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Competition and Antitrust in Internet Markets⁺

by Justus Haucap^{*} and Torben Stühmeier⁺

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Abstract:

This paper summarizes the peculiarities of online markets and discusses recent antitrust cases related to online markets. Following a brief description of the online markets' characteristics and potential tendencies for concentration the paper first discusses the antitrust allegations and proceedings against *Google*, before commenting on the most prominent cases related to vertical restraints, including the Apple ebook case and the ECJ's *Pierre Fabre* case. We also highlight competition issues at the infrastructure level, namely margin or price squeezing of incumbent operators vis-à-vis new ISPs and network neutrality. Finally, policy conclusions and further research questions are discussed in the paper's concluding section.

Keywords: Digital markets, Google, E-Book, online markets, net neutrality, vertical restraints

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I. Introduction

The fast rise and ongoing growth and success of Internet markets and e-commerce platforms have spurred a vivid and sometimes heated debate among academics and policy makers alike: Do Internet markets foster competition or do they rather facilitate market monopolization or, at least, concentration?¹ Relatedly, competition economists and lawyers vigorously discuss the peculiarities of these markets and whether traditional rules and interpretations of competition law are sufficient to deal with potentially new competition problems. The cases against the well-known search engine *Google* have received most public and academic attention (see, e.g., Lao, 2013; Manne and Rinehart, 2013; Haucap and Kehder, 2013), closely followed probably by the ebook case against Apple (see, e.g., Johnson, 2013, Germain and White, 2014; De los Santos and Wildenbest, 2014). In addition, there have recently been numerous cases before various European courts regarding vertical restraints for online sales (see, e.g., OECD, 2013, for an overview). These vertical restraints include (i) across-platforms parity agreements (APPA), which is a special form of a most-favored customer clause, (ii) general bans of online sales or bans of particular platforms, (iii) dual pricing systems, and (iv) selective and exclusive distribution systems. Among competition lawyers, the European Court of Justice’s (ECJ) decision of 13 October 2011 in the *Pierre Fabre* case has received much attention. In that case, the ECJ ruled that an

¹ See, e.g, Ellison and Ellison (2005), Evans and Schmalensee (2007, 2008), Evans (2013), Buccirossi (2013), Haucap and Heimeshoff (2014).

outright ban of Internet sales constituted a hardcore restriction under European competition law or, to be more precise, an infringement by object of Article 101 (1) of the Treaty on the Functioning of the European Union (TFEU). Following this decision, a discussion has emerged on the legal treatment of vertical restraints in Internet retail markets in general (see, e.g., OECD, 2013; Bundeskartellamt, 2013). In the US, in contrast, vertical restraints in Internet commerce have played much less of a role, reflecting the more lenient approach towards vertical restraints when compared to Europe. Instead, net neutrality has been a much more prominent issue than in most European countries. Common to the US and the EU is the high attention paid to the antitrust proceeding against Google and Apple in the ebook case.

This chapter will discuss recent antitrust cases related to online markets. However, before we describe and comment on these cases we will very briefly summarize the peculiarities of online markets in order to provide a basement for our analysis of the cases selected. Hence, the remainder of the chapter is organized as follows: Section II describes the peculiarities of online markets before section III discusses the antitrust allegations and proceedings against *Google*. Section IV discusses the most prominent cases related to vertical restraints, including the Apple ebook case and the ECJ's *Pierre Fabre* case. Section V highlights competition issues at the infrastructure level, namely margin or price squeezing of incumbent operators vis-à-vis new ISPs and network neutrality. Policy conclusions and further research questions are discussed in the concluding section VI.

II. Competition in Online Markets

II.1 Key Characteristics of Online Markets

The degree of competition in Internet markets is often (but not always) determined by direct and indirect network effects and switching costs (see, e.g., Evans and Schmalensee, 2007). In fact, many Internet markets operate as multi-sided platforms where a platform operator brings two different groups of customers together, for example buyers and sellers or “users” and advertisers. A market is typically called two-sided or even multi-sided if indirect network effects are of major importance (Rochet and Tirole, 2003, 2006; Wright, 2004; Armstrong, 2006; Rysman, 2009). Indirect network effects can be distinguished from direct network effects, which are directly related to the size of a network. Put differently, direct network effects mean that the utility that a user receives from a particular service is directly affected by the number of other users (Rohlf's, 1974; Katz and Shapiro, 1985; Farrell and Saloner, 1985). The classical example are telecommunications networks, as, for example, a service such as *Skype* or *WhatsApp* is more attractive as the possibility of users to communicate is

increasing with the number of *Skype* or *WhatsApp* users. Similarly, if a large customer base is already using a certain social network such as *Facebook* or *LinkedIn* this tends to attract even more users to join, as a large customer base increases the probability to find valuable contacts.

In contrast, indirect network effects only arise *indirectly* if the number of users on one side of the market attracts more users on the other market side. Hence, users on one side of the market do not *directly* benefit from an increase in the number of users on their market side, but only *indirectly*, as an increase of users on their market side attracts more potential transaction partners on the other market side. While there is no direct benefit of an increase in users on the same market side (in fact there may even be negative direct effects via increased competition), the network effect unfolds indirectly through the opposite market side. Taking *eBay* or *Amazon Marketplace* as illustration, more potential buyers attract more sellers to offer goods on these platforms as (a) the likelihood to sell their goods increases with the number of potential buyers and (b) competition among buyers for the good will be more intense and, therefore, auction revenues are likely to be higher (Rochet and Tirole, 2003, 2006; Ellison and Ellison, 2005; Evans and Schmalensee, 2007). A higher number of sellers and an increased variety of goods offered, in turn, make the trading platform more attractive for more potential buyers. With positive network effects, the more participants are on the one side of the market, the higher the participants' utility on the other market side and vice versa. These indirect network effects are the key characteristic of two-sided-markets. While these indirect network effects have always been present in market places such as fairs, exchanges or also malls, capacity constraints and transport costs or travel times have limited the expansion of market places. In contrast, for online markets capacity constraints and transport costs or travel times play virtually no role so that further concentration processes can be expected. The so-called "death of distance" removes the natural barrier to expansion imposed on traditional market places through travel costs, while the virtual location on the Internet removes the barrier to expansion traditionally imposed on malls, fairs, etc. by space or capacity constraints.

Apart from *eBay* and *Amazon Marketplace*, prominent online platforms that exhibit indirect network effects are *Uber*, *Lyft* and similar ride-sharing platforms, *AirBnB*, *Expedia*, *Booking* and other travel-related booking platforms, *Google*, *Bing*, and other search engines, *Craigslist*, file sharing networks and many other platforms and applications.

From a competition policy point of view it is important to note that network effects often make large platform sizes indispensable in order to achieve an efficient utilization of the platform. Hence, high concentration levels cannot simply be interpreted in the same manner as in conventional markets without network effects (see, e.g., Wright, 2004; Evans and

Schmalensee, 2013). In fact, the existence of one large market place is often efficient, as it helps to reduce search costs for potential trading partners compared to a situation where a large number of small marketplaces existed.

From a business perspective, two-sided markets pose the challenge that it is not sufficient for the platform operator to convince only users of one market side to join the platform, as there is an interrelationship between the user groups on both market sides. Neither the buyer side nor the seller side of the market can be attracted to join the platform if the other side of the market is not sufficiently large. This is a realization of the well-known “chicken-and-egg problem”, where both sides of the market affect each other and no side can emerge without the other (Caillaud and Jullien, 2003). As a consequence, often one side of the market is “subsidized” by the other (Wright, 2004; Parker and Alstyne, 2005). Products such as the *Acrobat Reader*, *Microsoft’s MediaPlayer* or the *RealPlayer* are available free of charge for consumers as is search with search engines or shopping on online trading platforms. These services are “subsidized” by the market side that is less price sensitive than the other. As a result, platform operators generate most of their profits on the market side with the lower price elasticity of demand.

II.2 Concentration of Online Markets

As a consequence of indirect network effects platform markets may be more concentrated than other industries. However, this does not imply that every digital platform market is automatically highly concentrated. Counter-examples are online real estate brokers, travel agents, and many online dating sites, where several competing platforms (still) co-exist. Hence, the presence of indirect network effects is by no means sufficient for a monopoly or even high levels of market concentration to emerge. Moreover, competition between several platforms is not necessarily welfare enhancing when compared to monopolistic market structures. While, generally speaking, competition between several firms is almost always beneficial in “traditional” markets (as long as the particular market under consideration is not characterized by natural monopoly conditions), this general wisdom does not always hold for two-sided markets. Even if multiple platforms are not associated with a duplication of fixed costs, the existence of multiple platforms may not be efficient due to the presence of indirect network effects. As Caillaud and Jullien (2003) and Jullien (2006) have shown, a monopoly platform can be efficient because network effects are maximized when all agents manage to coordinate over a single platform. Hence, strong network effects can easily lead to highly concentrated market structures, but strong network effects also tend to make these highly concentrated market structures efficient (also see Weyl, 2010; Chandra and Collard-Wexler, 2009). In contrast, capacity constraints (and the associated risk of platform overload),

heterogeneous preferences (and the resulting potential for platform differentiation) and users' "multi-homing" (i.e., the possibility to participate in several platforms at the same time) tend to drive competition in digital markets. Therefore, it is not only unclear how market concentration and consumer welfare are related in these platform markets, but also whether the market is quasi naturally converging towards a monopoly structure. As Evans and Schmalensee (2008) have outlined, there are five driving forces that determine the concentration process and level in two-sided-markets, as specified in Table 1:

Table 1: Determinants of Concentration on Two-sided Markets

Driving force	Effect on Concentration
Strength of indirect network effects	+
Degree of economies of scale	+
Capacity constraints	-
Scope of platform differentiation	-
Multi-homing opportunities	-

Source: Evans and Schmalensee (2008)

It is relatively straightforward and immediately plausible that indirect network effects and economies of scale lead to increasing concentration. The strength of these indirect network effects will differ from platform to platform, and it is difficult to make general statements. However, with respect to the second driver of concentration, i.e., economies of scale, many two-sided markets are characterized by a cost structure with a relatively high proportion of fixed set-up and maintenance costs and relatively low variable costs (see, e.g., Jullien, 2006). For example, for *eBay*, *Expedia*, *Booking.com* etc. most of the costs arise from managing the respective databases, while additional transactions within the capacity of the databases usually cause hardly any additional cost. Increasing returns to scale are, therefore, not at all unusual, but rather typical for two-sided markets in the online world. While network effects and economies of scale both have a positive effect on market concentration levels, there are also three countervailing forces that facilitate market competition.

