A Strategic Guide on Two-Sided Markets Applied to the ISP Market

Thomas Cortade

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Thomas CORTADE
LASER-CREDEN, University of Montpellier

Abstract: This paper looks at a new body of literature that deals with two-sided markets and focuses on the Internet Service Provider (ISP) segment. ISPs seem to act as a platform enabling transactions between web sites and end consumers. We propose a strategic guide for ISPs that covers features of two-sided markets such as strong externalities and discuss how these market characteristics can affect competition policy.
Key words: Platform, externalities, price allocation, competition policy.

In the internet, interactions between firms and/or consumers play an important role. Interactions between two (or more) parties are possible due the existence of "platforms" owned by third parties. The economics of these "two-sided markets" is the focus of a large amount of literature which has been published recently.

Following EVANS (2004), we can argue that a platform constitutes the set of the institutional arrangements necessary to realise a transaction between two users groups. Many markets can be seen as two-sided:

- the academic review market, since reviews compete to attract authors and readers;
- the video game market, where, the Sony Playstation, for example, is the platform and Sony is trying to attract game video providers and final users;
- a newspaper (or more generally media) is a platform between advertisers and readers.

One important characteristic of two-sided markets is the presence of network externalities between the two different groups using the platform. There is a large amount of literature on positive network externalities (KATZ & SHAPIRO,1985, 1986; FARRELL & SALONER, 1985, 1986). However, in this literature, users belong to the same group and externalities are "intra-

group" externalities, whereas in a two-sided market there are two different groups of users, and externalities are "inter-group" externalities.

The paper deals with the following questions. How can a two-sided market be identified? What are the features of such markets? What are the implications of these markets for competition policy and platform strategies?

We propose to focus on the Internet Service Providers (ISP) market. Indeed in this market, ISPs attempt to attract web sites and users, and so would appear to be platforms. This situation is particularly true of the B2B segment. Indeed, Internet users on the platform are willing to buy CD or books from Fnac or Amazon, for example.

The second section of the paper studies the features of two-sided markets and their pricing implications. This is followed by a strategic guide for ISPs, while the fourth section focuses on ISP strategy in the presence of multihoming. Lastly, we propose to study the implications of ISPs on regulatory and competition policy. The paper ends with a few concluding remarks.

■ Features of two-sided markets

This section analyses the main features of two-sided markets by focusing on the nature of the externalities involved and then assessing their implications on the prices set by platforms.

We retain the same definition of the two-sided market adopted by both EVANS (2004) and REISINGER (2003). A market is said to be two-sided if:

> "at any point in time there are (a) two distinct groups of customers; (b) the value obtained by one kind of customers increases with the number of the other kind of customers; and (c) an intermediary is necessary for internalizing the externalities created by one group for the other group".

Externalities in two-sided markets

The presence of two different user groups calls for a modification to the standard analysis of externalities. We can distinguish between two main sets of externalities in a two-sided market: membership externalities and usage

externalities. The first set closely resembles classical externalities, such as positive network externalities. Indeed there are positive externalities in the telecommunications industry, which have been analysed by KATZ & SHAPIRO (1985), as well as FARRELL & SALONER (1985).

The first feature of two-sided market is the membership externality. We can describe this external effect as follows. The more consumers connected to the platform, the greater the number of consumers will want to join this platform. ARMSTRONG (2004a) referred to this effect as the membership externality. For example, the greater the number of consumers connected to an ISP, the more consumers will be willing to pay to join the ISP in order to be able to exchange traffic. In two-sided markets, however, the membership externality results from the presence of the two different user groups. This means that the greater the number of web sites (ergo consumers) connected to the platform, the more attractive the latter (and the web sites accessed via the ISP) become from a consumer's point of view.

The second feature results from the interaction between the two user groups. That is referred to as the usage externality. The usage externality arises from one or several interactions caused by the ISP between web sites and internet users. As ROSON (2004) notes, there are:

- markets where only one interaction exists, such as estate agencies;
- markets with several interactions, as is the case with the ISP market. The interactions can be repeated. From this point of view, each agent receives some benefit from each interaction. This is true of the Google web site, for example, and for B2B more generally.

