FROM DEMOTING TO SQUASHING? COMPETITIVE ISSUES RELATED TO ALGORITHMIC CORRECTIONS: AN APPLICATION TO THE SEARCH ADVERTISING SECTOR

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I. INTRODUCTION

In April 2018, the European Commission decided not to extend its investigation into a complaint filed by a website publisher, Interactive Lab, alleging that Google was manipulating, to its detriment, keywords auctions for search-related online advertising.[2]

As such, the case may seem very disappointing. The Commission rejected the complaint on the grounds of the absence of any evidence. The lack of evidence supporting the damage theory had already led the French Competition Authority to reject another complaint from the same operator for the same practices last July.[3] However, the Commission's decision can be read in parallel with this decision.

As a matter of fact, this case is particularly interesting. Like the *Google Shopping* decision of June 2017, it raises questions over the risks of competitive disputes related to corrections made to algorithms.[4] In *Shopping*, the question was one of the demoting used to adjust the quality of online search results.[5] Here, Interactive Lab's case also involves a correction to an algorithm used for assigning search-related ads. This is a correction of the auction on keywords results that is based on the consideration of ad expected quality scores.

The complainant considered that Google did not select its bids in the auctions in order to favor less profitable competitors. For the Commission, such an eviction scenario does not make sense in economic terms. Indeed, if Google's business model is the one of an advertising agency, the company "would have no economic interest in applying the method claimed by Interactive Lab because it would produce a lower income" (point 15 of the decision[6]). However, it is possible to show that a squashing strategy can increase the revenues of the entity that implements it, and that the same strategy can also make sense in the logic of a two-sided model. The theory of damage could therefore be, in principle, possible, even if it is not substantiated by evidence in the present case.

In both demoting and squashing practices the correction of natural results may appear legitimate, considering the risks of algorithmic manipulation by the stakeholders themselves. As a consequence, it may be defended on the basis of efficiency through a guarantee of the quality of the service provided to the Internet user. However, in both instances, it can also be the vector for abuse of dominant position strategies, whether it is abuse of eviction or abuse of exploitation.

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2 European Commission Decision, *Interactive Lab*, case AT.39885, April 11, 2018

3 French Competition Authority, Decision n°18-D-13 of July 20, 2018 on practices implemented by Google in the online advertising sector.

4 European Commission, *Google Shopping*, Case AT.39740, June 27, 2017.

5 See for a thorough analysis of this case: Banasevic N., Marques B. & Portuese A., (2018), "The Google Shopping decision," *Concurrences* N° 2-2018, pp. 25-37.

6 Translation by the author.

This article is structured as follows. In the first part, we present the Commission's decision by comparing it with the decision of the French Competition Authority. We then analyze, in the second part, these practices in relation to the economic literature.

II. THE CASE

A. The Business Model of Online Advertising Related to Search

The complaint, filed by Interactive Lab before the European Commission on February 3, 2011, relates to practices implemented by Google. The plaintiff saw in them an abuse of a dominant position. The complaint was based on allegations of manipulation of the search advertising selection algorithm (*AdWords*). Google was accused of implementing audience dispatching procedures that would result in distorted auction outcomes.

A decision of the French Competition Authority, which was issued later but published earlier, helps to clarify the background of the case. The plaintiff in these two cases, Interactive Lab, is a website publisher that has developed a website called *Woxxo* which aims to connect professional customers with website designers. The site functions in the form of advertisements. The customer fills out a free online form characterizing his needs and service providers can submit their quotes to him, against payment of a commission to *Woxxo*. However, despite the use of the services provided by Google through *AdWords*, the number of requests for quotes was not only particularly low but also inexorably declining over time. According to the complainant, this low visibility could not be due to the level of his bids or the low quality of his offer. It could only be carried out through algorithmic manipulations.

In practice, the *AdWords* online advertising service automatically assigns locations (in sponsored links) for advertisements based on the former searches performed by Google's users. In the auction process, advertisers select keywords for searches that could generate the presentation of their ads. *AdWords* then sets up a full automatized auction mechanism to determine which ads will be displayed on the results page presented to each user.

