TWO-SIDED VS. COMPLEMENTARY PRODUCTS

BY LAPO FILISTRUCCHI[1]

1 Associate Professor, Department of Economics, University of Florence, Italy and TILEC, Tilburg University, The Netherlands.

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I. INTRODUCTION

In his dissenting opinion on the recent U.S. Supreme Court decision in *Ohio et al. vs American Express*, Justice Breyer seems to call for a clarification, from Filistrucchi et al.,[2] on the distinction between products sold by two-sided platforms and complementary products. Indeed, a great part of the discussion among the consenting and dissenting opinion centers on this distinction. The question that the U.S. Supreme Court debated is however not new and has been lingering in economic circles. In fact, it has often been the case in the past years that colleagues working in different fields have (often wrongly, but not always) commented to me that two-sided markets were like markets for complementary products.

Without taking any stance on whether the alleged behavior by American Express should or should not have been deemed illegal, I aim to clarify here why and to what extent two-sided platforms are different from platforms selling complementary products. I will also explain why the distinction is relevant in assessing firms' behavior for the purpose of competition policy.

II. WHY TWO-SIDED PLATFORMS ARE DIFFERENT FROM FIRMS SELLING COMPLEMENTARY PRODUCTS

According to the economic literature, a two-sided platform is a firm that sells two different products or services to two groups of consumers, while recognizing that the demand from one group of consumers depends on the demand from the other group and, potentially, *vice versa*.

For example, online directories sell search services to customers looking for information and listing services to customers interested in listing their business, house, and so on... They are well aware that the larger the number of listings, the higher the demand for searches and the larger the number of searches the higher the demand for listings. Similarly, producers of video game consoles sell consoles to users and both license the right to develop software and sell software development kits to video game developers. A console is more valuable to users the more video games are available. Similarly, video game developers are willing to pay more if there are more video game players and *vice versa*.

In other words the demands on the two sides of the market are

2 "The majority relies on an academic article which devotes one sentence to the question, saying that "a two-sided market [is] different from markets for complementary products [e.g., tires and gas], in which both products are bought by the same buyers, who, in their buying decisions, can therefore be expected to take into account both prices." Filistrucchi, Geradin, Van Damme, & Affeldt, "Market Definition in Two-Sided Markets: Theory and Practice," 10 J. Competition L. & Econ. 293, 297 (2014) (Filistrucchi), *Ohio et al. vs American Express*.

linked by *indirect network effects*[3] and the platform recognizes the existence of (i.e. internalizes) these indirect network effects.

So far, the definition would indeed apply also to a firm selling complementary products, whose demand for one product, by definition, increases with the sales of the complementary product.

Typical examples of complementary products are the inkjet printer and the ink cartridge. Clearly, the more printers a firm sells the higher the amount of ink cartridges it can expect to sell. A profit-maximizing firm prices accordingly and often sets a lower price for the printer hoping to boost sales of cartridges and thus recover the profits foregone on the printer's side.

Similarly, in a two-sided market, a newspaper publisher or a TV broadcaster may respectively set a low cover price to readers or a low subscription fee to viewers in order to boost demand of advertising slots from advertisers and recoup profits foregone on the readers' or viewers' side.

A first difference between two-sided platforms and firms selling complement products is that in the case of two-sided platforms one (albeit only one) of the links between the demands may be negative.[4] In other words, demand from one customer group may decline with higher sales to the other group of customer, in a sort of substitutability.[5]

For instance, it is well-known that TV viewers typically dislike advertising, as it interrupts the programs they watch and are not targeted to individual tastes. Hence, holding constant the price paid by viewers to watch a TV channel, the higher the amount of advertising on the channel the lower the demand from viewers. Indeed, in the TV market, a broadcaster can either set a high fee to viewers or broadcast a high amount of advertising: the two typical business models in the TV market are the Pay TV one in which viewers pay a subscription fee and bear little advertising, or the free TV one in which viewers do not pay a fee but bear a lot of advertising.[6]

Hence, one might be tempted to conclude that a two-sided platform is just a more general case that includes the case of a firm selling complement products. One, however, would be wrong.

In fact, a second and more important difference is that, according to the definition of a two-sided platform,[7] the buyers of the two products do not internalize the links between the two demands, which are therefore, to this regard, called *externalities*.