One important countervailing force are capacity constraints. While in physical two-sided markets such as shopping centers, trade fairs, and nightclubs space is physically limited,² this does not necessarily hold for digital two-sided markets. However, advertising space is often restricted since too much advertising is often perceived as a nuisance by users (see, e.g., Becker and Murphy, 1993; Bagwell, 2007) and, therefore, decreasing the platform's value in the recipients' eyes. In electronic two-sided market like online auction platforms or

² The capacity on one side of the market may be more limited than on the other. For example, the number of stands may be more limited on a trade show than the space for potential visitors.

dating sites capacity limits can also emerge as a result of negative externalities caused by additional users. If additional users make the group more heterogeneous, users' search costs may increase. In contrast, the more homogeneous the users are, the higher a given platform's value for the demand side. If, for example, only certain people visit a particular platform (as some platforms are, for example, mainly visited by women, golf players, academics or so), targeted advertising is much easier for advertisers. Also note that many dating sites advertise that they only represent a certain group of clients (for example, only academics). This reduces the search costs for all visitors involved. Additional users would make the user group more heterogeneous and not necessarily add value, as increased heterogeneity also increases the search cost for other users.

Directly related to the platforms' heterogeneity is the degree of product differentiation between platforms. For dating sites, magazines and newspapers it is almost always evident that consumer preferences are heterogeneous so that some product differentiation emerges. Such differentiation can be vertical (e.g., for the advertising industry high-income users may be more interesting than a low-income audience) and horizontally (e.g. people interested in sailing versus people interested in golf).

The higher the degree of heterogeneity among potential users and the easier it is for platforms to differentiate, the more diverse platforms will emerge and the lower will be the level of concentration. The finding that increasing returns to scale foster market concentration while product differentiation and heterogeneity of user preferences work into the other direction is not new, but rather well known (see, e.g., Dixit and Stiglitz 1977; Krugman 1980). On two-sided markets increasing concentration will be driven by indirect network effects, but capacity limits, product differentiation and the potential for multi-homing (i.e., the parallel usage of different platforms) will decrease concentration levels. How easy it is for consumers to multi-home depends, among other things, on (a) switching costs (if they exist) between platforms and (b) whether usage-based tariffs or positive flat rates are charged on the platform.

To illustrate this thought consider online travel agencies such as *Expedia*. Switching from one online travel agency to another is usually associated with relatively low switching costs. Multi-homing is also easy, as travelers can easily search for flights, hotels, etc. over more than one platform before actually booking, and airlines, hotels, etc. can easily be listed on more than one platform. With respect to search engines users can also easily, without major costs, switch away from *Google* to another general search engine such as *Bing* or even to specialized searches over *Amazon*, *TripAdvisor*, social networks (for people), library catalogues, travel sites, restaurant guides and so on if a switch appears to be attractive. In contrast, switching costs between social networks such as *Facebook* are generally much

higher because of strong direct network effects and the effort needed to coordinate user groups. While for *Google* no significant *direct* network effects exist, i.e., it does not *directly* matter how many other people use *Google*, this is not true for social networks such as *Facebook* where the number of users is a very important factor for users' utility. Still entry into the search engine business is not easy due to the *indirect* network effects above described and the economies of scale that are (a) at least partly based on learning effects, which depend on the cumulative number of searches made over the network in the past, and (b) on decreasing average costs, which are caused by substantial fixed costs of the technical infrastructure.

Another form of switching cost exists on auction platforms such as *eBay* where, apart from indirect network effects, the user's reputation is also highly relevant (see, e.g., Melnik and Alm, 2002; Bajari and Hortaçsu, 2004). As a user's reputation is a function of the number of transactions already conducted over the platform, the reputation is typically platform-specific (e.g., for *eBay*), so that changing platforms involves high switching costs, as it is difficult, if not impossible, to transfer one's reputation from one platform to another.

II.3 Market Definition for Platform Markets

Having discussed the determinants of concentration in two-sided markets, let us now discuss the peculiarities of antitrust market definition for platform services, as the definition of the relevant product market is typically the first step in any antitrust proceeding. Market definition concepts are based on actual and potential substitution patterns in order to determine the products and firms that actually or potentially compete with each other. The market definition process aims at revealing the products and firms which are likely to be affected by, e.g., a merger or an abuse of dominance. In the academic literature, a popular approach is the so-called SSNIP³ test. If a firm was (hypothetically) in the position to profitably raise its price not only temporarily by 5 to 10 % above the competitive price level, the firm is considered not to be effectively constrained by forces of competition. If in contrast such a price increase is unprofitable, for example because consumers switch to alternative products, which they consider to be sufficiently good substitutes, these alternative products are considered to belong to the same product market. Hence, if a 5-10% price increase is estimated to be unprofitable there must be other products or firms in the relevant product market.

In online markets this market definition process becomes much more complicated for two reasons. First, in many online markets consumers do not pay a positive price, at least not in monetary terms. Instead, consumers pay an implicit price in form of personal data and/or

³ Small but Significant Non-transitory Increase in Price.

attention (see Evans 2013). Platforms compete for consumers' data and their attention in order to sell this consumer attention to advertisers (tailor-made based on personal data). Clearly, the SSNIP test scenario of a 5-10 % price increase cannot be computed as long as the starting price (in money) is zero. Even if one would want to consider a 5-10 % increase of the implicit price that consumers pay, namely their disclosure of personal data and/or their exposure to advertising, it is practically rather unclear what such a 5-10 % increase of advertising exposure or data disclosure would mean. This highly practical problem of defining two-sided markets has been largely ignored in the literature so far.

More attention has been paid to a second problem in defining two-sided markets, namely that the profitability of a price increase on one market side also depends on user reactions on the other market side and the induced feedback effects (as a consequence of the indirect network effects). As Evans (2003, p. 325) has pointed out in two-sided markets "market definition and market power analyses that focus on a single side will lead to analytical errors". A price increase on one side of the market may not be analyzed in isolation of the other side, as an isolated analysis of a price increase on one side may define markets too narrowly. A price increase which may be profitable on one side of the market – if looked upon in isolation – may not be profitable anymore once user reactions on the other market side are accounted for. To provide a simple example: It may appear profitable for an online shopping platform to increase the commission charged to the sellers listed if the additional revenues generated from the price increase exceed the loss in revenues that results from some sellers leaving the platform. However, the fewer sellers are listed the lower is the platform's value for buyers and they may switch to a different online platform, making the platform, in turn, less valuable for sellers. Thus, in total, the price increase may be unprofitable once feedback effects are accounted for so that the market needs to be defined more broadly in this example.

The two-sided market structure causes another problem for competition authorities. Since a platform sets prices (explicit or implicit) to at least two customer groups (e.g., advertisers and users) it is not clear which price(s) should hypothetically be increased in a market definition exercise. Should only the price on one market side be increased or all prices simultaneously? This problem is especially severe in situations with asymmetric substitution patterns. Advertisers may regard platforms as closer substitutes than users and may respond more quickly to a price increase for advertising than users might do on their market side. An alternative approach to market definition may be to predict how a price increase on either market side will impact on the platform's transaction volume.

Both Argentesi and Filistrucchi (2007) and Filistrucchi et al. (2013) discuss the applicability of the SSNIP-test in two-sided markets and propose to modify the test accordingly.⁴ In order to measure market power, it is necessary to compute price-cost margins while taking into account the two-sided nature. For instance, on online news pages the publisher's optimal behavior would depend on four different elasticities: the elasticity of readers' demand with respect to the price to access an article, the elasticity of readers' demand with respect to the quantity of advertising; the elasticity of advertising demand with respect to advertising prices (which are typically charged on a pay-per-click basis); and the elasticity of advertising demand with respect to the click conversion rate. In order to compute the price structure an empirical model has to encompass demand estimations on all sides of the markets taking account for interactions between the sides. Clearly, this puts high requirements on both data and estimation techniques.

While the interrelatedness of the markets may, in theory, be resolved via more complex versions of the SSNIP test, data needs put practical limits on its use. Even more challenging is the fact that many Internet platforms are (seemingly) free for users so that a 5-10% price increase can often not be calculated, as users do not pay with money, but with their data and their attention to the advertising shown. However, a 5-10% increase of data disclosure requirements is hardly possible to operationalize in practice, even though one may resolve the issue in theory, as long as one assumes that users are homogeneous and hold the same valuation for privacy. However, the value of personal data or privacy varies heavily in terms of monetary equivalents between users (see, e.g., Bendorf, Kübler and Normann, 2015). Moreover, even a theoretical solution is unlikely to work in practice for antitrust agencies, given the enormous data requirements. Some relief may come from surveys about hypothetical consumer reactions and conjoint analysis techniques. Their major drawback is, however, that they use stated rather than revealed preferences and are, therefore, less reliable than data on observed consumer behavior.

III. Competition among Search Engines and the Antitrust Case against Google

Search engines such as *Google* or *Bing* are multi-billion dollar businesses. At the same time, the market for online search is highly concentrated around the globe. While *Google* is the clear market leader in virtually all Western countries, *Baidu* in China, *Yandex* in Russia and to a lesser degree *Yahoo* in Japan have dominant positions in these countries. In all of these markets, we observe a highly concentrated structure with a monopoly or at best a duopoly (in

⁴ See also Evans and Noel (2008).

Japan) emerging. The reasons for these high concentration levels are economies of scale as well as network effects that characterize search engines.