To summarize, there are two kinds of externalities. The usage externality results from the interaction between two different user groups, whereas the membership externality refers to the installed base.

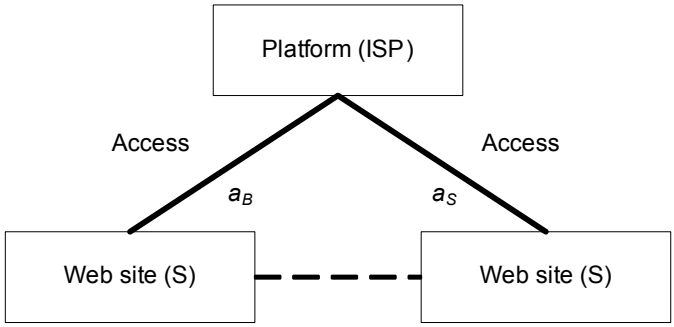
General implications of externalities on ISPs' strategy

The presence of externalities in two-sided markets has implications on the prices set by platforms, allowing us to draw a distinction between two-sided markets and their classical counterparts. This presence impacts both the price level and the price structure. In this respect, ROCHET & TIROLE (2004) argue that price structure can provide a basis for identifying two-sided markets. Since there are two different user groups, ISPs face two distinct types of demand. Thus the global end price is composed of a price paid by the web site and a price paid by internet users. The presence of externalities

and the existence of two different prices raise the issue of price allocation. This in turn raises poses key questions. What are the efficient price level and an efficient allocation of prices from the platform's point of view? What are the implications of the presence of positive externalities?

The first implication is essential. EVANS (2003) affirms that the price on each side can be different. In cases where demand is developed on each side, price level and allocation play an important role in maintaining two different types of consumer. We can argue with ROCHET & TIROLE (2003) that since there is a membership externality, the price charged by ISPs for a transaction decreases with the size of the installed base. Again, this effect closely resembles the network positive externality. However, the usage externality may be internalised by the user groups through the price structure set by the platform. In this case EVANS (2004) argues that the service is jointly consumed by the two types of users in two-sided markets, and the usage externality exists only if the transaction takes place.

Figure 1 - An ISP as a platform



Therefore the presence of externalities [1] implies that the aim of an ISP is not to offer cost-oriented and symmetric prices, but to balance demand between websites and internet users. In other words, discrimination is possible. In these conditions, a market can be described as two-sided if it is characterised by the following phenomenon. There is a confrontation between supply (websites) and demand (internet users), which, when combined, also express a demand ISP access to realise transactions. The ISP market structure is illustrated in the diagram above.

[1] It is worth noting that potential negative externalities do exist. This is the case with advertising in newspapers. Indeed, consumers are willing to pay more to have less advertising. For a more detailed analysis of this point see FERRANDO, GABSZEWICZ, LAUSSEL & SONNAC (2004) AND GABSZEWICZ, LAUSSEL & SONNAC (2002).

In this situation it is easy to understand the distinction proposed by ROCHET & TIROLE (2004) between the price level (the total price set by the platform) and price structure (allocation). Thus there is no evidence that the two types of users equally share the total price for access to the ISP. As underlined above by the definition, the benefit gained by a consumer (website or internet user) results from their interactions on the platform. Hence, in such markets, a consumer on side i earns a positive net surplus from interactions with another consumer on side $j \neq i$. This feature refers to the usage externality, whereas the membership externality refers to the decision (*ex ante*) to join the platform, for a given fixed fee.

ROCHET & TIROLE (2004) explain the features of two-sided markets in the following way. They argue that, from a theoretical point of view, it is impossible to apply Coase's theorem (1960) to two sided markets, since the transaction between sellers and buyers takes place only if there is a platform. This implies the presence of a third party, which owns the platform, and prevents direct bargaining between the agents. The authors conclude that, in a Coasian world, the price structure would be neutral. In other words, there would be neutrality in the allocation of the total price. However, as explained above, this is not the case in two-sided markets. Since there is no pricing neutrality, ISP strategy should be based on price allocation.

