak on the R-side of the market (readers have weak positive indirect externalities from advertisers), then the merger is more likely to be beneficial to the A-side of the market (advertisers) and harmful to R-side of the market (readers).

In the 2004 simulation of the merger of Belgian newspaper publishers De Persgroep and VUM, Van Cayseele, and Vanormelingen (2019) assume that readers create positive indirect externalities for advertisers but that readers are indifferent to advertisements. These two publishers accounted for 60% of the total circulation in Belgium and 50% of advertising revenue. Newspapers in Belgium have on the average negative price-cost margin on the readers' side, but the overall price-cost margin (including the advertising side) is positive.

In the simulation of the merger of two newspaper publishers in Belgium, Van Cayseele and Vanormelingen (2019) assume in the first scenario that there was no increase in efficiency due to the merger, in the second scenario that there was a 2% reduction in marginal costs on the readers' market side, and in the third scenario that there was a 2% reduction in marginal costs on both sides. Based on the simulation, it is possible to determine that the selling price of the newspapers would increase by 1.8% after the merger. Although the two newspapers had greater market power after the merger, the possibility of increasing the price for readers was limited because reducing the number of readers decreases advertising revenue. The impact of the merger on change in consumers' surplus (ΔCS), change in producers' surplus (ΔPS) and change in total welfare (ΔW), depending on cost savings, is presented in Table 1.

Table 1. *Merger simulation of Belgian newspapers*

| marginal cost reduction | | ΔCS | | ΔPS | ΔW |
|-------------------------|-----------------|-------------|-----------------|-------------|------------|
| for readers | for advertisers | for readers | for advertisers | | |
| 0 | 0 | -1.15% | -1.61% | 1.64% | -1.35% |
| 2% | 0 | 0.02% | -0.42% | 2.11% | -0.2% |
| 2% | 2% | 0.18% | -0.08% | 2.18% | 0.09% |

Source: Van Cayseele and Vanormelingen (2019)

From Table 1, it can be seen that with cost savings of 2% on both sides of the market, the producer's surplus of publishers and the consumer's surplus of readers increase as well as overall welfare. The merger only slightly

reduces consumers' surplus for advertisers. Therefore, a reduction of 2% of marginal costs on both sides of the market is needed for the merger to improve welfare.

5. PREDATORY BEHAVIOUR IN TWO-SIDED MARKETS

Areeda and Turner (1975) define predatory behaviour as a situation in which a dominant firm sets a price below the short-run marginal cost or the average variable cost. This rule can lead to erroneous conclusions if it is applied to two-sided markets with indirect externalities. As explained above, the price level in a two-sided market is the sum of prices paid by both sides, while the price structure is the ratio of the prices paid by the two sides of the market. The prices paid by the two sides of the market must be expressed in the same units of measurement to be aggregated. In the case of daily newspapers, the price level is the sum of the price at which the newspaper is sold and the total advertising revenue divided by the daily circulation (advertising revenue per daily newspaper copy).¹⁶ The price structure represents the ratio of the price at which the newspaper is sold and the revenue from advertising per one daily newspaper copy. In two-sided markets, the platform's profit depends not only on the price level but also on the price structure. Therefore, for daily newspapers, it may be profitable (in terms of overall profitability) if the price for readers is below marginal cost. This increases the number of readers, which allows the newspapers to increase its advertising revenue. However, competition authorities often neglect this two-sided aspect of the market. Consequently, Berhinger and Filistrucchi (2015) propose a modification of the Areeda-Turner rule in two-sided non-transaction markets by comparing the sum of the prices paid by both sides of the market with the sum of average variable costs on both sides of the market.

According to the modified rule for two-sided markets, if the price is below marginal cost on one side of the market, this should not be considered as predatory behaviour. If the price on both sides of the market is below marginal cost, this can be characterised as predatory behaviour in two-sided markets. More precisely, the newspaper with a dominant position behaves predatorily if the sum of prices on both sides of the market, weighted by marginal network effects, is less than the sum of marginal costs weighted by marginal network effects. In other words, if the newspaper with a dominant

¹⁶ As already explained, if the price of the newspaper is EUR 2, and advertiser pays EUR 0.10 per copy of the newspaper, the price level is EUR 2.10.

position cannot compensate for the loss on the readers' side with the profit on the advertising side, this can be considered predatory behaviour. Therefore, if the price-cost margins on both sides of the market are negative, this is a sufficient condition for predatory behaviour. A necessary condition is that the weighted sum of price-cost margins on both sides of the market is negative.