However, while it appears to be relatively easy to understand that large customer bases may be more attractive for advertising companies, this becomes less clear at second sight. As online advertising is charged on a pay-per-click basis, an online site that induces 10,000 clicks may be as attractive as ten smaller sites that induce 1,000 clicks each (see Manne and Wright 2011). Nevertheless, large search engines may still be more attractive than smaller ones, as (a) there can be a fixed cost per webpage associated with monitoring advertising campaigns and (b) larger search engines may be better able to place targeted advertising, as they have access to a larger base of historical search data and past “clicking behavior”. These two features can make larger search engines more attractive than smaller ones. In addition, *Google* has traditionally created (by means of contract) some artificial incompatibility between advertising campaigns on *Google* and other search engines, but this incompatibility issue has been largely resolved following investigations by the Federal Trade Commission (see Federal Trade Commission 2013). Furthermore, since space is limited on webpages a given webpage that induces 10,000 clicks for a given ad generates more revenue per page than a page that only induces 1,000 clicks. Given the largely fixed-cost nature of online content provision, the resulting economies of scale can induce market concentration.

It is much less clear though how important a search engine’s size is for search engine users. While it is plausible that access to a large set of (historical) search data and consumer clicking behavior is beneficial to improve an engine’s search results, there is some debate about how much data is needed to further refine the search mechanism before the marginal benefit of additional data exceeds the additional cost of processing it (see Manne and Wright 2011). In fact, the literature is divided about whether it is *Google*’s sheer size that allows it to maintain its market position (see, e.g., Pollock, 2010; Crane, 2012) or whether it is its superior innovativeness (see Bork and Sidak, 2012, Manne and Wright, 2011). Overall, it appears that *Google*’s superior ability to place advertising, based on its analysis of large data sets of customer clicking behavior, and the fixed cost of placing and monitoring advertising give rise to indirect network effects from users to advertisers, which make *Google* a two-sided market in the end.⁵

In any case, switching costs between search engines are very modest for consumers, as the past has shown. When *Google* entered the market in 1998, *Altavista* was the leading search engine with *Yahoo!* closely following on the second place in the Western world. Still *Google* managed not only to enter the market, but also to offer superior quality so that *Google* even

⁵ For a different conclusion see Luchetta (2014).

leapfrogged its competitors. Similarly, *Rambler* has been the leading Russian search engine in the late 1990s before it was surpassed by *Yandex*. Therefore, many commentators suggest that *Google's* success is also a result of its superior quality (see, e.g., Evans, 2008; Argenton and Prüfer, 2012).

Overall, the quality of search engines can be approximated by “expected time a user needs to obtain a satisfactory result”. The time needed to find a satisfactory result in turn depends on several factors (Argenton and Prüfer, 2012), including search algorithm quality, hardware quality, and data quality, where data quality refers to both data freely available on the Internet and search engine specific data that has been collected during previous search processes. In principle, the availability of hardware and Internet data should not differ between competitors, especially given the substantial financial resources are available to firms such as *Microsoft*, *Google* and also *Facebook* for whom the access to sufficient financial resources should be taken as given. The main competition problem for those firms is argued to be rather the limited availability of high-quality search data, which is firm specific (see Argenton and Prüfer, 2012). Due to its significant market share *Google* also has the best access to (also historical) search data and consumer clicking behavior. This is an important aspect for success in search engine markets, as search data is needed to refine the engines' search algorithms. The more search data an operator has, the better are the refinements of its search algorithm. This process results, in principle, in superior search engine quality and provides a competitive advantage for the market leader, i.e., *Google*. It is unclear, however, at which point or data quantity the marginal benefit of utilizing additional data exceeds the marginal cost of additional processing capacity. As some authors such as Manne and Wright (2011) argue, this point where the marginal cost exceeds the marginal benefit has not only been passed by *Google*, but also by other large search engines such as *Yahoo!* and *Bing*. In fact, it appears that most search engines only use subsets of their search data to further improve the search algorithm and not all their data available.

While the existence of a superior search engine is, of course, not a policy concern for competition authorities in itself, there have also been numerous complaints that *Google* is abusing its dominant position, especially to favor its own subsidiaries (such as *Google Map*, *YouTube* or *Google Shopping*) over competing platforms. More precisely, the allegation is that *Google* biases its search results so that links to its own subsidiaries appear ahead of links to rival sites even though a rival's site may be a better fit for what the user is searching for. This *search bias* allegation (see, e.g., Goldman, 2006; Ammori and Pelican, 2012; Edelman, 2011; Crane, 2011) has – by and large – been the key of the antitrust investigations against *Google* (see FTC 2013, European Commission, 2015).

In addition, other allegations have concerned Google's (unlicensed) use of content generated by other specialized search engines (so-called vertical search engines) as well as the strategic incompatibility that Google introduced for third parties between advertising campaigns on Google platforms and other webpages. Both issues have largely been resolved through commitments accepted by the Federal Trade Commission (2013) in January 2013. A fourth antitrust investigation concerns the exclusive or default contracts Google has used to incentivize mobile handset manufacturers (through exclusive contracts, rebates or potentially predatory prices) to use Google's Android operating system and Google as the default search engine (see, e.g., Manne and Wirght, 2011; Bork and Sidak, 2012). Whether these contracts give rise to market foreclosure is currently still investigated by the European Commission and other competition agencies.

Regarding the most prominent allegation of *search bias*, the Federal Trade Commission (2013) has, in January 2013, decided not to initiate formal proceedings though. In contrast, the European Commission has, after more than five years of investigation and analysis (which started in early 2010) and following a lengthy discussion of various commitments that *Google* had offered to undertake in order to mitigate the alleged search bias problem, issued a formal statement of objections (SO) against *Google* in April 2015. The SO outlines the European Commission's preliminary view that *Google* is "abusing a dominant position, in breach of EU antitrust rules, by systematically favouring its own comparison shopping product in its general search results pages in the European Economic Area (EEA). The Commission is concerned that users do not necessarily see the most relevant results in response to queries – to the detriment of consumers and rival comparison shopping services, as well as stifling innovation" (European Commission, 2015). More specifically, the Commission's preliminary main conclusions are that (i) "Google systematically positions and prominently displays its comparison shopping service in its general search results pages, irrespective of its merits", (ii) "Google does not apply to its own comparison shopping service the system of penalties, which it applies to other comparison shopping services on the basis of defined parameters, and which can lead to the lowering of the rank in which they appear in *Google's* general search results pages" and that (iii) "*Google's* conduct has a negative impact on consumers and innovation. It means that users do not necessarily see the most relevant comparison shopping results in response to their queries, and that incentives to innovate from rivals are lowered as they know that however good their product, they will not benefit from the same prominence as *Google's* product." The SO suggests that "*Google* should treat its own comparison shopping service and those of rivals in the same way. This would not interfere with either the algorithms *Google* applies or how it designs its search results pages. It would, however, mean that when *Google* shows comparison shopping services in response to a user's query, the most relevant service or services would be selected to

appear in *Google's* search results pages” (European Commission, 2015). In addition, further proceedings are underway at the US state level as well as in India, Argentina and South Korea.

Whether *Google* has in fact biased its search results in favor of its own subsidiaries is difficult to determine from the outside, as *Google's* search algorithm is naturally a business secret. Moreover, personalized search results (based on one’s own search history and one’s cookies) imply that different persons may obtain different search results for the same search keywords. Bork and Sidak (2012) furthermore argue that *Google's* incentives to bias search results are limited as users could easily switch to another search engine that may provide better (and less biased results), given that switching costs are low and multi-homing easy in case of search engines. As Bracha and Pasquale (2008) correctly point out though this implies that consumers notice that they are shown biased results – something not very likely given that consumers are searching for something they do not know where to find. Given that search becomes more and more personalized and that *Google's* estimate of what results consumers may want to see in which order may only be an (informed) opinion (see Grimmelmann, 2011), it is by no means easy to establish a search bias (see, e.g., Edelman and Lockwood, 2011) or to design appropriate remedies.

The European Commission’s statement of objection also reveals how difficult it is to delineate the relevant product market. While the European Commission defines a distinct product market for general search, it is far from clear how consumers would substitute if *Google* were to charge for search requests. While some users may switch to other general search engines, other users may use Wikipedia, amazon, IMDb, LinkedIn, twitter and other websites with search functions for their searches for general information, books, movies, people etc. In fact, the Commission appears to hold the view that users search for specific web pages, while one may also argue that users rather search for information. In its market delineation the Commission, therefore, exclusively focuses on technical aspects (how and which websites are crawled and listed), but does not analyze consumer behavior. Hence, it is completely unclear whether the Commission’s market delineation is appropriate or not. Similarly, the Commission argues that comparison shopping services constitute a different product market than specialized search services, online retailers, and merchant platforms/marketplaces. Again, the Commission bases its view entirely on technical and functional aspects, arguing that comparison shopping services constitute a market in their own, since consumers cannot directly purchase the product from these sites. This means, of course, that *Google* shopping would belong to a different and more competitive market, were *Google* to include one-click-purchase options in its ads. From an economic perspective, this is not immediately plausible, as a further vertical integration would imply that *Google* is no

longer dominant vis-à-vis eBay and Amazon. Again, user behavior has not been analyzed to delineate the market, which is somewhat troublesome.

In addition, the European Commission's statement of objections appears to suggest that discrimination and favoring one's own services is abusive by its very nature for dominant firms, absent an objective justification. Alternatively, the Commission may hold the view that Google Shopping is an essential facility or bottleneck for online retailers, even though the Commission does not use the term. In any case, given the presence of numerous market places such as eBay and Amazon, the view may be difficult to sustain.

Finally, the Commission argues that the success and growth of Google's services do not reflect its relative quality and attractiveness for users. The statement of objections rather suggests that Google's success is not the outcome of competition on the merits. Again, little evidence is provided to substantiate this claim. Given these shortcomings an interesting question, also from a political economy of antitrust perspective, is why the Commission chose Google Shopping as its showcase and not any of the other services for which market definition may be much less contentious. For now, it is interesting to see how the case will evolve.

Even ignoring the practical problems of proving a potential abuse, the next question concerns potential remedies to prevent any anticompetitive search biases in the future. A number of scholars have suggested to mandate search neutrality (see, e.g. Pollock, 2010; Edelman, 2011; Ammori and Pelican, 2012; Crane 2012; Manne and Wright, 2012). As has been pointed out though, search neutrality is, first of all, difficult to operationalize and, secondly, may inhibit further innovation, thereby harming consumers in the end (see Grimmelmann, 2011; Crane, 2012; Bork and Sidak, 2012). As a consequence some policy makers have proposed to unbundle or to separate Google's search business from its content business. However, consequences for innovation and consumers may be even more adverse than with search neutrality requirements, as unbundling would imply that search engines would not be allowed to answer questions themselves any longer, but only provide links to answers. Another suggestion has been to require *Google* to reveal its search algorithm, but such a measure would appear disproportionate, as has been argued in the literature, as it concerns the heart of *Google's* business and the main element of competitive rivalry (see, e.g. Bork and Sidak, 2012; Argenton and Prüfer, 2012).