■ Pricing strategy for ISPs: a strategic guide

To introduce this topic, we can distinguish between internal competition occurring within the same platform, and external competition, which occurs between two or more platforms (see ROSON, 2004).

In this context, externalities have major implications for price structure. Thus, if the price on one side of the market decreases, for internet users for example, they tend to use the platform more. However, at the same time, the other side, which consists of web sites, also stands to benefit from this. Indeed when the price decreases, the direct effect is as follows: there are more internet users, so the incentive for web sites to join the platform increases. This result is not surprising. However, interaction between the different user groups modifies the standard results of competition *à la Bertrand*, since the prices are cost-oriented. Thus the utility derived by one group depends on the number of users in the other group.

In this context price allocation is an important issue. ARMSTRONG (2004b) and ROCHET & TIROLE (2003) present an overview of this price allocation problem. Their analyses insist on externalities and their implications for prices, in line with LAFFONT, MARCUS, REY & TIROLE (2003) who study ubiquitous connectivity. More precisely, they consider a platform as a monopoly [2] in order to explain how price allocation is affected by different factors such as:

- multihoming,
- user costs,
- platform differentiation,
- a platform's capacity to use a price based on the number of transactions (ROCHET & TIROLE, 2003),
- the number of users (ARMSTRONG, 2004b),
- externalities between user groups (ROCHET & TIROLE, 2003) and within a group (ARMSTRONG, 2004b).

In order to illustrate this topic, this paper studies the pricing strategy for a monopolistic ISP in order to underline the impact of a two-sided market's features.

A theoretical framework: a monopolistic ISP

In line with ARMSTRONG (2004b), ROCHET & TIROLE (2003), we consider that the monopoly offers linear prices on the two sides. In this situation the aim for an ISP should be to define a price level, but also an efficient price allocation between web sites and internet users. ARMSTRONG (2004b) focuses on the membership externality, while ROCHET & TIROLE (2003) focus on the usage externality.

ARMSTRONG (2004b) compares a situation in whereby a platform maximizes the global welfare of the industry to a situation whereby it sets prices to maximize its own profits. In cases where platforms maximize social welfare, prices are below fixed costs, since prices are defined by this cost minus a parameter of the externality related to the other side of the market. In cases where the platform maximizes its own profit, the price is equal to the fixed cost minus the externality plus a factor related to the demand elasticity of the group in question, and given the participation of the other

[2] Or that the connectivity is the same for the platforms.

side. ARMSTRONG (2004b) concludes that is the membership externality that determines the allocation of prices.

The first insight into pricing strategy is consequently provided by the membership externality. It is worth noting that the pricing strategy for a monopolistic ISP could be to identify the side of the market most sensitive to the network effect.

ROCHET & TIROLE (2003) focus on the usage externality. This could be more realistic in our framework since several transactions take place between the internet and web sites.

As a result, the price depends on the elasticity of the side in question. This is noted by a Lerner index as follows:

$$p^S + p^B - c = \frac{p^S}{\eta^S} = \frac{p^B}{\eta^B}$$

where p^B and p^S are the price respectively for the buyers (internet users) and the sellers (web sites) and η^S and η^B represent the respective elasticity of demand from each group. The interesting insight afforded by ROCHET & TIROLE (2004) is that prices are inversely proportional to elasticity.

It follows that ISP strategy should consider the side of the market more sensitive to price by analysing the direct elasticity on each side impacted by the usage externality. Internet users should thus be more sensitive than web sites.

A strategic pricing guide in the presence of ISP competition

ISP competition with single-homing

In line with the principles described above (network effect and elasticity), this section considers competition between ISPs, in cases of single home connection i.e. where each side can only be connected to one platform.

ARMSTRONG (2004b) focuses on competition between ISPs that provide services perceived as different by users. The author supposes that each consumer, web site or internet user, can be connected to one exclusive

ISP only. The first insight provided by this study is that the net surplus for each group is a function of the external benefit of having an additional consumer in the group. Its main conclusion is that ISPs should consider this external benefit as a measure of the opportunity cost.