So that, whereas the provider of an online directory knows that the higher the number of listings the higher the demand for searches and the higher the amount of searches the higher the demand for listings, searchers do not consider that by searching on the directory they increase the value of a listing nor are they interested in the fee for a listing. Similarly, whereas a producer of video game consoles knows that video game developers value consoles that have more users and that users value consoles that have more games, users do not take into account that by buying a console they increase the value of the console to game developers nor do they care about the royalties paid by video game developers.

In fact, here lies the crucial difference between a two-sided platform and a firm selling complement products: the two products sold by a two-sided platform are bought by different customers unlike complementary products that are bought by the same customer. It is exactly because each customer buys only one of the two products sold by the platform that buyers typically do not internalize the indirect network effects. In the case of complement products, both products are bought instead by the same buyer who, in his buying decision, can therefore be expected to

3 Demand is characterized by an indirect network effect as consumers' willingness to pay for a product depends on the number of consumers (or the quantity bought) of another product.

4 Intuitively, it cannot be the case that the two demands faced by a two-sided platform are linked by two negative indirect network effects, because in that case the platform would be unable to profitably compensate both customer groups for the unwanted interaction with the other group. The firm would have no reason to choose a two-sided business model.

5 Interestingly, since it cannot be that both indirect network effects are negative, while a situation similar to two-way complementarity is possible, one similar to two-way substitutability is not.

6 See Emilio Calvano & Mihele Polo, 2016. "Strategic Differentiation by Business Models: Free-to-Air and Pay-TV," CSEF Working Papers 438, Centre for Studies in Economics and Finance ("CSEF"), University of Naples, Italy, revised November 7, 2017.

7 See, for instance, Evans D.S., 2003, "The Antitrust Economics of Multi-Sided Platform Markets," Yale Journal of Regulation, 20(2): 325-381.

take into account both prices. [8]

When you consider buying an inkjet printer, if you are not too naïve, you will ask not only the price of the printer but also the price of the cartridges. The salesman would probably expect such a question. On the other hand, it would surprise the news agent if you also asked, in addition to the price of the newspaper, the price of an advertising slot in the newspaper. He is not likely to know it. Knowing it would not increase his sales as his customers do not buy advertising slots on the newspaper.

As discussed in Filistrucchi et al. (2014) and recognized by the U.S. Supreme Court, in cases involving two-sided platforms the distinction between two-sided *transaction* and *non-transaction* platforms is crucial.[9] This distinction is important because it highlights a fundamental difference in the pricing strategies available to platforms and, therefore, in the way these firms compete.

Two-sided non-transaction platforms 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 by the platform, so that the platform is unable to set a per-transaction or per-interaction fee or a two-part tariff.[10]

Examples of two-sided non-transaction markets are traditional media markets: newspaper publishers, for instance, set access prices on both sides.

Two-sided transaction platforms are instead characterized by the presence and observability of a transaction between the two groups of platform users. As a result, the platform is not only able to charge a price for joining the platform but also one for using it, i.e. it can charge a two-part tariff.[11]

An example of a two-sided transaction platform is a payment card company,[12] which sells the services of a card to buyers and that of a point-of-sale ("POS") terminal to shops

While two-sided non-transaction markets are characterized by *membership externalities* (or indirect network effects), two-sided transaction markets are characterized also by *usage externalities*.

Membership externalities arise from joining the platform (buying a newspaper or placing an ad in a newspaper, holding a payment card or having a point-of-sale terminal, listing your product at an auction or attending an auction), while usage externalities arise from using the platform (paying or accepting payment with a card, selling and buying a product at an auction). The value of joining the platform depends on the number (or more generally the demand) of customers of the other side. The benefit of using the platform similarly depends on the demand for usage by the other side.

For instance, assuming that a customer holds a card and a shop has the corresponding point-of-sale terminal, even if this customer wants to pay by card, the merchant has to be willing to accept that card for that particular transaction and *vice versa*. Once again, these externalities are not internalized by the users of the platform, i.e. the cardholder and the merchant. For instance, suppose a given merchant would benefit from being paid by card because she would not need to go to deposit cash and she would not have to face the risk of being robbed (or, at the opposite, would not benefit from being paid by card because of having to pay a transaction fee). A cardholder would not take that into account

8 See also J. D. Rochet & J. Tirole, "Platform Competition in Two-Sided Markets," 1(4) J. Eur. Econ. Assoc. 1990-1029 (2003).