Others have proposed to regulate Google's search algorithm and changes thereof. However, practically, this is not without problems either. First, Google changed its algorithm 516 times in 2010 only.⁶ Hence, any regulation will either fall behind or, alternatively, retard innovation.

⁶ <http://www.google.com/competition/howgooglesearchworks.html> (last visited 24.10.2012).

Instead Argenton and Prüfer (2012) have recently suggested that *Google* should be required to share its specific search engine data to foster competition in search engine markets. This suggestion is based on the assumption that for competing search engines catching up or even overtaking *Google* is very difficult due to missing online search data to develop better search engine algorithms. Hence, access to (historical) search data may help enabling *Google*'s competitors in developing better search algorithms, thereby increasing competitive pressures in the market for search engines.

Another option, which is more light-handed, would be to mandate that *Google* colors the background of links to its own subsidiaries in a similar manner as sponsored links. Once consumers realize that some search results point towards *Google* websites, they can better evaluate the quality of the results and, in case they are not satisfied, switch to some other search engine. Increased transparency should resolve most of the problems associated with any potential discriminatory search bias in vertical search.⁷

The European Commission has been in discussions with Google since 2011 how the concerns can be alleviated through binding commitments. In 2014⁸ Google proposed a threefold remedy for its current and future specialized services. First, users would be informed by a label indicating Google's own services. Second, Google services would be graphically separated from general search results and, third, Google would display prominent three links to three rival specialized search services in a format, which is visually comparable to that of links to its own services. Joaquín Almunia, then European Commissioner for Competition stated that the objective of the Commission is not to interfere in Google's search algorithm but to ensure that rivals can compete fairly with Google. The Commission, at that time, stated that the concessions "are far-reaching and have the clear potential to restore a level playing-field in the important markets of online search and advertising".⁹ However, with the change of Commissioners, following the appointment of the new Commission in 2014, the Commission has changed its view and issued the statement of objections, mentioned above.

IV. Vertical Restraints in Internet Commerce

Apart from the highly visible and hotly debated Google cases, there have been numerous cases in Europe regarding the use of vertical restraints in online markets. The development of the Internet as a powerful channel for the distribution of goods and services has created

⁷ A much more detailed analysis of a potential antitrust case against *Google* and the costs and benefits of various remedies can be found in Pollock (2010), Manne and Wright (2011) and Bork and Sidak (2012).

⁸ http://europa.eu/rapid/press-release_MEMO-14-87_en.htm?locale=en (last visited 27.02.2014).

⁹ http://europa.eu/rapid/press-release_SPEECH-14-93_en.htm.

new platforms and sellers such as *eBay*, *Amazon*, *Expedia*, *Booking.com* etc. The most common vertical restraints in online commerce are the following:

- i. general bans of online sales by manufacturers,
- ii. agreements limiting the absolute quantity or percentage of online sales,
- iii. dual pricing strategies with higher wholesale prices for online sales and lower wholesale prices for offline sales
- iv. selective distribution schemes, and
- v. across-platforms parity agreements (APPA).

The most common restraint is probably the complete or partial restriction of online sales. One of the earliest cases has been *Yves Saint Laurent Perfume*, where the European Commission approved in 2001 that online sales were only allowed for retailers that were already operating a brick-and-mortar store.¹⁰ The Commission recognised that certain products cannot be properly supplied without specialized distributors, especially if the product's quality needs to be preserved or its proper use ensured.

A very similar conclusion was reached in 2006 and 2007 by the French competition authority and also the appeals court when a pure online retailer (*Bijourama*) wanted to enter the *Festina France* selective distribution system in the market for (expensive) watches. The authority and the court stressed that a manufacturer with a market share below 30% can limit online sales as long as the criteria are used consistently and transparent. Hence, the exclusion of a pure online dealer was ruled to be legal. A similar decision was reached in another decision in 2007 regarding several selective distribution systems of high-end cosmetics and hygiene products (*Bioderma*).

In 2002, a Belgian court ruled that even a complete ban of online sales, which *Makro* imposed on its selective distribution networks of luxury perfumes and cosmetics, were legal because of the products' nature required personal expert guidance and the sale methods could not be replicated over the Internet.

The most prominent case has been the *Pierre Fabre* ruling where the European Court of Justice ruled in 2009 that a de facto ban of online sales (through the requirement to assist the sales by a qualified pharmacist) is to be regarded as an infringement "by object" of Article 101 (1) TFEU. Put differently, the ban of Internet sales is regarded a hardcore restriction, even though the Paris court to which the case was referred noted *Pierre Fabre's* 20 percent market share and the lively inter-brand competition.

There are several other cases dealing with selective distribution systems, some of which are summarised in *Buccirossi* (2013), *Dolmans and Leyden* (2012) and *Dolmans and Mostyn*

¹⁰ European Commission press release IP/01(713 of 17 May 2001.

(2015). In principle, European competition authorities tend to take a rather strict view, focusing on the protection of intra-brand competition without much analysis of the degree of inter-brand competition and the economic effects on consumers and the competitive process as such.

This is also reflected in proceedings against various firms for engaging in dual pricing. Dual pricing means that a retailer is granted different wholesale prices, depending on whether the retailer intends to sell the product online or over the counter. While wholesale price discrimination between different retailers and different retail channels is perfectly in line with naïve profit maximization in all but perfectly competitive industries, European competition authorities have – in contrast to the US- viewed this pricing practice with high scepticism when applied to Internet commerce. For example, Bosch Siemens Home Appliances (BSH) introduced a new rebate system in 2013 with lower performance rebates for online sales. BSH argued that different rebate levels aimed at compensating brick-and-mortar dealers and sales for their high quality sales services vis-à-vis online dealers. The German Cartel Office took the view though that lower rebates for online sales create incentives for hybrid dealers to sell less online, which reduces competition through online sales and is, therefore, without further analysis anticompetitive. The German Cartel Office also suggested that BSH should compensate brick-and-mortar sales through fixed payments, thereby largely ignoring the lack of incentive effects that fixed lump-sum payments have.

From an economic perspective the high attention paid to intra-brand competition is misguided, as long as there is active inter-brand competition. Moreover, it is unclear why excluding the Internet as a distribution channel should be considered a hardcore restriction. Many cases concern status products such as watches, perfumes, cosmetics and similarly expensive products. In these instances, consumers may actually purchase the product because of its (expensive) brand image. If online sales destroy the expensive image of the product, this may obviously harm the manufacturer, but also many consumers themselves who buy status products exactly because they are expensive. To prove such a case appears to be extremely onerous though given the current approach in Europe.

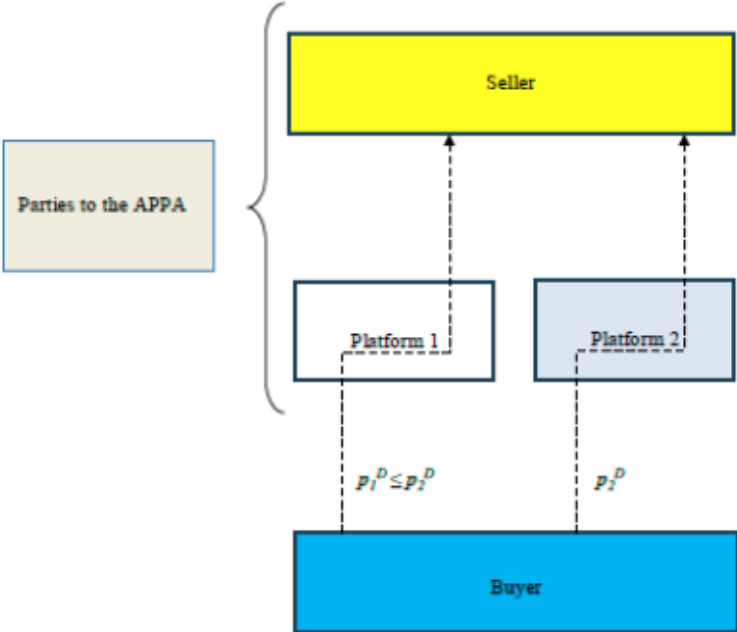
Dual pricing schemes are nothing but a form of price differentiation, which is common in almost all wholesale markets that are less than perfectly competitive. Prohibiting dual pricing and prohibition a ban of online sales makes it much more difficult for firms to incentivize offline sales and presence which manufacturers may value due to the window-shopping effects, the additional service that can be provided offline and the easier provision of after-sales services by brick-and-mortar stores, which may all contribute to marinating a brand's vale, thereby intensifying inter-brand competition.

Furthermore, preventing dual pricing can make manufacturers more reluctant to hand out special discounts for offline sales in regions, where a presence may be valued (e.g, to have nationwide presence), but retailer profits lower (e.g., due to lower demand). As a combination of a dual pricing ban and online sales basically ensures that all retailers pay the same wholesale price for offline sales, input price differentiation becomes much more difficult, even though the welfare effects are at best unclear (see Dertwinkel-Kalt et al., 2015a). In fact, dual pricing with higher rebates offered for offline sales may actually even be procompetitive if the potential market exit of brick-and-mortar stores can be prevented through specific wholesale discounts for offline sales (see Dertwinkel-Kalt et al., 2015b).

Hence, European competition agencies should revisit their overly strict approach to vertical restraints in the Internet and take a more lenient approach such as the US.

A final vertical restriction that has received much attention are across-platforms parity agreements (APPA) as illustrated in Figure 1:

Figure 1: An across-platforms parity agreement



Source: Buccirosi (2013, p. 22)

APPA have most famously applied in the Apple ebook case and for travel and hotel booking platforms. With APPAs a booking platform mandates from its content providers (e.g., ebook publishers or hotels) that they do not offer their products at lower prices on any other platform. The standard theories of harm are either that this may lead to collusion among the content providers (e.g., publishers) or a foreclosure of the platform market, as no new

platform can enter with lower prices. Other cases involve Amazon (in Germany and the UK) and motor insurance providers (in the UK).