This means that, since there is competition between ISPs, their strategy should be based on avoiding price hikes to discourage consumers from switching to a competitor's platform. The expression of price is simple. It is the sum of fixed costs and the substitutability parameter (since services are perceived as different), minus the valorisation of the inter-group externality resulting from the transaction. Moreover, this means that pricing is generally not cost-oriented.

The impact of single homing on pricing strategy can be summarised as follows:

- In the presence of single homing, the more the users on one side place a high value on the presence of the other group, the lower the price determined by the ISP should be.
- However, the single homing hypothesis is not really consistent with the ISP market. Web sites, in particular, can be connected to several platforms.

ISP competition with multihoming

Following on from ARMSTRONG (2004b) and ROCHET & TIROLE (2003), this section considers cases whereby one side of the market can multi home, *i.e.* connect to several platforms. In these conditions the result is naturally as follows.

The inter group externality arising from transactions or the usage externality is more valued by the users' multihoming. As a result, competition takes place only on the single home side.

ROCHET & TIROLE (2003) propose a more general model than ARMSTRONG (2004b). They suppose that web sites are connected to two different platforms, and that internet users choose the platform where transactions take place. Transactions will take place when the benefit to each user on each side (buyer and seller) is higher than the price set by the platform. At first the authors postulate that the price levels proposed by each ISP are the same.

In these conditions web sites have three different possibilities. They realise no transaction if the price is higher than the value generated by the transaction. Secondly, the choice of connection to one or two platforms implies the following trade off: a web site compares its net surplus expressed by the difference between the benefit stood to be gained and the price in view of demand from internet users in the two situations (multihoming versus single home). Thus, the ISP's strategy consists of setting a price lower than its rivals in order to limit the incentive for web sites to become multihoming. Indeed, when a platform decreases its price, this increases its own demand and attracts web sites that were previously multihoming.

To represent this trade-off ROCHET & TIROLE (2003) define the following index [3]:

$$\sigma_i = \frac{d_1^B + d_2^B - D_J^B}{d_i^B}$$

With $\sigma_i \in [0,1]$, this index provides a measure of consumer loyalty to the platform i. D_J^B corresponds to the proportion (demand) of internet users (buyers) who are willing to use the platform j when web sites are exclusively connected to the platform j ($j = 1,2$). d_i^B ($i = 1,2$) corresponds to the proportion (demand) of the internet users who are willing to proceed to a transaction on the platform i when the seller is multihoming. So when $\sigma_i = 0$, all web sites are multihoming. On the contrary for $d_1^B + d_2^B = D_j^B$, $\sigma_i = 1$ all web sites are single home ($D_j^B = d_i^B$).

The outcome of competition, where the aim of the platform is to maximize its own profit, closely resembles the outcome of the monopoly situation. We can note [4]:

$$p^B + p^S - c = \frac{p^B}{\tilde{\eta}^B} = \frac{p^S}{\left(\tilde{\eta}^S / \sigma\right)}$$

where $\tilde{\eta}^B$ and $\tilde{\eta}^S$ respectively represent the demand-elasticity of internet users and of web sites for a given platform, where the transaction takes place. It is worth noting that the web sites' elasticity is corrected by the index

[3] Where the index B refers to buyers, thus to internet users.

[4] Where the index S refers to buyers, thus to web sites.

of loyalty. When web sites are connected to an exclusive platform, ($\sigma = 1$) this produces the monopoly result.

In cases where multihoming is widespread, the sensitivity of web site demand to price variations is higher. As a result, a small decrease in the price of one platform implies that web sites have incentives to move from multihoming to the single-home model. ROCHET & TIROLE (2004) conclude that there are cross subsidies between the two sides. The authors call this principle the "topsy-turvy principle". This can be defined as follows: an increase in the price on one side implies an increase in the mark-up for the platform, but also implies a decrease in price on the other side, in order to attract users and to preserve balanced demands.