Several pricing options are available. A first is based on the number of clicks ("CPC"). A second one depends on the conversion rate; that is, the number of times users access the site, register, or make a purchase.[7] A third modality corresponds to the number of displays on the screens. Advertisers must specify caps (in terms of maximum CPCs for example) when bidding. It should be noted that the bidding system set up by Google corresponds to the optimal *Vickrey style* bidding scheme that is the second price auctions model[8]. The advertiser does not pay the price he specified but the price offered by the competitor who arrived immediately after him. Another modality, implemented for instance by *Yahoo!*, consists in the setting up of a reserve price.[9]

The auction model implemented by Google is therefore based on a particularly thought-out economic approach.[10] It should be noted that the field of auctions for online advertising is one of the sectors in which the dominant Internet firms have made the most intensive use of economic analysis. International microeconomics specialists have been recruited by these firms to develop their auction models: *GoTo*, the pioneer in this field, was advised by Simons Wilkie, a professor at California Tech. His California Tech colleague, Preston McAfee then joined *Yahoo!*. Hal Varian, professor at Berkeley, was in the same period recruited as chief economist at Google, and Susan Athey had the same experience at Microsoft.

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7 Such mechanisms are intended to address moral hazard issues. As noted by Athey & Luca (2018): "pay-per-action helps to address the problem of click fraud, in which a site has an incentive to click the ads they host with no intention of buying the product." Athey S. & Luca M., (2018), "Economists (and Economics) in Tech Companies," *Harvard Business School Working Paper*, n° 19-027. For a detailed discussion of this issue, see Agarwal et al (2009). Agarwal N., Athey S. & Yang D., (2009), "Skewed Bidding in Pay-per-action Auctions for Online Advertising," *American Economic Review* volume 99, n°2, pp.441-447.

8 Edelman B. & Schwartz M., (2010), "Optimal Auction Design and Equilibrium Selection in Sponsored Search Auction," *American Economic Review*, volume 100, issue 2.

9 Ostrovsky M. & Schwarz M., (2016), "Reserve Price in Internet Advertising Auctions: A Field Experiment," *Stanford Business School Working Paper*, n°2054.

10 For a literature review see: Varian H.R., (2009), "Online Advertising Markets," *American Economic Review*, Papers and Proceedings 2009, 99(2), pp.430-434. Athey S. & Ellison G., (2011), "Position Auctions with Consumer Search," *Quarterly Journal of Economics*, volume 126, n°3, pp.1213-1270.

In auction procedures for keywords, the winner is not necessarily the highest bidder. The presentation of the results to internet users does not depend exclusively on the value of the bid.[11] It is linked to the number of clicks expected.[12] The platform must not maximize only its own revenues from the auction process.

Indeed, the attractiveness of the search engine for users could be reduced if the ads displayed were of insufficient quality. Google's business model is that of a two-sided market: maximizing profit on one side of the activity (related to auctions on sponsored links associated to keywords) can lead to low relevance results or poor-quality experiences for users on the second side of the activity. This could weaken the attractiveness of the platform itself. The loss of user traffic would weaken the business model twice as much: user disaffection would reduce the data flows that Google can exploit, and a reduction in the number of users would negatively affect the level of auctions.

Therefore, the CPC is weighted by different criteria to decide which ad display has the highest predicted click rate (§15). From the advertiser's historical data the algorithm determines a CTR (Click-Through Rate), or actually its mathematical expectation ("pCTR"). The evaluation of the ad expected quality also takes into account more subjective factors such as the relevance of the ad or the conviviality of its website. The aim is to avoid directing the Internet user to advertisements that are not relevant to him or her.

In other words, ads do not appear according to the value of the auction but according to its combination with its predicted click rate (pCTR). We must keep in mind that the company carrying out the advertising campaign will only pay to the extent that the Internet user actually clicks. In this respect, it seems appropriate to correct the bid price results on the basis of a quality index that takes into account the characteristics and past experiences of each Internet user in order to assess his or her propensity to click.

According to what method is this assessment of the expected quality of the advertisement carried out? It involves the application of a coefficient, γ, which will be combined with the value of auction b and its coefficient c (its CTR). With a $\gamma < 1$, the platform can maximize its revenue: its audience dispatching can, in other words, be explainable in economic terms. The γ coefficient is set according to historical data and/or Bayesian estimates.[13]

Adopting a display rule based solely on the auction result (that is, the level of the bids) would be sub-optimal. Indeed, even if the financial returns of the auction process were maximized for Google, it would be suboptimal in the medium term if internet users were to give up clicking on ads or even turn away from its search engine. The correction of auction results can therefore be justified on an objective ground, as well as the correction of search results in the Google Shopping case.[14]

B. The Complaint and its Analysis

Interactive Lab had filed a complaint on February 3, 2011 concerning practices implemented by Google in its *AdWords* online advertising program. These practices, according to the plaintiff, were likely to infringe Article 102 TFEU.

