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I. INTRODUCTION

Consumer's choice requires the collection of information to make a conscious and satisfactory decision. This structural feature of consumption has dramatically changed with the Internet and the diffusion of big data. This note reviews the impact of web-based searches on consumers' satisfaction and surplus, distinguishing the case of search and experience goods.

II. SEARCHING FOR A SEARCH GOOD...

Search goods are those products or services whose attributes can be adequately evaluated through search and inspection before purchasing and consuming them. For example, buying an airline ticket from a given place of departure to a final destination requires the purchaser to consider the price, the time of the flight, the business/economy class, the connections for non-direct flights and other contractual restrictions. All these elements can be collected before choosing the preferred option.

The Internet and big data have deeply changed the way consumers approach searching and, ultimately, satisfy their needs of searched goods.² First, search costs are substantially reduced, since collecting information on the web is a cheap, simple and quick activity. Lower search costs boost search activity by consumers, who may find it convenient to sample a larger number of options before choosing and purchasing a good in the first place. In an off-line world, with larger search frictions, they would have made their choice based on a smaller sample of options, or they might have not even participated in the market. Second, in comparison with an off-line environment, search results are typically not received at random, but rather they come in a predetermined order. It may be the listing of results of a search engine, or it may derive from a natural ranking in the inspection of sample results that are retrieved with some easily observable elements (e.g. the price) and other (e.g. characteristics) that require a time consuming inspection. Finally, when a consumer repeatedly uses a digital platform, providing personal information and generating a search and click history, the platform itself may be able, by analyzing big data through algorithms, to provide a personalized ordering that better fits the preferences of the consumer. In short, in the digital world, search is cheaper, ordered and personalized. Consumers will sample more, more frequently and following a certain order.

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² See, for a comprehensive survey, Anderson S. and Renault R. (2016), Firm Pricing and Consumer Search, (forthcoming), *Handbook of Game Theory and Industrial Organization*, L. Corchon and M. Marini (eds.), Edward Elgar, and Armstrong M. (2016), Ordered Consumer Search, CEPR DP n.11566.

While this statement correctly applies to those consumers who have the knowledge and habit to use the web, there are still groups and cohorts that remain off-line. While we may reasonably think that the share of informed consumers has increases with the web, we should keep in mind the distributional effects and externalities across users. The interaction between savvy and non-savvy users may go either way. A search externality suggests that a large fraction of informed consumers, putting more pressure on firms, induces lower prices and higher qualities to the benefit of all buyers, including the uninformed ones. However, we may also have an opposite effect that comes from non-savvy customers, who are ripped off with supernormal prices, to the savvy ones, which benefit from a lower base price set by firms.³

Turning to firms, being positioned at the top of a search ordering is profitable, since consumers will more frequently patronize the prominent options. Competition for prominence, then, will determine the ordering of sponsored results, a better position in the banners of a web page, as a popular mass consumer product will pay to occupy the more visible shelves in a supermarket.

The key question in an antitrust perspective is whether competition for prominence will determine an ordering of products that is consistent with consumers' preferences, such that consumers sampling along the ordered results will end up with an optimal matching. Several recent papers have explored this issue under different perspectives, confirming in many cases this property.⁴ Products that are sampled first, being inspected by a larger number of consumers, have a more elastic demand and therefore, for given attributes, have an incentive to set a lower price.⁵ Hence, they get higher profits through larger sales rather than higher mark ups. Moreover, a higher quality (search) product is more likely to match consumers' preferences and to be selected if inspected. Hence, higher quality products gain relatively more from being prominent. Their marketing effort will be higher, in the form of advertising expenditures or bids for sponsored search slots, and they will end up being more visible. The message coming from these recent contributions, therefore, in several cases confirms that competition for prominence may determine a better matching of consumers and goods even when the former have to collect information through costly searches.

Before drawing general conclusions and suggesting a weak antitrust enforcement, some caveats are in order. First, the hints from economic analysis are today still partial and not unanimous, obtained under restrictive assumptions and not yet adequately tested. Second, and more importantly, we have to consider whether market power may distort the apparently favorable mechanism that aligns consumers and firms' preferences.