As a result, the more widespread multihoming becomes, the more platform competition implies a decrease in price on the web site side. Finally, the volume of transactions depends not only on the overall price, but also on price allocation. The price structure is again not neutral in the presence of competition with multihoming.

Finally ISP pricing strategy should be guided by the following factors, which all have an impact on price allocation:

- Elasticity: For example, if the installed based on one side increases and if this side is captive, then it is profitable for the platform to increase its price (for web sites, for example) in order to decrease the price on the other side and attract new buyers (internet users).

- The web site's market power: if web sites enjoy significant market power, then the platform could decrease the price it charges those service providers to decrease the double marginalization effect.

- In the ISP market internet users can be seen as "marquee buyers," as highlighted by ROCHET & TIROLE (2003). Indeed, their presence has a high value for web sites and thus modifies the price structure. This effect implies that ISPs could set a lower price for buyers and a higher price for web sites.

- The consequences of multihoming are not clear. Indeed, if some on the internet users' side are connected to several platforms then price sensitivity appears to increase on this side (higher elasticity). Platforms can react in the following way: to create an incentive for web sites to stop multihoming, ISPs may decide to charge them low prices.

According to EVANS (2004) other factors impact the price structure such as investment on one side of the market, since an investment allows the platform to decrease the price on this side. As a result, this strategy makes it possible to attract new consumers on the other side. Moreover Evans argues that multihoming offers a key insight in the study of two-sided markets. Multihoming consequently implies higher competitive pressure and tends to decrease prices.

Competition for market share among ISPs

The analysis above explains how the features of two-sided markets affect price structure, making them subject to economic consequences that differ from standard effects. Under such circumstances, a platform may have an incentive to modify price structure according to the valorisation of the usage externality. Thus, the demand of one side tends to decrease if the demand of the other is too low. In this context the following two questions arise:

- Which strategy should a platform adopt to attract both sides and reach critical installed bases on each side?
- On which side should demand be stimulated first by the platform?

In a competitive environment ISPs must be able to defend their existing market share, as well as bidding for new clients.

CAILLAUD & JULLIEN (2003) and JULLIEN (2001) look at this issue in greater detail. Following Caillaud and Jullien, we can argue that ISPs must own an important installed base of web sites in order to attract internet users. However, web sites will only be willing to pay if they anticipate that a large number of internet users will be present. That is the chicken and egg problem.

The authors argue that a possible strategy for platforms (in our case: ISPs) is to "divide and conquer" the market. This platform strategy is based on dividing one side to conquer the other, with price discrimination arising in two-sided markets. Caillaud and Jullien focus on market structure and platform strategies. The study considers imperfect competition with a two part tariff between platforms, whereby the services provided can be exclusive (single home) or non exclusive (multihoming).

Competition for market share with exclusive services

Exclusive services denote a single home connection. In this case, all users on both sides prefer to belong to the same platform. The ISP's strategy is consequently based on subventions on one side. As a result, with exclusive services externalities tend to favour market concentration market. This appears to be an efficient market structure, which generates low profits as a result. CAILLAUD & JULLIEN (2003, 2004) explain this effect as follows.

Let suppose that two platforms compete against each other for exclusive services. This implies that all users single home. A platform could decrease the price on the Internet users' side in order to attract web sites, which stand to gain a higher net surplus from connection to this platform. This process can be repeated, turning the monopoly into an efficient structure with low profits. In other words, when services are exclusive, competitive pressure is high. This is true as long as transaction prices are not distorted, that means as long as the price enables ISPs to collect all the profit on one side and subsidize the other. Under such circumstances subsidies would appear to represent a competitive strategy and entail a concentrated market structure.

When there is intense competition for market share with exclusive services, a concentrated market may offer an efficient market structure.