9 This distinction was originally proposed by Filistrucchi (2008), who used however the terms "two-sided markets of the media type" and "two-sided markets of the payment cards type." It was later renamed as above by Damme et al. (2010).

10 A two-part tariff is a tariff (i.e. a price) which is composed of a fixed part, independent of usage, plus a variable part, that depends on usage. A traditional example were the tariffs of fixed phone lines (before the appearance of flat tariffs): they included a subscription price (the fixed part) plus a price per minute (the variable part).

11 Note however that the fact that a two-part tariff can be charged does not necessarily imply that it will be charged. Indeed both or either of a membership fee and a per-transaction fee can be charged. In fact, the crucial point is that a per-transaction fee can be charged. For example, for most payment cards in Europe and the U.S., cardholders pay at most an annual fee, while merchants pay a two-part tariff.

12 Other two-sided transaction platforms are the markets for payment cards, virtual marketplaces, auction houses and operating systems.

when offering to buy in cash or by card. He would only consider his own convenience.

When the platform is a transaction one, the link between the two customer groups is in some sense stronger because of the additional usage externality. In fact, when a transaction is needed to use the services of a platform, one member of each customer group needs to agree in some way with one member of the other group in order to use such services. The platform cannot sell its usage services unless both customers buy them.

Indeed, Justice Breyer, in his dissenting opinion, was correct to observe that in the case of payment card companies, which are two-sided transaction platforms, "the services resemble complements because they must be used together for either to have value." Still, the products are not complements in an economic textbook sense because they are not bought by the same customers.

It is true that, as observed above, demand for the products on one side may decline with a rise in the price on the other side. Yet, typically, there is no individual customer that finds the two products complementary because no customer wants to consume both. For instance, in the case of an online directory for hotels, it may be the case that demand from travelers will decline with an increase in the price charged to hotels for the listing services. However, no traveler wants to list his hotel.

Consider the case of a heterosexual nightclub. The owner knows that success of the evening will depend on getting both men and women on board. She will take into account that men would find the evening more attractive the more women they find in the club. Similarly, at least to some extent, women will like the evening more the more men are around. In such a situation, irrespective of income differences between men and women, the owner may find it profit maximizing to differentiate prices of entry tickets between men and women.[13] No customer, neither man nor woman, will buy both entry tickets, because for no single customer are the two entry tickets complements. Except, in one special case: when a couple wishes to enter the nightclub. Only then, the couple may reason as a single customer and find the two entry tickets complementary.

Importantly, it is exactly because the entry tickets are not complements that raising the ticket price to one customer group, lowering it to the other group will change the mix of men and women present in the nightclub, and thus determine the commercial success of the evening. Even more, it is only because of this feature that the market is two-sided.[14] If all customers were couples, and they were ready to split the total price paid to enter according to some rule independent from the price of the two entry tickets, it would make little sense for the owner of the nightclub to price differentiate.

III. WHY TWO-SIDED PLATFORMS RESEMBLE PLATFORMS SELLING COMPLEMENTARY PRODUCTS

For all the reasons mentioned above, two-sided markets are inherently different from markets for complementary products. So why then do even economists sometimes say that two-sided markets are like markets for complement products? Are they simply wrong?

Remember that two-sided platforms take into account or *internalize* the network effects between the demands they face.

As a first result, we already observed that they know that by changing their price to one group of customers they will influence also the demand from the other group of customers, even if they hold constant the price charged to the latter group. When demand for the product sold to one customer group declines (rises) with an increase (decrease) in the price charged to the other group, there is a similarity with the case of complementary products.

A second, more important consequence of the internalization of the network effects, is that, under some conditions, competing two-sided platforms selling substitute products may behave (e.g. price) as firms in one-sided markets that sell complementary products. Consider two competing platforms that sell on each side of the market substitute products. One would expect prices on each side to be strategic complements and quantities on each side to be strategic substitutes. It may be the case that, at least on one side, products sold by the two platforms become

13 In Southern Europe this often leads to the typical two-sided pricing strategy in which women do not pay or are even subsidized (with a first free drink) and men are charged a higher price.