Market power is a relevant issue for the sellers' as well as for the platforms' side. When the market for the searchable good is concentrated and producers have market power, consumers may be harmed by two different practices, obfuscation and price discrimination. Sellers may find it convenient to increase search frictions, obfuscating their product, for instance by publicly announcing that their good is not sampled in a price comparison website, or making it harder to collect all the relevant information on the good's attributes, or adopting complex pricing schemes. Introducing search frictions, indeed, may lead to a generalized increase in prices, and the obfuscating firm, although losing prominence, would still gain from higher prices.⁶

While obfuscation has a clear negative impact on consumers, the effects of price discrimination are less univocal. Big data and consumer profiling lead to segmenting of the market and post a full range of different prices, up to the limit of perfect price discrimination through individual prices that extract all the consumer surplus. However, this is not the end of the story, and the Internet environment features different and conflicting effects. Indeed, the web facilitates reselling (buying on Amazon and selling on eBay), reducing the ability of producers to price discriminate. Evidence suggests that price discrimination tends to take a less extreme form, with prices posted for groups of consumers rather than differentiated at the individual level. Distributional concerns are relevant across different groups of consumers, but the decisive effect relates to the possibility that, through price discrimination, sellers find it convenient to serve a larger group of consumers, some of which would instead be rationed if a single price were imposed. Economic theory and antitrust practice have suggested that the phenomenon requires a careful analysis and flexible evaluation, as the British OFT (2013) and the Executive Office of the President of the USA (2015) documents claim.⁷

3 Armstrong M. (2014), Search and Ripoff Externalities, University of Oxford, Dept. Economics DP n. 715.

4 See Armstrong M., Vickers J. and Zhou J. (2009), Prominence and Consumer Search, *Rand Journal of Economics*, and Athey S., and Ellison G. (2011), Position Auctions with Consumer Search, *Quarterly Journal of Economics*, 126: 1213-70.

5 This holds true when demand is log-concave, see Armstrong (2016).

6 See Armstrong (2016), sect. 4 and Ellison G. and Ellison S. (2009), Search, Obfuscation and Price Elasticities on the Internet, *Econometrica*, 77: 427-52.

7 Office of Fair Trade (2013), The Economics of Online Personalized Pricing, and Office of the President of the United States of America (2015), Big

Price discrimination may also emerge due to the composition of consumers according to their search costs. Energy retail markets are a good example. Recently the British Competition and Market Authority released a report on the UK energy markets that, among other issues, shows that a non-negligible fraction of final users does not exploit all the opportunities offered in the retail energy markets. Although price comparison websites would allow consumers to compare the offers and choose the best deal with very modest search costs, consumers show a low level of engagement and often carry on with their legacy contracts even when not convenient. The main operators choose menus of contracts that allow to segment the market and price discriminate. We observe similar patterns also in other European markets, suggesting that search and switching costs may persist for certain categories of goods or services notwithstanding the opportunities of the web.⁸

A second line of arguments refers to dominance of the digital platform that offer support to consumers' search activity. There are several reasons why we may fear the emergence of quasi-monopolistic positions in these markets. The importance of network externalities, emphasized by the multi-sidedness of digital platforms, generates a push to market tipping. The access to detailed personal information on users further fuels this loop, allowing platforms to create higher quality services that are offered to users for free, cashing in their attention on the advertising side. The larger financial resources obtained boost research and development in the improvement of the algorithms. The rich list of effects supporting a tendency to dominance has to be contrasted with counter-arguments that call for a different prediction. On top of them, digital platforms offer different services, from search engines to social networks to online shopping, each one being a way to help consumers' searches and a channel for advertisers to reach them. In other words, digital platforms would be differentiated and complementary, and there is no reason why one should prevail over the others. Internet platforms, in turn, collect different information on consumers' tastes, choices and traits. They represent different sources of personal information, each one being able, to a certain extent, to profile its users. These latter, in turn, tend to multi-home, using different platforms for different purposes, and disseminating their information in several data bases with no exclusivity. Finally, advocates of a digital world without dominance argue that the economies of scale and scope in data collection need to profile consumers are not so large, and even new entrants can easily reach a significant performance. The hot debate on these issues has not found a common conclusion,⁹ and each prediction is countered by an opposite one. Only a careful empirical analysis of the relative importance of the different effects may help reach a sound and well-grounded judgement, which, being empirically based, will hardly be a general one.

Coming back to the impact of platforms' market power on users, the key question refers to the possibility that dominance weakens the incentives to provide high quality services to consumers. In other words, once a dominate position is reached in a given segment of the digital world, is it possible that the platform will reduce its research effort, while still being non-contestable by new entrants? We know that network goods benefit consumers through two different channels. The intrinsic quality of the service provided (stand-alone value) and the positive contribution of being popular (network externality). This latter effect, once reached a dominant position, ensures an advantage over smaller competitors even when these latter provide a higher stand-alone value, and may therefore push to a reduction in the innovative efforts of the large operator. Again, we find a potential adverse effect on market power, that requires an empirical evaluation.