Competition for market share with non exclusive services

This section examines cases where competition takes place with non exclusive services. In many cases users are connected to several platforms (multihoming). This is particularly true of internet users. CAILLAUD & JULLIEN (2003) show that service providers have incentives to propose non exclusive services when competitive pressure is not too high in order to exercise their market power. In such cases it is easy to divide (to subsidize), but more difficult to conquer. With non exclusive services the competitive pressure is lower, making it more difficult to attract new users

Finally ARMSTRONG & WRIGHT (2004) provide an analysis of this topic based on endogenous users' decisions between exclusive and non exclusive services. Their results close resemble those cited above. We can consequently argue that:

An optimal strategy for ISPs is to sustain losses on one side in order to achieve a critical installed base on this side. The "divide and conquer"

strategy consists of ISPs subsidizing internet users in order to attract them. Once their participation is obtained on this side, there is a bandwagon effect that allows the platform to recover the subsidy through the fixed fee paid by web sites on the other side. This platform strategy is based on the idea of "buying" the participation of one side in order to create some value for the other due to the presence of inter group externalities. As seen above, many factors have implications for the price structure and ISP strategy.

■ Implications for regulatory and competition policy

It seems that the usual principles of competition in terms of price level and allocation are modified in two-sided markets. More specifically, the membership externality and usage externality imply that ISP strategy is not based on cost-oriented prices, but on the ability to achieve balanced demand. We have shown that the price strategy depends not only on competitive pressure and elasticity, but also on externalities and their valorisation for each group, according to whether there is multihoming or not. As a result, the different level of valorisation impacts both on pricing strategy and on competition to maintain and conquer market share. Under such circumstances, a pricing strategy could consist of subsidizing one side to attract consumers on the other. Those questions need to be debated from a regulatory and competition policy point of view.

Competitive policy and price structure

A first insight is afforded by the impact of externalities on price structure, which is not neutral in two sided markets. An efficient price structure is no longer cost-oriented. However, it seems essential to take into account the surplus received by each consumer, web site and internet user from transactions.

A price above marginal cost does not reflect market power

Indeed interactions between the two sides imply counter-intuitive effects. As shown with the "divide and conquer" strategy, we can affirm with EVANS (2004) that the estimation of market power should take both sides of the market into consideration. This is particularly true if a price is higher than marginal cost on one side, and below marginal cost on the other.

Competition policy in a traditional market can embrace price distortion (price below marginal cost) in the short term; but is opposed to this principle once the market becomes mature.

Thus, competition policy can not consider these prices separately. This policy is not relevant for two-sided markets, where goods or services are only sold if the platform attracts sufficient users on both sides. In this framework the competition authority seems unable to analyse collective welfare without taking the price level, price allocation and the external effects created by the presence of the two sides into account.

A strategy based on cross subsidies is not a predatory strategy in a two-sided market

ROCHET & TIROLE (2004) compare a two sided market with a vertically related market structure. They suppose that a vertical organization in which there is no direct relation with consumers (downstream market), but only with sellers. In two-sided markets, if sellers enjoy significant market power, platforms may have an incentive to subsidize prices in order to increase the buyers' surplus and their willingness to pay. Another strategy according to ROCHET & TIROLE (2004) is to encourage competition on one side, in order to attract users on the other side. Platforms thus have an incentive to offer cost-oriented prices. This stimulates interactions and tends to make the volume of transactions optimal.

If we consider a vertical market structure such positive effects are limited because there is no internalization of the benefits resulting from transactions when platforms contract with sellers only. The authors demonstrate that foreclosure is less possible in two-sided markets.

The key insight of their study is the existence of differences in the economic effects of one sided and two-sided markets. According to ROCHET & TIROLE (2004) a platform is able to control or regulate interactions. This is not the case in a vertical related market. Their analysis becomes valid again if we consider a price lower than marginal cost and this does not imply to a predatory pricing strategy. In a two-sided market, it is essential to consider that a given service is provided to each user on each side at the same time.

Competitive policy and market concentration

A concentrated market is not an inefficient market structure

Increasing the number of firms in a market, as is the case in a competitive multihoming scenario, has no positive impact on price structure. Under such circumstances we have shown that internet users may pay a lower price, since the ISP's strategy consists of reaching a critical installed base on this side. On the other side, web sites are usually willing to pay a higher price to participate in transactions.