In its view, the correction of bidding results by the CTR was carried out by Google in an environment devoid of any external scrutiny. In addition, Google also made this unsupervised quality coefficient the determining factor in the ranking. Moreover, according to the plaintiff, Google would calculate this score on the basis of a "historical perception." Google's strategy would, still according to the complainant, correspond to an audience dispatching aimed at "modulating impressions to satisfy the widest possible spectrum of advertisers." These practices would have had the effect of limiting the number of impressions for Interactive Lab's ads despite the level of its bids on keywords associated with searches.

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11 The first keyword-based auction mechanisms, implemented in 1998, were based only on the value of the bid. They were implemented by *GoTo*, a company, later renamed *Ouverture*, whose algorithm was eventually used by *Yahoo!*.

12 Lahaie S. & McAfee P., (2011), "Efficient Ranking in Sponsored Search," *WINE'11 Proceedings of the 7th international conference on Internet and Network Economics*, pp.254-265.

13 Lahaie S. & Peenock D.M., (2007), "Revenue Analysis of a Family of Ranking Rules for Keyword Auctions," *Proceedings of the 7th conference on electronic commerce*.

14 Buttà A., (2018), "Google Search (Shopping): An Overview of the European Commission's Antitrust Case," *Rivista Italiana di Antitrust/Italian Antitrust Review*, n°1, volume II.

As early as November 16, 2015, the Commission informed the plaintiff of its intention to reject its complaint. With the decision of April 11, 2018, the EU Commission confirmed its position. Firstly, it considers that there is a low probability that the alleged facts will be proven. The Commission implicitly applies a no-economic-sense test: what would be the justification for a decision that would reduce auction revenues? Secondly, the Commission considers that it is possibly unlikely that an in-depth investigation would lead to characterization of an infringement of Article 102.

Indeed, taking into consideration a quality score based on previous search results when deciding how to display advertising is part of Google's commercial prerogatives. Similarly, Google cannot be sued on the basis of competition rules for not disclosing its algorithm for setting quality scores. At worst, this litigation would fall under the scope of the judge of the contract. Thirdly, not only would it be unlikely that an in-depth investigation would characterize anti-competitive behavior, but it would also require disproportionate resources to be invested. The EU Commission therefore considers that there is insufficient evidence to further its investigation. Its decision is in full conformity with the margin of discretion it enjoys in assessing the opportunity to pursue an investigation. Considering the interest of the complaint for the Union and the individual circumstances of the case, the Commission may decide not to pursue its inquiry.

It is well-known that a complainant cannot require the Commission to issue a decision on whether or not an infringement has been committed. In addition, the Commission is not bound to deal with a complaint if it considers that it does not fall within the scope of competition law, but within other fields such as contract law.

Ultimately, the lack of supporting evidence is the main factor leading to the Commission's decision not to prolong the investigation. However, in this decision too there is an important point to discuss. It consists in the assumption that there is no economic interest in setting up an audience dispatching system for the platform. We discuss this hypothesis in our second part.

III. A DISCUSSION OF THE COMMISSION'S DECISION FROM AN ECONOMIC PERSPECTIVE

A. Where We Discover that Squashing makes Sense from the Economic Point of View

Interactive Lab claims that Google has implemented a strategy of discrimination against the advertisers who bid the highest. This may seem difficult to justify at first glance: the platform does not maximize its immediate revenues. However, this strategy can make sense in the logic of audience dispatching methods that are equivalent to squashing practices, such as those implemented by *Yahoo!*.

This practice is based on theoretical research in economics on CTR estimation developed in-house at *Yahoo!* by its chief economist, Preston McAfee. In a situation of uncertainty regarding the quality of the ad, the approach is to apply to the bid value a corrective coefficient. While such a correction enhances the effectiveness of the prediction, it does change the ranking and therefore the probability of displaying the ad.[15]

This auction procedure cannot be dissociated from research conducted to tailor the auctions to the specific context of online advertising. Maximizing revenue from the bid value would not be sustainable in the long term as the whole "ecology" of the platform must be considered. As we have already stressed, this implies we take into account a set of constraints such as the possible disaffection of Internet users or the rivalry of other operators.