14 Filistrucchi, L., Geradin D., Van Damme E., 2013, "Identifying Two-Sided Markets," World Competition, vo. 36(1), 33-59.

complements once network effects are internalized by the platforms. If this happens, quantities will become strategic complements and prices will become strategic substitute.

In general, it is the sign and the size of the own and cross network effects, together with their internalization, by the platforms that determines whether the firms behave as in the case of complementary products. When this happens economic theory predicts market outcomes that will appear counterintuitive if one starts from the assumption that products on each side are substitutes.[15]

Consider two competing TV stations offering content to viewers and advertising space to advertisers. Keeping fixed the amount of advertising, TV channels are substitute for viewers. Assume also that keeping fixed the number of viewers, advertising on one channel is a substitute for advertising on the other channel and *vice versa*. It may be the case that, once one allows broadcasters to take into account the network effects, products sold by the two platforms become complements once network effects are internalized by the platforms. As a result, if one TV station reduces its amount of advertising, the other might do so too. In addition, entry by an advertising financed competitor might increase advertising on existing channels.[16]

Hence, to some extent, it is correct to say that "two-sided markets are like markets for complementary products." More precisely, it is correct, under certain conditions, when referring to firm (pricing) strategies. Yes, this a different sort of complementarity than the one Justice Breyer seems to have in mind in his dissenting opinion.

IV. WHY THE DIFFERENCE BETWEEN TWO-SIDED PLATFORMS AND FIRMS SELLING COMPLEMENT PRODUCTS MATTERS FOR COMPETITION POLICY

Yet, even when firms in two-sided markets behave as firms selling complementary products, welfare consequences may be very different. The reason lies once again in the fact that customers on the two sides are different and that, as a result, the two consumers' welfare may not move in the same direction.

Consider for instance the case of an inkjet printer. Assume (just to simplify the argumentation) that each customer needs to buy one printer and 10 cartridges. Suppose the price of the printer declines by 10 dollars and the price of each cartridge increases by 1 dollar each. Then the total price paid by each customer will not change and consumers' welfare will not change.

Consider instead the case of a pay-per-view TV station offering a soccer match. Assume (just to simplify the argumentation) that there are 100 viewers buying one match subscription and there is only one advertising slot at half time that can be sold to a unique advertiser. Suppose that the price paid by the viewers declines by 10 dollars and the price paid by the advertisers increases by 1000 dollar. On the one hand, the two price changes will have effects on different customers: the viewers will enjoy the price reduction, while the advertiser will bear the price increase. On the other hand, advertisers will benefit from the likely increase in the number of viewers, while viewers may also enjoy a reduction in the length of the advertising due to the increase in the advertising price. In this case, the viewers' welfare is likely to increase, while advertisers' welfare may rise or decline.

When consumers' welfare moves in opposite directions, competition policy needs to take a stance on which customer group, if any, should be given more consideration. For instance, in the assessment of a merger in the EU, should it give more weight to the welfare of one customer group, should it give equal treatment to the two customer groups and sum up their consumers' welfares or should it consider the two consumers' welfares incomparable and require each customer group to benefit from the merger?

All of this is not an issue in markets for complement products, in which there is only one customer and, hence, one consumer's welfare. But in a two-sided market it is likely to be crucial for the decision to be taken.

Hence, to this other extent, it is not correct to say that "two-sided markets are like markets for complementary products." More precisely, it is not correct, except in very special circumstances, when referring to welfare effects of firms' (pricing) strategies, even when such (pricing)

15 See, for instance, Boffa, F., Filistrucchi, L., "Optimal Cartel prices in Two-Sided Markets," NET Institute Working Paper No. 14-19.

16 See, for instance, Reisinger, Ressner & Schmidtke, 2009, Journal of Industrial Economics.

strategies are similar to those used by firms selling complementary products. Blurring the distinction between two-sided platforms and firms selling complement products may end up hiding fundamental choices of competition policy that antitrust authorities, courts, and legislators should be taking explicitly.

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