Regarding the ebook case, when Apple entered the electronic books industry in 2010, it convinced book publishers (a) to adopt agency agreements, under which final ebook prices are set by publishers, while retailers only receive a commission on every copy sold (in the case of Apple itself 30 percent), and (b) to adopt an APPA for their ebooks, which allowed Apple to sell ebooks at its competitors' lowest price. The agency agreements replaced the previous wholesale agreements that left the retail pricing decision with retailers. Around this time, the retail price of ebooks sold by Amazon, the dominant retailer with a 90 percent market share in 2010, rose by about 18.6 percent on average, and the price of New York Times bestsellers rose by about 42.7 percent (Cote, 2013, p. 94).

In April 2012, the U.S. Department of Justice (DOJ) brought a case against Apple and a group of five major publishers for illegally conspiring to raise ebook prices, claiming that agency agreements played an instrumental role. The DOJ reached a settlement with the publishers and won the case against Apple. Both the court's order and the settlement prohibited further use of agency agreements.

Similar proceedings against Apple and the five publishers were opened in the EU in December 2011. The European Commission had doubts concerning the companies' joint switch from the wholesale model, where the ebook retail price is set by the retailer, to agency contracts that all contained the same key terms for retail prices - including an APPA, maximum retail price grids and the same 30% commission payable to Apple. The European Commission was particularly concerned "that the joint switch to the agency contracts may have been coordinated between the publishers and Apple, as part of a common strategy aimed at raising retail prices for ebooks or preventing the introduction of lower retail prices for e-books on a global scale. This would violate Article 101 of the Treaty on the Functioning of the European Union (TFEU) that prohibits cartels and restrictive business practices" (European Commission, 2013). In December 2012 the Commission accepted the commitments offered by Apple and four of the publishers, while the fifth publisher settled on the same conditions in July 2013. The publishers and Apple offered commitments which contained the following three key provisions:

- Apple and the publishers terminate their then valid agency agreements;
- For a period of two years, the publishers cannot prevent ebook retailers from setting their own prices for ebooks or, from offering discounts and promotions;
- For a period of five years neither the publishers nor Apple can conclude agreements for ebooks with retail-price APPAs (see European Commission, 2012).

In its defense, Apple had claimed that its introduction of the iPad represented a major innovation that should be taken into account. In fact, around the time Apple entered the ebook market it also introduced the iPad, thereby increasing competition in the market for ebook reading devices. In response, Amazon lowered the price of its reading device, the Kindle, from \$299 to \$139 (and later even further) and also developed free software allowing its ebooks to be read on the iPad and other devices.

In fact, the evidence on the ebook case is mixed. While de los Santos and Wildenbest (2014) show that ebook prices have increased following the APPA introduced by Apple, Germain and White (2014) also show that the ebook reader prices (the complementary asset) have fallen at the same time, making the overall effect less clear.

With respect to hotel booking platforms and online travel agencies (OTA), several European authorities have investigated the OTA's APPA. Parallel investigations took place in several countries, including France, Germany, Italy, Sweden and the UK. In Germany, the Federal Cartel Office concluded that the APPA foreclosed the market and softened competition in the distinct market for searching, comparing and booking hotels online, as new entrant platforms would not be able to undercut existing platforms' hotel rates. While the OTA platforms argued that an APPA was needed to safeguard its platforms investment, as hotels could otherwise free-ride on the platform's investment by charging lower prices in own channels, the German Federal Cartel Office did not accept this argument and ruled that APPA were anticompetitive and a violation of competition law. In contrast, the joint investigation started, under the coordination of the European Commission, in Italy, France and Sweden, concluded in April 2015 with a commitment by booking.com not to implement a general APPA any longer, but to impose a so-called narrow APPA (or NAPPAs). Under a NAPPAs price parity clauses will only apply to prices and other conditions publicly offered by the hotels through their own online sales channels (such as their own website), in order to prevent the most obvious possibility for free-riding. However, hotels are free to set prices and conditions to other OTAs and to offline channels. This decision appears to be more balanced than the rather strict prohibition by the German Cartel Office, especially since the Office's theory of harm – namely that competition between platforms is not possible between OTAs in the presence of an APPA – must be put into question, once it is noticed that the leading OTA, called HRS, had its market share reduced from more than 40 percent to almost exactly 30 percent over a period of two years. Even with APPAs, competition between platforms could occur through general rebates provided by the platform itself to users. In general though, APPAs are an interesting new form of most-favoured-customer clause where more analysis is needed before robust results can be used.

V. Competition Issues at the Infrastructure Level

At the infrastructure level two competition issues have received most attention: (1) Price- or margin-squeeze cases where incumbent network providers charge retail prices for Internet access that make it unsustainable for competitors to operate in the market, given the incumbent's retail prices, and (2) the debate surrounding net neutrality and the risk that network operators or Internet service providers engage in price and/or quality discrimination with respect to different content providers or types of content. We will discuss the two issues in this section.

V.1 Price- and Margin-Squeezes in Internet Access Markets

One of the most common allegations in Internet access markets is that vertically integrated incumbent network operators abuse their dominant position by engaging in so-called price or margin squeezing, i.e. by strategically lowering retail prices or raising access prices at the wholesale level in order to constrain reasonably or even equally efficient downstream competitors. In the academic literature, one of the debates has been about the incentives of regulated firms to engage in price or margin squeezing at all (see e.g., Bouckaert and Verboven, 2004). This debate is quite similar to well-known discussions about the rationality of predatory pricing in unregulated markets. In principle, the regulated access price at the wholesale level reflects the incumbent's opportunity cost of serving a particular customer. Hence, the economic logic of a margin squeeze largely resembles that of a predatory pricing strategy or, alternatively, refusal to deal. Nevertheless, there is a vivid legal debate whether price and margin squeezes should be treated as a competition policy concern in its own or rather be subsumed as a particular case of predatory pricing or refusal to deal (see, e.g., Sidak, 2008).

Further policy debates concern the proper efficiency standard that an incumbent has to adhere to when setting its retail prices: Which competitors need to be able to survive in the retail market, reasonably efficient operators or only equally efficient operators? While most economists argue for the equally efficient operator test (see, e.g., Bouckaert and Verboven, 2004; Gaudin and Saavedra, 2014), Clerckx and De Muyter (2009) defend the reasonably-efficient competitor standard and emphasize that incumbent network operators tend to have inherited their positions from a Government enterprise or other forms of protection. Moreover, even though the reasonably-efficient competitor test may lead to productive inefficiency, as it allows for the entry of inefficient competitors, the reasonably-efficient competitor standard may alleviate allocative inefficiencies in imperfectly competitive markets. There is, however, another rather practical objection, namely that a reasonably-efficient

competitor standard would require the access provider to know or correctly guess the retail costs of its competitor to avoid violating competition law, while the equally efficient operator rule only requires that the access provider knows the costs of its own retail unit (also see Martin and Vandekerckhove, 2013).

The legal analysis of margin squeeze furthermore diverges between two different philosophies: one considering margin squeezes as a form of the classical refusal to deal-abuse or predatory pricing and another one, which considers a margin squeeze as a peculiar form of abuse in itself, an abuse on its own.

In Europe, the four most prominent cases of the numerous price-squeeze case have been *Deutsche Telekom* (2003/2010), *Wanadoo* (2003), *Telefonica* (2007) and *Telia Sonera* (2011), but there are several other cases in almost all EU member states. For detailed discussions, see Motta and de Streel (2006), Polo (2007), Clerckx and De Muyter (2009), Heimler (2010), Hay and McMahon (2012) as well as Gaudin and Saavedra (2013).

The general approach in the EU, following the *Deutsche Telekom* case, is that the European Commission as well as national competition or regulatory authorities tend to consider a price squeeze abusive per se and liable under Article 102 TFEU, regardless of the economic effects on competition and consumers. When the European Union's Court of First Instance (CFI) endorsed the Commission's decision in the *Deutsche Telekom* case, it also clarified that an abusive margin squeeze can be discovered through the so-called imputation test: A price squeeze occurs whenever the retail arm of a vertically integrated operator cannot operate profitably if it had to pay the same wholesale access prices as its retail competitors. Hence, the "equally efficient" or "just as efficient" standard is used in the cases mentioned above, even though the Commission has also shown sympathy to the reasonably efficient-standard in other cases (EL/2010/1113 & IT/2010/1103).

The formalistic approach of the imputation test contrasts heavily with the more economic or effects based approach, to which the European Commission has moved in other areas. Interestingly enough, all four cases were decided on grounds of predatory (retail) pricing, not on grounds of excessive (wholesale) pricing. The alleged margin squeeze came not from an excessive wholesale/access price for an essential input (access to the fixed local loop), but from a too low retail access price.

The US follows a rather different approach since *Trinko* and *linkLine*. The *linkLine* decision concerns four California Internet service providers (ISPs) of retail digital subscriber line (DSL) Internet access, who purchased wholesale transmission services from the vertically-integrated Pacific Bell, which itself supplied DSL Internet access to the retail market. In July 2003, the ISPs brought a private antitrust suit against AT&T alleging that it had monopolized and attempted to monopolize the regional DSL market in violation of Section 2 of the

Sherman Act, in among other ways by creating a price squeeze. While the four ISPs prevailed in the District Court and the Circuit Court of Appeals, the Supreme Court saw no need to view price squeeze as a distinct exclusionary strategy for antitrust purposes. It decomposed vertical price squeeze into two parts: First, the high wholesale price is an exercise of monopoly power, and the exercise of lawfully obtained market power does not violate the Sherman Act Section 2 prohibition of monopolization. And, secondly, the low retail price only violate the Sherman Act Section 2 prohibition of monopolization if the price is predatory, but otherwise not (see Martin and Vandekerckhove, 2013). Similarly, the *Trinko* case has made clear that in the US price or margin squeezes are, in contrast to Europe, dealt with under the refusal-to-deal standard and not seen as an antitrust violation in their own right. As a consequence, Sidak (2008) has proposed to abolish price or margin squeeze as a distinct theory of antitrust liability under section 2 of the Sherman Act.