The quality of the service provided to Internet user is an indispensable condition for the sustainability of the market position of the platform itself.[16] Thus, the platform must not only consider the maximization of its short-term income but also its long-term ones, which are dependent on the interests of its users on the search engine side and of advertisers on the advertising side. The audience dispatching can increase revenues by attracting, or retaining in the auction, one more bidder.[17] Taking into account a quality score and applying a squashing method can therefore make sense from the economic point of view by accommodating the interests of all the players involved in the online ad ecosystem. Indeed, a large amount of research findings confirm that audience dispatching can increase avb platform's revenues.[18]

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15 Lahaie S. & McAfee P., (2011), *op. cit.*

16 Bachrach Y., Ceppi S., Kash I.A., Key P. & Kurokawa D., (2014), "Optimising Trade-offs Among Stakeholders in Ad Auctions," *EC'14 Conference Proceedings*.

17 Bulow J. & Kemplerer P., (1996), "Auctions versus Negotiations," *American Economic Review*, volume 86, issue 1, pp.180-194.

18 Bachrach Y., Ceppi S., Kash I.A., Key P. & Kurokawa D., (2014), *op. cit.*

As we have seen above, this dispatching stems from the insertion of a corrective factor, γ. Its role is well established in the literature. It is a question of displaying less priced ads. Its potential effect is to also allow the platform to maximize its revenues. As noted by Lahaie & McAfee: "The purpose of the exponent is to handicap stronger bidders (with higher advertiser effects), leading to higher competition and increased revenues [...] Efficiency is improved by using $\gamma = 1 - \varepsilon$ rather than $\gamma = 1$, for some $\varepsilon > 0$."[19]

According to the plaintiff, Google would have secretly set up a system to artificially penalize the best placed suppliers. What would be the advantage for Google of shifting traffic to advertisers with lower potential? For Interactive Lab, artificially keeping them on the market would make it possible to maintain incentives for advertisers to make higher bids in the auction process.

Squashing should display ads in an order different from the bid values in a way that would not be explainable by real differences in quality. The manipulation would involve a strategic alteration of the predicted click rate ("pCTR"). The gain produced by this rotation might be that competition on the downstream market could be maintained, pushing good quality operators to bid higher. This strategy would be all the more easily implemented since the algorithm and its corrections are opaque and the platform would be inclined, as the plaintiff claims, to provide distorted statistics to its partners.

Discrimination could therefore be a lever for exploitative abuse to the detriment of efficient suppliers. In this sense, squashing could lead to extracting a higher share of the surplus from downstream operators who are dependent on *AdWords'* auctions. This contrasts with the Commission's statement that "Google would have no economic interest in applying the method claimed by Interactive Lab because it would produce a lower income."

However, the effects of squashing or, more generally, the ones of algorithmic corrections based on quality predictions, have been the subject of many studies. Many of them conclude that these procedures can instead increase the platform's revenues.[20] If the Commission might legitimately question Google's economic opportunity to foreclose one of its downstream customers, it might be possible to envisage that squashing can pertain to an anticompetitive purpose. Nevertheless, if squashing was part of an anti-competitive strategy, it would be analyzed as an exploitative abuse and not as an exclusionary one. Google would implement a discriminatory strategy to generate revenue from suppliers who cannot match the highest bids. This would also indirectly increase the incentives for good quality suppliers to offer higher prices than they would have had to do otherwise.

In any case, a platform has no interest in driving a bidder off the market... If a bidder does not see its ad displayed despite the level of its bids, this can also be explained "naturally" by a low predicted click rate. This can be, for instance, based on historical data collected by Google. The issue is therefore close to that of demoting. To maintain its attractiveness the platform has to correct the results of its algorithms. This correction is essential for a two-sided platform whose revenue is driven by its traffic, which in turn depends on the quality of the services provided to Internet users. In the case of demoting the aim was to correct the results of the effects of manipulations on keywords for online searches. In the case of squashing it is to offset the risk that excessive bids on keywords would lead to displaying ads related to searches that would prove to be of poor quality for Internet users.

A final point of the complaint could be discussed in light of the evolution of the online advertising market: in its complaint, Interactive Lab states that "Google does not guarantee to two competing advertisers on AdWords that their ads will be displayed to audiences with comparable characteristics." This point can be explained by the changes introduced by the diffusion of programmatic advertisements. Adequacy is predicted by algorithms. It can lead to different advertising displays from one consumer to another, despite their similarity according to the knowledge acquired about each consumer from his past actions. The results of these campaigns are much less *ex post* explicable than non-automated programs for which the context of the advertising display or the segmentation of Internet users into broad categories can be easily presented as explanatory factors.