To conclude, the opportunities that the web and big data offer to improve the efficacy of searching while reducing its cost exert important positive effects on consumers. Cheaper searches can increase the level of participation and market size. Competition for prominence may align the incentives of consumers and sellers with a better match. However, market power on the sellers' side may distort these positive features through obfuscation and price discrimination. Digital platforms, the pivotal cornerstones for search activities, display a mixture of elements that push towards dominance or soften the tendency to market concentration, the ultimate word coming from a careful empirical analysis case by case. Platforms' dominance, if confirmed, may be an additional ingredient that reduces the potential benefits of the web on consumers' surplus from search goods by softening innovation.

III. ...AND CHOOSING AN EXPERIENCE GOOD

Renting an apartment may be a hard task both on the landlord and on the guest side, an example of the difficulties that arise with experience goods. The landlord may fear that the guest will damage the apartment, while the guest may be uncertain about the characteristics of the flat and the care the landlord will take to accommodate reasonable requests during the stay. These information asymmetries will be solved only by consuming the good, which is renting the apartment.

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⁸ See Crampes C. and Waddams C. (2017), Empowering Electricity Consumers in Retail and Wholesale Markets, CERRE Policy Report.

⁹ See Lerner A. (2014), The Role of Big Data in Online Platform Competition, <http://papers.ssrn.com/abstract=2482780>, Rubinfeld D. and Gal M., Access Barriers to Big Data, *Arizona Law Review*, 59: 339-81, and OECD (2016), Big Data: Bringing Competition Policy to the Digital Era, DAF/COMP(2016)14.

If expectations are pessimistic, many potentially favorable deals may fail to realize. Economists usually suggest that repeated interaction may solve this market failure by creating the proper incentives to behave well. Continuing with our example, if the visitor discovers that the flat is worse than pledged, or that the landlord does not take care of his guests, the consumer will not try a second time. The same mechanism applies with the landlord, which will refuse to rent his flat again to the guest if this latter misbehaved during his stay. Unfortunately, this solution does not work if interactions between the same pair of agents are infrequent, as presumably would be the case in our example.

The web has offered a new and easy solution to this problem. If the matching of the landlord and the guest occurs through a digital platform, this latter will always be the intermediary of a search for apartments (all over the world) by the guest, and a search for guests (among all tourists) by the landlord. Frequency is now potentially restored, since the tourist will interact with the platform every time he is planning a travel, and the landlord will use the platform every time he is looking for a guest. Both sides have now an incentive to well behave if, once reviewed after the stay, a poor record would lead to a downgrading of their future opportunities. The longer and richer the string of information that enter into the agents' files, the stronger the incentives. The opportunities for deals for experience goods are therefore substantially improved by digital platforms, as many examples, from AirBnB to BlaBlaCar or Uber, suggest. The market expansion effect of the web and big data, that we already claimed for search goods, is even stronger for experience goods.

The positive effect of digital intermediaries, at the same time, poses an intriguing issue in an antitrust perspective. On the one hand, we may expect the benefits of actual or potential competition to apply also to digital intermediaries, in the form of lower fees and a better service. On the other, in the case of experience goods an additional efficiency argument may apply. More numerous and smaller intermediaries may be unable to provide an effective enforcement mechanisms, leading to a contraction of the market. Indeed, consider a market with several competing platforms offering the same service, and where agents multi-home. In this case, the interactions take place involving different intermediaries, becoming less frequent on each platform. Moreover, past reviews offer only a partial record of the multi-homing agent's history, and misbehavior leads to the downgrading on just one of the affiliated platforms. All these effects may weaken the effectiveness of the mechanism and reduce its market expansion effect.

This particular efficiency argument might be compared, when handling a case, with the adverse effects of restricted competition. The argument potentially applies to all areas of antitrust enforcement. In a mergers case a reduction in the number of intermediaries increases market power but, at the same time, makes the incentive mechanism more effective. Monopolization entails the prevalence of a single platform, with the negative and positive effects further enhanced. An agreement among intermediaries to pool and share the reviews of past deals is, at the same time, a dangerous sharing of information on individual transactions and a way to cover the past history of agents even when these latter multi-home.

We do not suggest that with experience goods digital intermediaries should be lifted from antitrust scrutiny and enforcement. We simply mention a specific efficiency argument that should be considered. The overall evaluation of a case, then, will depend on the relative importance of the negative and positive effects envisaged, an evaluation that should be based on empirical evidence.