V.2 Net Neutrality

Traditionally, the Internet has developed within a non-discriminatory architecture. All data packages are treated equally (with so-called “best effort”), independent of their content and origin. Recent technologies, however, enable network providers to distinguish and to differentiate and discriminate between different packages. In the advent of the new traffic management technologies a debate has emerged in policy circles and in academia – originally only in the US (see Wu, 2003; Lessig, 1999), but later spreading to Europe – on whether the traditional principle of “net neutrality” would need to be secured by means of regulation.

The term net(work) neutrality is not clearly defined and used in several meanings. As Krämer et al. (2013) point out, the meaning “is often ambiguous and can mean anything from blocking certain types of undesired or unaffiliated traffic (Wu, 2007), to termination fees (Lee and Wu, 2009), to offering differentiated services and taking measures of network management (Hahn and Wallsten, 2006).”

One of the core elements of net neutrality is in any case the best-effort principle. As long as network operators do not identify the origins of the various packages, all packages are obviously treated equally (best-effort rule). In addition, network operators cannot charge the data sender as long as they do not identify them. This in turn implies zero prices for sending traffic (zero-pricing rule). Consequently, similar to the “receiving-party-pays”-principle in many telecommunications networks, data receivers (the typical Internet user) are charged for receiving and accessing online content, while content providers do not pay network operators for transmission services. As long as network operators cannot prioritize certain traffic, this

implies non-discriminatory pricing of packages (non-discriminatory pricing rule). Any departure from one or more of these rules may be considered a violation of net-neutrality. Focusing on these three distinct rules, Schuett (2010) surveys the net-neutrality discussion in the economic literature.¹¹ Moreover, van Schewick (2012) offers an extensive report and framework on net neutrality with a special emphasis on non-discrimination rules adopted by the Federal Communications Commission (FCC).

From an antitrust policy perspective, the concept of net neutrality as a non-discrimination rule is of particular interest. Strict net neutrality then prevents ISPs from prioritizing any traffic from any origin. Advocates of strict net neutrality fear that any departure from this rule would induce vertically integrated ISPs to behave in anticompetitive fashions by entirely blocking or discriminating rivals' content in terms of prices and quality of service. Thus, ISPs should be subject to a prophylactic regulation to prevent any such behavior right from the start.

We want to shed some light on both the incentives of ISPs to engage in such behavior and to the consequences on competition and welfare now.

V.2.1 Blocking and Degradation

Vertically integrated ISPs that own the network infrastructure and act, at the same time, as content providers may have an incentive to degrade the quality of rivals' content on their network or to entirely block services in order to reduce competition in the content market and enhance the demand for their own content. The concern is that ISPs will use their control over the last mile to favor their own proprietary content over content provided by competitors (see see Krämer, Wiewiorra and Weinhardt, 2013).

These practices are common examples of so-called vertical foreclosure practices. According to Rey and Tirole (2007) a case of foreclosure is a dominant firm's denial of access to an essential facility with the intent of extending market power from one segment of the market (the bottleneck segment) to an adjacent segment (the competitive segment). By treating some group of customers preferentially and offer less attractive terms to others firms can achieve the same results as a vertically integrated firm even without vertically integrating.

The theoretical findings on vertically integrated firms' incentives to foreclose rivals downstream are mixed. Bowman (1957) famously made the argument that there is only one monopoly rent in any vertical chain of production and, thus, a monopolist in the upstream market would have no incentive to monopolize the downstream market (and vice versa). According to the Chicago School's "single-monopoly-rent hypothesis" a vertically integrated firm can only earn a monopoly profit in one of the markets, either upstream or downstream,

¹¹ Further surveys are provided by Faulhaber (2012) and Krämer, Wiewiorra and Weinhardt (2013).

but not two separate monopoly rents in both markets. As a result, a monopolist either has no incentive to vertically integrate in order to leverage its dominant position from the upstream to its downstream market or, in case of imperfect downstream competition, vertical integration would actually benefit consumers and increase welfare as it removes the inefficiencies from double marginalization, according to the Chicago School.¹² Post-Chicago economists have shown, though, that the validity of the hypothesis depends, among others, on the assumption that market participants have perfect information.¹³ The modern economic literature identifies various circumstances where vertical foreclosure can be profitable (for an overview see Rey and Tirole, 2007).

In telecommunications markets, there is at least some evidence that ISPs may sometimes foreclose rival services in practice. In the US, the net neutrality debate evolved in several steps: First, in 2005, the FCC took action against the Madison River Telephone Company¹⁴. Madison River, a regional ISP offering both telephone and Internet services has manipulated its customers' Internet access in a way they could not use Voice-over-IP services. The FCC regarded this action as an infringement against net neutrality, which should generally enable customers to access any legal content.¹⁵ In this context, the FCC adopted Open Internet Principles in 2005, establishing four consumer rights. However, these principles did not have the legal status of a binding law, but were only a declaration by the FCC. When, in 2008, the cable net operator Comcast slowed transfers of the BitTorrent peer-to-peer network in response of heavy usage by private customers,¹⁶ the FCC required Comcast to disclose the details of its discriminatory network management practices to the Commission within 30 days of release. In addressing the BitTorrent case, the 2005 Open Internet Principles were applied, but the decision was overturned by an appeals court. In response, the FCC adopted its 2010 Open Internet Order. This order was then challenged by Verizon and remanded by an appeals court back to the FCC. That Court argued that the FCC had the authority to classify and reclassify broadband access services as information or telecommunication services (the two major US legal categories), that the FCC had the authority to promulgate rules assuring non-discrimination in the Internet, and that there was concern that broadband access providers might abuse their market power. After a lengthy process and many changes in direction, the FCC has now adopted a new Order in February 2015, which established the following:

a) Bright line standards (no blocking, no traffic degradation, no paid prioritization)

¹² See, e.g., Director and Levi (1956), Posner (1979), and Bork (1993).

¹³ See, e.g., Whinston (1990). Ahlborn et al. (2004) and Rey and Tirole (2007) provide overviews of Post-Chicago models challenging the one-monopoly-rent hypothesis.

¹⁴ FCC File No. EB-05-ICH-0110, 2005.

¹⁵ The investigation was finally dropped under terms of a consent decree.

¹⁶ FCC File No. EB-08-ICH-1518, 2008.

b) Broadband access services, both fixed and mobile, were reclassified as common carrier services according to Title II of the Communications Act

c) Additional safeguards for edge providers and customers (along the lines of the 2005 declaratory order) were adopted

In Europe, broadband markets are less concentrated than in the US (see Krämer, Wiewiorra and Weinhardt, 2013). This may explain the European Commission's cautious view on any ex ante regulation of ISPs. In a less concentrated market there might be less potential for unlawful behavior of ISPs as long as consumers are able to figure out that certain services are blocked or degraded and can switch in a reasonable time. Moreover, European competition and telecommunications law already widely provide sufficient tools for dealing with many of the problems of net neutrality. The risk of discrimination through (potentially) vertically integrated content and network providers can be addressed by means of sector specific regulation, as an ISP with significant market power can already be obliged to provide access to its facilities. In this case, a regulation of access fees already prevents discrimination of (vertical integrated) ISPs.¹⁷ Moreover, discrimination can be addressed by means of competition law. Article 102 TFEU, which prohibits the abuse by one or more undertakings of a dominant position within the internal market or in a substantial part of it. Hence, the European Commission's Universal Service Directive¹⁸ acknowledges the positive effect of prioritization traffic and product differentiation, as long as consumers have a free choice among services and the conditions of these services are transparent to consumers.

V.2.2 Quality of Service and Price Discrimination

Strict net neutrality prevents ISPs to prioritize and discriminate certain traffic. However, one of the main arguments against this best-effort principle is that services differ in their sensitivity to delay. Streaming services and voice-over-IP telephony are more sensitive to delay than say Web browsing and emails. Moreover, services like E-Health are highly sensitive to delay and require guarantees of prioritization. Hence, proponents against net neutrality state that it makes sense to manage traffic by i) offering different categories of quality of services and ii) discriminate in prices according to the sensitivity of delay. Contrary,

¹⁷ Similarly, according to Section 2 of the Sherman Act dominant firms can be obliged to provide access to essential facilities. However, different from Europe, the FCC characterizes broadband services as information services and thus, cable net operators in the US are not part of the Common Carrier obligation.

¹⁸ Directive 2009/136/EC of the European Parliament and of the Council of 25 November 2009 amending Directive 2002/22/EC on universal service and users' rights relating to electronic communications networks and services, Directive 2002/58/EC concerning the processing of personal data and the protection of privacy in the electronic communications sector and Regulation (EC) No 2006/2004 on cooperation between national authorities responsible for the enforcement of consumer protection laws (Universal Service Directive).

advocates of strict net neutrality fear that this kind of traffic management may result in competition and welfare distorting behavior by ISPs.

In the theoretical literature, there are both arguments in favor and against discrimination. Hermalin and Katz (2007) and Litan and Singer (2007) widely acknowledge positive effect of a discrimination in service quality. In their model ISPs only offer a single medium quality under net neutrality, whereas discrimination allows offering an efficient high quality to high valuation providers. Moreover, due to the structure of the Internet one has to consider another effect of strict net neutrality. All services use the network as a common resource. As stated above, services differ in their sensitivity to delay. Too much traffic by less sensitive service, say file sharing, can cause capacity overload and delay or loss of data packages. This capacity overload, however, mainly affects the high-sensitive services like IP television. Finally, if this happens quite often, the high-sensitive services may be crowded out by low-sensitive services, which is a well-known phenomenon of the “tragedy of the commons.” To avoid crowding out ISPs have to manage traffic according to the sensitivity of delay and provide different quality class contract (Quality of Service).

On the other hand, Economides (2008) points that in such cases an ISP may abuse its market power and force also low valuation providers to accept priority pricing. Choi and Kim (2010) find ambiguous effects of prioritization of welfare. They state that for a large set of parameters a discriminatory regime may lead to lower short-run welfare. Bauer (2007) furthermore points towards potential dynamic inefficiencies. Summarizing, the theoretical literature Schuett (2010) concludes that while welfare effects are not entirely clear, in many scenarios there are likely to be positive effects of non-neutrality.