B. Is the Algorithmic Decision Really Accountable in Competition-law Related Terms?

In the present case, there is no evidence to support the plausibility of the anti-competitive scenario. This was already the case in the above-men-

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19 Lahaie S. & McAfee P., (2011), *op. cit*.

20 Thompson D.R. & Leyton-Brown K., (2013), "Revenue Optimization in the Generalized Second-Price Auction," *Proceedings of the EC'13, 14th Conference on electronic commerce*, Philadelphia.

tioned decision of the French Competition Authority. Whether competitive or not, the audience dispatching strategy has not been established. The argument that the AdWords algorithm gives different results over queries and from one Internet user to another is consubstantial to the way the algorithm works. This fact does not constitute in any way evidence of an algorithmic manipulation.

The Australian competition authority stresses this risk in its December 2018 report on digital platforms:

The auction based mechanisms used by Google and Facebook do not mean that they have no control over price. For example, Google is able to influence prices by its specification of (i) how many advertisements can appear alongside search results, which affects its supply of advertising, and (ii) how the various inputs to the auction algorithm — such as the bids, Google's assessment of ad relevance and Google's assessment of landing page quality — determine the outcome of the auction.[21]

The difficulties in analyzing the compliance of algorithmic decisions with competition rules are generating growing concerns for the authorities responsible for their application.[22] In our case the issues are related to the field of online advertising, but they can be extended to many areas in which algorithmic decisions are increasingly important.

In this domain, many advertisers are denouncing exploitative abuses resulting from the opacity of the practices of both platforms and intermediaries. This point was emphasized by the statement issued last December by the Australian Competition Authority: "As advertisers have few other attractive alternatives for search advertising, Google is likely to be able to charge prices that are higher than it would if there was a risk it would lose a material level of advertising expenditure to rival platforms."

These practices would result in additional costs denounced as *ad tech taxes*.[23] However, the revenues generated by online advertising account for a very substantial share of the resources of some major Internet operators. On the basis of information reported to the U.S. financial markets regulator (Form 10-K), Geradin & Katsifils show that advertising represents 98 percent of Facebook's revenues, and 86 percent of both Google's and Twitter's.[24]

If, in online advertising auctions, a correction is necessary to prevent the negative effects of excessively high bids, the problem remains the same as for demoting. How to assess *ex post* the legitimacy and proportionality of an algorithmic correction applied to the results of an algorithmic decision-making process?

The Commission points out in its decision that the "cost" that could result from the search for eventual evidence would be very high, given that it is not even certain it can do so: "assessing more thoroughly the veracity of Interactive Lab's claims would require a systematic analysis of the adequacy of Google's method of calculating the quality score of the applicant ads and their pCTRs. However, the calculation of this type of parameter is part of Google's advanced technical expertise. It uses a detailed analysis of user and merchant behavior based on historical data compiled by Google. Such an analysis would be a complex one and would require a significant amount of resources." (pt.26).

Because of its limited investigative capacities, the Commission is obliged to define priorities. These depend on its assessment of the potential damage to the economy that these practices can potentially cause and the likelihood that an abusive behavior can be characterized. The Commission therefore carries out a proportionality check with regard to the resources to be invested in this purpose.

In such a situation, the costs associated with a decision on the merits deciding on the existence of a breach of EC competition rules could be significantly disproportionate. However, a question remains beyond the present case: if we put into perspective the technical complexity of algorithmic manipulation strategies and the limitation of the authorities' budgetary and technical capacities, is this not likely to lead to an increased risk not of false positives but of false negative decisions? Indeed, there is an increasing probability that the plaintiffs will fail to provide sufficient evidence to support their complaints.

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21 Australian Competition & Consumer Commission, (2018), *Digital platforms inquiry*, December.

22 French Competition Authority, Opinion 18-A-03 of March 6, 2018 regarding data usage in the online advertising sector.

23 Geradin D. & Katsifis D., (2018), "An EU Competition Law Analysis of Online Display Advertising in the Programmatic Age," *Working Paper*, December, https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3299931.

24 Geradin D. & Katsifis D., (2018), *Ibid.*

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