As a result, a more competitive two-sided market does not imply that the price structure is more balanced.

Moreover, if we consider a merger between ISPs like EVANS (2004), we can argue that when competition policy faces a merger between two platforms, the presence of the two sides must be considered. In general terms, competition policy accepts or refuses the merger in view of the evolution of prices. However, the total price must be considered in two-sided markets. Indeed a price increase on one side can reflect a decrease on the other in order to preserve balanced demand. So a price decrease on one side increases willingness to pay on the other side. In the end the variation in the total price may be low, although the price structure has changed significantly.

Price regulation and interconnection in two sided markets

Price regulation is not neutral if this regulation only attributes a competitive advantage to regulated firms. In two-sided markets WRIGHT (2004) underlines that a non regulated firm will not want to match a suboptimal price structure imposed on a regulated firm. In other words, suppose regulation prevents one side from participating. The first impact of regulation is to decrease prices. However, users may prefer to pay more to access the non regulated platform if installed bases are larger, thus enabling the non regulated firm to increase its market share and profits.

This analysis of regulatory policy can be extended in line with LAFFONT, MARCUS, REY & TIROLE (2003). They provide a model which considers a reciprocal access charge in a two-sided market. The framework analysis is as follows: two ISPs compete at the same time for final users and for web sites. The authors suppose that to exchange traffic, the ISPs set a reciprocal

access charge for termination. This means that the ISP at the origination of the traffic must pay an access charge to its rival for termination. Finally, users' decision to join one exclusive ISP (i.e. single homing) is endogenous.

The ISPs are considered as perfect substitutes from the consumer's point of view. The total price set by an ISP consists of the price set for consumers, plus the price fixed for web sites. The authors adopt the "off-net cost principle". Moreover, they suppose that the hypothesis of the "balanced calling pattern" is respected. This highlights an important difference between their views and theoretical literature on the telecommunications industry. The receivers of traffic pay a price to receive calls, which is not true in telecommunications. This has two major implications. The first is related to prices, while the second is linked to competition stability.

The impact on price is as follows: when a consumer receives traffic without paying, ISPs are left to pick up the perceived marginal cost (as pointed out by LAFFONT, REY & TIROLE, 1998a). However, when consumers pay to receive traffic, the perceived marginal cost is only equal to the opportunity cost of losing a consumer who may switch to another ISP. This is the result of the usage externality in two-sided markets. Moreover, competition stability is stronger in this context. Indeed, when receivers do not pay for traffic, then equilibrium can only exist if the access charge is close to the marginal cost for termination or if the networks are close substitutes. Yet in the scenario outlined above this is never the case, since the sum of the prices (for each side) is just equal to the traffic cost, independently of the access charge level. The access charge only determines how cost is allocated between the two sides.

As a result, the price structure implied by externalities modifies the access pricing problem. Here again, it is the study of the total price that is relevant.

All the features can potentially modify the tools used by competition policy. In short, two main difficulties for competition policy arise with regard to two-sided markets. The first is characterized by the utility received by consumers, since there are usage and membership externalities. Although it is difficult to measure these externalities, they must be taken into account in studies of two-sided markets. The second difficulty concerns the advantages that consumers derive from price structure that enable them to perform transactions at the lowest possible cost. It is important to consider that the benefits on one side increase with participation on the other. Again, it is not easy to take this effect into account in competition policy.

However, there is no reason to believe that non competitive behaviour is more widespread in two-sided markets. In fact, behaviour is just different, with prices not set based on cost on each side, for example. Moreover, price level and allocation must be determined in order to maximize output. In such cases, it is important to increase installed bases on each side to solve the chicken and egg problem. From this point of view, CAILLAUD & JULLIEN (2003) show how dominant firms prefer to set prices related to volumes of transactions, rather than a fixed fee when entry is impossible. Like ARMSTRONG (2004b), CAILLAUD & JULLIEN (2003) show that the pressure of competition is more intense without multihoming. This fact seems to oppose economic intuitions.