Clearly on the other hand, service and price discrimination may provide potential for ISPs to behave in an unlawful manner and distort competition and welfare. ISPs with significant market power, however, are subject to dominance control in Europe as well as in the US. Article 102 TFEU prohibits discriminatory behavior by firms enjoying a dominant position. In the US, section 2 of the Clayton act prohibits price discrimination if such discrimination substantially lessens competition or tends to create a monopoly. In a competitive environment, ISPs are free, as is any other firm, to offer differentiated services. The parties will monitor whether the respective qualities promised are really maintained, and otherwise they are free to switch. Hence, the European Commission puts a special emphasis on transparency of providers' terms and condition. The EU Commission's Universal Service Directive forces national regulatory authorities to put transparency obligations into national law. According to the directive, providers with significant market have to announce the regulatory authority the terms and conditions for access to and usage within their network. Moreover, all providers shall disclose information to consumers about their net neutrality

policy. This should enable consumers to make their choice among providers. Practically, it may be questioned whether consumers are able to evaluate and compare the net neutrality policy or whether this mandates high expertise. Finally, the EU Commission's Universal Service Directive shall entitle the national regulators to secure a minimum quality level if necessary.

A case for strict net neutrality regulation is not compelling, many violations are already a case for antitrust and competition law (also see Yoo, 2005, 2007; Sidak, 2007). Strict net neutrality, where all services are treated equally, is economically inefficient since services differ in their sensitivity to delay and users differ in their willingness to pay for these services. Although network management can provide incentives for discriminating, we state that competition policy already provides sufficient tools to deal with many of the concerns and any further ex ante regulation of net neutrality is not compelling. Finally, a departure from strict net neutrality may allow ISP to deviate from the zero-pricing rule for content providers and split the charges among content providers and users. Economically, this seems to be more efficient than the current "receiving-party-pays"-principle since both parties share a benefit from the content.

V. Conclusion

In principle, online markets are prone to similar competition concerns as offline markets and competition policy can address many of the concerns by well-established competition policy tools. Some of the tools need to be adjusted to account for special characteristics of Internet markets such as their two-sidedness.

In addition, Internet markets are typically more dynamic than long established good markets. Any intervention has to balance establishing a fair level playing-field against maintaining incentives for innovative players in the markets. We conjecture that competition concerns at the service level can be widely solved by competition policy whereas there is some scope for regulation at the infrastructure level. The degree of regulation and competition policy intervention certainly depends on competitive conditions which differ in Europe and in the US.

Areas for future research include the precise effects of APPAs which are less well understood than traditional best price clauses. In addition, major research efforts are necessary to better understand the value of data for competitive processes and the conditions under which databases may become essential for competition. Under what circumstances does data become an essential facility? If data is a bottleneck under which conditions should access be granted and how should the original data collector be

compensated? These questions lead to the further field of privacy and competition. While data sharing may be helpful to foster competition, if data is used as a resource, privacy concerns may arise, as subjects granting one firm access to personal data may not be willing to do the same for another firm. These questions again lead to more mundane and practical questions, such as how markets can be delineated and market shares calculated if consumers do not generate sales, but “pay” with their data and/or attention. Hence, many open questions remain and the design for and application of competition rules to Internet markets will remain an interesting area for further research.

Literature

Ahlborn, C., D.S. Evans and A.J. Padilla (2004), The Antitrust Economics of Tying: A Farewell to Per Se Illegality, *Antitrust Bulletin*, 49, 287-341.

Alexandrov, A., G. Deltas and D. F. Spulber (2011), Competition and Antitrust in Two-Sided Markets, *Journal of Competition Law and Economics*, 7, 775-812.

Ammori, M. and L. Pelican (2012), Competitors` Proposed Remedies for Search Bias: Search “Neutrality” and Other Proposals, *Journal of Internet Law*, 15 (11), 8-31.

Argentesi, E. and L. Filistrucchi (2007), Estimating Market Power in a Two-Sided Market: The Case of Newspapers, *Journal of Applied Econometrics* 7, 1247-1266.

Argenton, C. and J. Prüfer (2012), Search Engine Competition with Network Externalities, *Journal of Competition Law and Economics*, 8, 73-105.

Armstrong, M. (2006), Competition in Two-Sided Markets, *Rand Journal of Economics*, 37, 668-691.

Bagwell, K. (2007), The Economic Analysis of Advertising, in: M. Armstrong and R. Porter (Eds.), *Handbook of Industrial Organization* Vol. 3, Amsterdam: Elsevier, 1701-1844.

Bajari, P. and A. Hortaçsu (2004), Economic Insights from Internet Auctions, *Journal of Economic Literature*, 42, 457-486.

Bauer, J. M. (2007), Dynamic Effects of Network Neutrality, *Journal of Communication*, 1, 531-547.

Becker, G.S. and K.M. Murphy. (1993), A Simple Theory of Advertising as a Good, *Quarterly Journal of Economics*, 108, 941-964.

Bendorf, V., D. Kübler and H.-T. Normann (2015), Privacy Concerns, Voluntary Disclosure of Information, and Unraveling: An Experiment, *European Economic Review*, 75, 43-59.

Bork, R.H. (1993), *The Antitrust Paradox: A Policy at War with Itself*, Basic Books.

Bork, R.H. and J.G. Sidak (2012), What does the Chicago School Teach about Internet Search and Antitrust Treatment of Google?, *Journal of Competition Law and Economics* 8, 663-700.

Bouckaert, J. and F. Verboven (2004), Price Squeezes in a Regulatory Environment, *Journal of Regulatory Economics*, 26, 321-351.

Bravo, L. F. and P. Siciliani (2007), Exclusionary Pricing and Consumers Harm: The European Commission’s Practice in the DSL Market, *Journal of Competition Law and Economics*, 3, 243-279.

- Bowman, W. (1957), Tying Arrangements and the Leverage Problem, *Yale Law Journal*, 67, 19-36.
- Bracha, O. and F. Pasquale (2008), Federal Search Commission? Access, Fairness, and Accountability in the Law of Search, *Cornell Law Review* 93, 1149-1209.
- Buccirossi, P. (2013), Background Note, in: *Vertical Restraints for Online Sales*, OECD Policy Roundtable, Document DAF/COMP(2013)13, OECD: Paris, 9-44.
- Bundeskartellamt (2013), *Vertical Restraints in the Internet Economy*, Bonn.
- Caillaud, B. and B. Jullien (2003), Chicken and Egg: Competition among Intermediation Service Providers, *RAND Journal of Economics* 34, 309-328.
- Chandra, A. and A. Collard-Wexler (2009), Mergers in Two-Sided Markets: An Application to the Canadian Newspaper Industry, *Journal of Economics and Management Strategy*, 18, 1045-1070.
- Choi, J.P. and B.C. Kim (2010), Net Neutrality and Investment Incentives, *Rand Journal of Economics*, 41, 446-471.
- Clerckx, S. and L. De Muyter (2009), Price squeeze abuse in the EU Telecommunications Sector: A Reasonably or Equally Efficient Test, *Global Competition Policy*, April 2009.
- Crane, D.A. (2012), Search Neutrality and Referral Dominance, *Journal of Competition Law and Economics*, 8, 459-468.
- Crocioni, P. and C. Veljanovski (2003), Price Squeeze, Foreclosure and Competition Law, Principles and Guidelines, *Journal of Network Industries*, 4, 28-60.
- De los Santos, B. and M. R. Wildenbeest (2014), E-Book Pricing and Vertical Restraints, Working Paper.
- Dertwinkel-Kalt, M., J. Haucap and C. Wey (2015a), Raising Rivals' Costs through Buyer Power, *Economics Letters*, 126, 181-184.
- Dertwinkel-Kalt, M., J. Haucap and C. Wey (2015b), Procompetitive Dual Pricing, forthcoming in: *European Journal of Law and Economics*.
- Devine, K.L. (2008), Preserving Competition in Multi-Sided Innovative Markets: How Do You Solve a Problem Like Google?, *North Carolina of Law and Technology*, 10(1), 59-117.
- Director, A. and H.E. Levi (1956), Law and the Future: Trade Regulation, *Northwestern University Law Review*, 51, 256-281.
- Dixit, A. and J. Stiglitz (1977), Monopolistic Competition and Optimum Product Diversity, *American Economic Review*, 67, 297-308.
- Dolmans, M. and A. Leyden (2012), Internet & Antitrust: An Overview of EU and National Case Law, *e-Competitions: Competition Laws Bulletin*, No 45647.
- Dolmans, M. and Mostyn (2015), Internet & Antitrust: An Overview of EU and National Case Law, *e-Competitions: Competition Laws Bulletin*,
- Economides, N. (2008), Net Neutrality, Non-Discrimination and Digital Distribution of Content through the Internet,
- Edelman, B. (2011), Bias in Search Results?: Diagnosis and Response, *Indian Journal of Law and Technology*, 7, 16-32.
- Edelman, B. and B. Lockwood (2011), Measuring Bias in "Organic" Search, online available at: <http://www.benedelman.org/searchbias/>.
- Ellison, G. and S. F. Ellison (2005), Lessons from the Internet, *Journal of Economic Perspectives*, 19 (2), 139-158.

European Commission (2012), Statement on Commitments from Apple and Four Publishing Groups for Sale of E-Books, Speech by Joaquin Almunia, Vice President of the European Commission responsible for Competition Policy, 13 December 2012, SPEECH/12/955.

European Commission (2013), Press Release: Antitrust: Commission Accepts Legally Binding Commitments from Penguin in E-Books Market, 25 July 2013.

European Commission (2015), Fact Sheet: Antitrust: Commission Sends Statement of Objections to Google on Comparison Shopping Service, 15 April 2015.

Evans, D.S. (2003), The Antitrust Economics of Multi-Sided Platform Markets, *Yale Journal on Regulation*, 20, 325-381.

Evans, D.S. (2008), The Economics of the Online Advertising Industry, *Review of Network Economics*, 7, 359-391.

Evans, D.S. (2009), Two Sided Market Definition, in: ABA Section of Antitrust Law (Ed.), *Market Definition in Antitrust: Theory and Case Studies*, Chapter XII.