Since marginal costs are not observable, average variable cost is used to approximate marginal cost, while the number of readers and the number of advertisements are used as an approximation of marginal network effects.¹⁷ The prices set by the platform can be considered predatory if:

$$n_R (p_R - AVC_R) + n_A (p_A - AVC_A) < 0, \quad (3)$$

where p_R and p_A are prices that newspapers charge to readers and advertisers, AVC_R and AVC_A are average variable costs for platform on the readers' and advertisers' sides of the market, while n_R and n_A are the numbers of readers and advertisers, respectively. An operational rule that can be used in competition policy in two-sided markets is that if the weighted total price on both sides of the market is lower than the weighted average variable cost, such behaviour is predatory.

Berhinger and Filistrucchi (2015) consider the behaviour of three of the four most important daily newspapers in Great Britain: The Times, The Independent and The Guardian. All three newspapers had a price for readers of 45 pence on 1 September 1993. On 6 September 1993, The Times reduced the price from 45 pence to 30 pence. On 24 June 1994, there was a new reduction in the price of The Times from 30 pence to 20 pence. This was followed by a reduction in the price of The Independent, which filed a lawsuit before the UK NCA. The UK NCA concluded that The Times did not have a dominant position in the market and rejected the complaint for predatory behaviour but did not consider the two-sided aspect of this market and the fact that losses from selling newspapers to readers could have been offset by advertising revenue.

When only the sale of newspapers to readers was taken into account, the average variable cost of the Times was 32.5 pence, which is higher than the price for readers of 30 pence and even higher than the price of 20 pence which it later established. Hence, when only this side of the market is considered, the price-cost margin is negative. However, the sum of

¹⁷ Marginal network effects measure the change in the number of users on one side of the market, due to the change in the number of users on the other side of the market. Formally, $\partial q^R / \partial q^A$ or $\partial q^A / \partial q^R$.

price-cost margins on both sides of the market was positive because the reduction in the price for readers increased the number of readers, which induced an increase in advertising revenue. Based on this example, it is evident that the wrong conclusion about predatory behaviour can be made when considering only one side of the market.

The DMA prohibits all practices conducted by platforms that limit the market's contestability, which includes predatory behaviour and other restrictive practices such as exclusive contracts that will be discussed in below (Article 10).

6. CARTELS IN TWO-SIDED MARKETS

A cartel between platforms can exist on one or both sides of the market. For example, newspaper publishers can fix prices of daily newspapers for readers but set prices competitively for advertisements. In fact, in this case, the prices will be higher for newspaper readers, but the prices for advertisers may be lower due to the higher revenue generated from the sale of newspapers. In this situation, one side of the market is harmed by the cartel and the other benefits from the cartel on the opposite side of the market.

Cartel agreements are less stable in two-sided markets because if an agreement is reached on fixing prices on one side of the market, cartel members can compete on the other side of the market, thus reducing the stability of the cartel. The empirical research in Italy by Argentesi and Filistrucchi (2007) has shown that some daily newspapers fixed selling prices of newspapers for readers during a certain period but did not fix the prices of advertisements. Restrictive horizontal agreements are not explicitly mentioned in the DMA, but they also fall under Article 10 of the DMA as practices that limit the market's contestability.

7. OTHER ANTI-COMPETITIVE PRACTICES IN TWO-SIDED MARKETS

A detailed discussion about other anti-competitive practices in two-sided markets is presented in Jullien and Sand-Zantman (2021). In some two-sided markets, there are high barriers to entry due to the presence of indirect externalities and the need to have a sufficient number of users

on both sides of the platform. For example, the many applications written for Windows operating system represent a high barrier to entry for other operating system vendors.