■ Conclusion

This paper attempts to offer a strategic guide to two sided markets, and to identify the difficulties for competition and regulatory policy with regard to the features of two-sided markets.

At first, our analysis shows that two-sided markets differ from their classical counterparts because there is a third party involved that is subject to two different types of demand. The platform allows transactions between different user groups. As a result, there are two types of externality. The first externality, also present in the telecommunications industry, is the membership externality, whereas usage externality is specific to the two sided market structure. Thus users of the platform benefit from the presence of members on the other side.

Such interactions have an impact on price level, and especially on the allocation of the total price between the two sides of the market. Indeed, platforms charge each side a price. In such cases, it is possible for the third party to charge one side a price below marginal cost and the other a price that is higher than this cost. However, as demonstrated above, such prices do not express cross subsidies or market power. Price allocation is not neutral.

As a result, we show that competition policy tools can be modified by such features of two sided markets. The most efficient market structure is not always competition (multihoming). On the contrary, concentrated markets can be justified since there are strong externalities. Similarly, mergers are not necessarily detrimental to the industry. The second insight

of our paper is the impact on competition and regulatory policy of the presence of externalities. We show that a price that is higher than marginal cost doesn't reflect market power, while a strategy based on cross subsidies is not a predatory strategy in a two-sided market. We also demonstrate that a concentrated market is not an inefficient market structure and that price regulation in two-sided markets would be not neutral.

Finally, we assess the impact of such features on the interconnection market. When we consider two-way interconnection in telecommunications, the theoretical literature on the topic shows that competition between symmetric networks arises from collusion and implies exclusion when these networks are asymmetric. In two sided markets, on the other hand, the role of the reciprocal access charge is modified since this charge makes it possible to determine price allocation. In such cases it is essential for competition policy to study a two sided market and the strategic behaviour of its players by considering the total price, not the price paid by each side.

References

ARMSTRONG M. (2004b): "Competition in two-sided markets", mimeo.

ARMSTRONG M. & WRIGHT J. (2004): "Two-sided markets with multihoming and exclusive dealing", working paper.

CAILLAUD B. & JULLIEN B.:

- (2003): "Chicken & egg: Competition among intermediation service providers", *Rand Journal of Economics*, vol. 34, pp. 309-328.
- (2004): "Two-sided markets and electronic intermediaries", working paper IDEI.

EVANS D.S.:

- (2003): "Some empirical aspects of multi-sided platform industries", *Review of Networks Economics*, vol 3, pp. 191-209.
- (2004): "The antitrust economics of two-sided markets", *Yale Journal on Regulation*, vol. 2, pp325-382.

FERRANDO J., GABSZEWICZ J., LAUSSEL D. & SONNAC N. (2004): "Two-Sided Network Effects and Competition: An Application to Media Industries", Conference on "The economics of two-Sided markets", Toulouse, January 23rd-24th.

GABSZEWICZ J., LAUSSEL D. & SONNAC N. (2002): "Network effects in the press and advertising industries", mimeo, CORE Discussion Paper.

JULLIEN B.:

- (2001): "Competing with network externalities, and price competition", mimeo IDEI Toulouse.
- (2004): "Two-sided markets and electronic intermediaries", working paper IDEI.

LAFFONT J.J. & TIROLE J. (2000): "Competition in telecommunications", MIT Press, Cambridge.

LAFFONT J.J., MARCUS S., REY P. & TIROLE J. (2003): "Internet Interconnection and the off-net cost pricing principle", *Rand Journal of Economics*, vol.34, pp 370-390.

REISINGER M. (2003): "Two sided markets with negative externalities", Mimeo.

ROCHET J.C. & TIROLE J.:

- (2004): "Two-sided markets: an overview", Mimeo.
- (2003): "Platform competition in two-sided markets", *Journal of the European Economic Association*, vol. 1, pp. 990-1029.

ROSON R. (2004): "Two-sided Markets", Mimeo.

WRIGHT J. (2004): "One sided logic in two-sided markets", *Review of Networks Economics*, vol. 3, pp. 42-63.