Evans, D.S. (2013), Economics of Vertical Restraints for Multi-Sided Platforms, Working Paper available at: <http://ssrn.com/abstract=2195778>.

Evans, D.S. and R. Schmalensee (2007), The Industrial Organization of Markets with Two-sided Platforms, *Competition Policy International*, 3 (1), 151-179.

Evans, D.S. and R. Schmalensee (2008), Markets with Two-Sided Platforms, *Issues in Competition Law and Policy*, 667.

Evans, D.S. and M.D. Noel (2008), The Analysis of Mergers that Involve Multi-Sided Platform Businesses, *Journal of Competition Law and Economics* 4, 663-695.

Farrell, J. and G. Saloner (1985), Standardization, Compatibility, and Innovation, *RAND Journal of Economics* 16, 70-83.

Faulhaber, G.R. (2011), Economics of Net Neutrality: A Review, *Communications & Convergence Review*, 3 (1), 53-64.

Federal Trade Commission (2013), Google Agrees to Change Its Business Practices to Resolve FTC Competition Concerns in the Markets for Devices Like Smart Phones, Games and Tablets, and in Online Search, online at: <http://ftc.gov/opa/2013/01/google.shtm>.

Federal Trade Commission (2015), FCC adopts strong, sustainable rules to protect the open Internet, FCC News Release, 26 February 2015.

Fernández Álvarez-Labrador, M. (2006), Margin Squeeze in the Telecommunications Sector: An Economic Overview, *World Competition*, 29, 247-267.

Filistrucchi, L., D. Geradin, E. van Damme and P. Affeldt (2014), Market Definition in Two-Sided Markets: Theory and Practice, *Journal of Competition Law and Economics*, 10, 293-339.

Gaudin, G. and C. Saavedra (2014), Ex Ante Margin Squeeze Tests in the Telecommunications Industry: What is a Reasonably Efficient Operator?, *Telecommunications Policy*

Gaudin, G. and A. White (2014), On the Antitrust Economics of the Electronic Books Industry, DICE Discussion Paper No. 147.

Goldman, E. (2006), Search Engine Bias and the Demise of Search Engine Utopianism, *Yale Journal of Law and Technology* 8, 188-200.

Grimmelmann, J. (2011), Some Skepticism about Search Neutrality, in: B. Szoka and A. Marcus (Eds.), *The Next Digital Decade: Essays on the Future of the Internet*, Washington, D.C.: TechFreedom, 435-459.

Hahn, R.W. and S. Wallsten (2006), The Economics of Net Neutrality, Discussion Paper, AEI-Brookings Joint Center for Regulatory Studies.

- Haucap, J. and U. Heimeshoff (2014), Google, Facebook, Amazon, eBay: Is the Internet Driving Competition or Market Monopolization?, *International Economics and Economic Policy*, 11, 49-61.
- Haucap, J. and C. Kehder (2013), Suchmaschinen zwischen Wettbewerb und Monopol: Der Fall Google, in: R. Dewenter, J. Haucap and C. Kehder (Eds.), *Wettbewerb und Regulierung in Medien, Politik und Märkten*, Nomos: Baden-Baden, 115-154.
- Hay, G. A. and K. McMahon (2012), The Diverging Approach to Price Squeezes in the United States and Europe, Cornell Law Faculty Working Papers No. 91.
- Hovenkamp, E. N. and H. Hovenkamp (2009), The Viability of Antitrust Price Squeeze Claims, *Arizona Law Review*, 51, 273-303.
- Heimler, A. (2010), Is a Margin Squeeze an Antitrust or a Regulatory Violation?, *Journal of Competition Law and Economics*, 6, 879-890.
- Hermalin, B.E. and M.L. Katz (2007), The Economics of Product-line Restrictions with an Application to the Network Neutrality Debate, *Information Economics and Policy*, 19, 184-215.
- Johnson, J. P. (2013), The Agency and Wholesale Models in Electronic Content Markets, Working Paper, available at <http://ssrn.com/abstract=2126808>.
- Jullien, B. (2006) Two-Sided Markets and Electronic Intermediaries. In: G. Illing and M. Peitz (Eds.) *Industrial Organization and the Digital Economy*, MIT-Press: Cambridge, 272-303.
- Katz, M. and C. Shapiro (1985), Network Externalities, Competition, and Compatibility, *American Economic Review*, 75, 424-440.
- Kaiser, U. and M. Song (2009), Do Media Consumers Really Dislike Advertising? An Empirical Assessment of the Role of Advertising in Print Media Markets, *International Journal of Industrial Organization*, 27, 292-301.
- Kaiser, U. and J. Wright (2006), Price Structures from the Magazine Industry, *International Journal of Industrial Organization*, 24, 1-28.
- Krämer, J., Wiewiorra, L. and C. Weinhardt (2013), Net Neutrality: A Progress Report, *Telecommunications Policy*, 37, 794-813.
- Krugman, P. (1980), Scale Economies, Product Differentiation, and the Pattern of Trade, *American Economic Review*, 70, 950-959.
- Lao, M. (2013), "Neutral" Search as a Basis for Antitrust Action?, *Harvard Journal of Law and Technology* (Online Paper Series), 26 (2).
- Lee, R., and T. Wu (2009), Subsidizing creativity through network design: Zero-pricing and net neutrality, *Journal of Economic Perspectives*, 23, 61-76.
- Lessig, L. (1999), *Code and Other Laws from Cyberspace*, Basic Books: New York.
- Litan, R. and H. Singer (2007), Unintended Consequences of Net Neutrality, *Journal on Telecommunications & High Technology Law*, 5, 3-33.
- Luchetta, G. (2014), Is the Google Platform a Two-Sided Market?, *Journal of Competition Law and Economics*, 10, 185-207.
- Manne, G.A. and W. Rinehart (2013), The Market Realities that Undermined the FTC's Antitrust Case against Google, *Harvard Journal of Law and Technology* (Online Paper Series), 26 (2).
- Manne, G.A. and J.D. Wright (2011), Google and the Limits of Antitrust: The Case against the Antitrust Case against Google, *Harvard Journal of Law and Public Policy* 34 (1), 171-244.
- Manne, G.A. and J.D. Wright (2012), If Search Neutrality is the Answer, What's the Question?, *Columbia Business Law Review* 2, 151-239.

- Martin, S. and J. Vandekerckhove (2013), Market Performance Implications of the Transfer Price Rule, *Southern Economic Journal*, 80, 466-487.
- Melnik M.I. and J. Alm (2002), Does a Seller's Ecommerce Reputation Matter? Evidence from ebay Auctions, *Journal of Industrial Economics*, 50, 337-349.
- Motta, M and A. de Streel (2006), Excessive Pricing and Price Squeeze under EU Law, in: C.-D Ehlermann and I. Atanasiu (Eds.), *European Competition Law Annual: 2003 What Is an Abuse of a Dominant Position?*, Hart Publishing Oxford and Portland, 92-125.
- OECD (2009), *Margin Squeeze*, OECD Policy Roundtable, Document DAF/COMP(2009)36, OECD: Paris.
- OECD (2013), *Vertical Restraints for Online Sales*, OECD Policy Roundtable, Document DAF/COMP(2013)13, OECD: Paris.
- Parker, G.W. and M. van Alstyne (2005), Two-Sided Network Effects: A Theory of Information Product Design, *Management Science*, 51, 1494-1504.
- Pollock, R (2010), Is Google the Next Microsoft? Competition, Regulation in Internet Search, *Review of Network Economics* 9 (4).
- Polo, M. (2007), Price Squeeze: Lessons from the Telecom Italia Case, *Journal of Competition Law and Economics*, 3, 453-470.
- Rey, P. and J. Tirole (2007), A Primer on Foreclosure, in M. Armstrong and R. Porter (Eds.), *Handbook on Industrial Organization* Vol. 3, Elsevier: North Holland, 2145-2220.
- Rochet, J.-C. and J. Tirole (2003), Platform Competition in Two-Sided Markets, *Journal of the European Economics Association* 1, 990-1029.
- Rochet, J.-C. and J. Tirole (2006), Two-Sided Markets: A Progress Report, *RAND Journal of Economics*, 37, 645-667.
- Rohlf's, J. (1974), A Theory of Interdependent Demand for a Communications Service, *Bell Journal of Economics and Management Science*, 5, 16-37.
- Rysman, M (2009), The Economics of Two-Sided Markets, *Journal of Economic Perspectives*, 23 (3), 125-143.
- Schuett, F. (2010), Network Neutrality: A Survey of the Economic Literature, *Review of Network Economics*, 9, Article 1.
- Sidak, G. (2007): A Consumer-Welfare Approach to Network Neutrality Regulation of the Internet, *Journal of Competition Law and Economics*.
- Sidak, G. (2008), Abolishing the Price Squeeze as a Theory of Antitrust Liability under Section 2 of the Sherman Act, *Journal of Competition Law and Economics*, 4, 279-309.
- van Schewick, B. (2012), Network Neutrality and Quality of Service: What a Non-Discrimination Rule Should Look Like, Center for Internet and Society, Stanford.
- Vogel, L. (2012), EU Competition Law Applicable to Distribution Agreements: Review of 2011 and Outlook for 2012, *Journal of European Competition Law & Practice*,
- Whinston, M.D. (1990), Tying, Foreclosure and Exclusion, *American Economic Review*, 80, 837-859.
- Whinston, M.D. (2006), *Lectures on Antitrust Economics*, MIT Press: Cambridge, MA.
- Weyl, E.G. (2010), A Price Theory of Multi-Sided Platforms, *American Economic Review*, 100, 1642-1672.
- Wright, J. (2004), One-Sided Logic in Two-Sided Markets, *Review of Network Economics*, 3, 42-63.

Wu, T. (2003), Network Neutrality, Broadband Discrimination, *Journal on Telecommunications and High Technology Law*, 2, 141-179.

Wu, T. (2007), Wireless Carterfone, *International Journal of Communication*, 1, 389-426.

Yoo, C. (2005): Beyond Network Neutrality, *Harvard Journal of Law and Technology* 1, 2-77.

Yoo, C. (2007), What can Antitrust Contribute to the Network Neutrality Debate?, Institute for Law & Economics University of Pennsylvania Law School Research Paper No. 07-11.

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