Platforms may use exclusive agreements, preventing users from using more than one platform. However, by using this practice, the platform can monopolise the market. Namely, if the platform has exclusive contracts with users on the market side that create a high level of indirect externalities, it influences users on the other side of the market to leave competing platforms and join the platform that binds users with exclusive contracts. In addition, exclusive contracts make it harder for a competitor to undermine the platform's dominant position.

8. CONCLUSION

The literature on two-sided markets is relatively new. The first paper published on this issue was Rochet and Tirole (2002). Since then the literature has been developing considerably. Following the logic presented in this paper, many real-life situations having features of two-sided markets can be identified.

The recent literature on two-sided markets has shed light on new aspects of competition policy. The main conclusion is that standard market competition policy cannot be extrapolated to two-sided markets. As explained, the definition of the relevant market is quite different. Mergers of platforms induce a considerably lower increase in prices than in standard markets and increase the level of indirect externalities, which is beneficial for users. Hence, the main issue for mergers is to evaluate the trade-off between post-merger price increases and the increase of indirect externalities. There is a natural tendency towards market concentration in two-sided markets due to the indirect externalities, and competition authorities should focus on the abuse of dominance by large platforms. If competition authorities are not familiar with the profit-maximising strategy of many platforms (to charge prices below marginal cost on one side of the market), they might reach the wrong conclusion about predatory behaviour. Cartels are less stable and less likely to occur in two-sided markets. If cartel members fix prices for one side of the market, they can compete on the other side of the market, which undermines the cartel agreement. Also, collective negotiations between banks about the level of interchange fees should be exempted as restrictive horizontal agreements. The one-sided wisdom of the competition authorities might consider this multilateral agreement between banks as collusive.

As previously mentioned, the European Parliament endorsed the Digital Markets Act which should regulate competition in online two-sided markets (platforms), and it will be implemented by a Digital Markets Advisory Committee (Article 32). The main aim of this document is to prevent abuse of dominance. This act prohibits platforms locking users with exclusive contracts, making strategic barriers to entry for other platforms, or favouring its own services or products (or its another platforms) to users. The DMA envisages fines of up to 10% of the platform's worldwide annual turnover if it conducts prohibited practices (Article 26). The platform may also be fined of up to 1% of annual turnover if it does not provide required information or provides incorrect data to the EC. The EC can impose periodic penalty payments of up to 5% of the average daily turnover if a platform denies access to its algorithms or undermines on-site inspections in other ways (Article 27). All fines and penalties imposed by the EC may be reviewed by the Court of Justice of the EU, which may confirm, cancel, reduce or increase the fines imposed by the EC (Article 36). The EC can conduct on-site inspections (Article 21) and impose non-financial measures such as behavioural or structural measures, e.g. selling part of the business (Article 16). Similar concerns about the abuse of dominance were present in the US, where American Innovation and Choice Online Act was proposed to the Senate in October 2021.

In Serbia, two-sided markets are present to a lesser extent than in the EU or the US. Nevertheless, this also requires special legislation tailored for such markets, partly based on the DMA. Serbian regulation is based on one-sided market logic, and it should adopt a supplementary regulation that identifies specific features of two-sided markets. The timeframe for the adoption of the supplementary legislation should depend on the pace of development of platforms, but it has become evident that the first steps should already be taken. In that process, the economic analysis should significantly impact the domain of law. The platform regulation could be based on the DMA but with lower threshold levels for defining gatekeepers than in the EU. After the adoption of this regulation, it should be accompanied by precise guidelines for the Serbian competition authority.

There are other platforms that operate in Serbia as well: newspapers, accommodation search platforms and Internet advertising. From the previous discussion, it is evident that there is a need for the Serbian Commission for Protection of Competition to analyse potential anti-competitive practices through a different perspective than in one-sided markets to avoid the mistakes that some European commissions have made in the past.

This paper provides a sketch of up-to-date literature about competition policy in two-sided markets. The main finding of the paper is that the number of two-sided or even multi-sided markets is growing particularly due to the increasing number of online platforms, and these markets have a natural tendency for high market concentration. Thus, academics, competition authorities and practitioners should adopt a different point of view on competition issues in two-sided markets. Moreover, competition legislation that is based on the logic of one-sided markets should be complemented with supplementary legislation that deals with two-sided markets.

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