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Algorithmic competition – Note by Portugal

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This document reproduces a written contribution from Portugal submitted for Item 5 of the 140th OECD Competition Committee meeting on 14-16 June 2023.

More documents related to this discussion can be found at
<https://www.oecd.org/competition/algorithmic-competition.htm>

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1. Introduction

1. The digital sector has been one of the priorities at the Autoridade da Concorrência – Portuguese Competition Authority (AdC) since 2018. Within the digital sector, the AdC has given special focus to the use of algorithms by firms, encompassing monitoring, pricing, ranking, search and recommendation algorithms.
2. In 2019, the AdC published the Issues Paper “Digital Ecosystems, Big Data and Algorithms”¹, covering some of the key challenges that the digital sector brings to competition policy. This included a specific section on algorithms and a survey on the prevalence of use of monitoring and pricing algorithms in Portugal.
3. In 2021, the AdC launched a call for information regarding the digital sector to all interested parties². It aimed at identifying possible barriers to entry and expansion in the digital sector, and included questions on the use of algorithms and potential competition concerns algorithms may raise.
4. In the same year, the AdC also sent a survey to online retailers of electronic products and household appliances in Portugal to understand their use of monitoring and pricing algorithms.
5. In 2022, the AdC published a policy brief covering its activity in the digital sector, summarizing the conclusions from the call for information and the survey on algorithms, as well as the AdC’s recent investigative work³. The latter includes an investigation for possible abuse of Google’s dominant position in digital advertising, and an investigation for resale price maintenance (RPM) in the digital space, in the pharmaceutical / health sector. So far, the AdC has not yet gathered significant experience applying competition law to cases involving algorithms.
6. The aim of this contribution is to present a summary of the work and the views of the AdC on algorithmic competition. Section II describes the type of algorithms on which the AdC has been focusing, as well as the main competition concerns they may raise. Section III describes the work carried out by the AdC on the prevalence of use of monitoring and pricing algorithms in Portugal, with an emphasis on the main conclusions from the surveys of online retailers in Portugal. Section IV concludes with final remarks.

2. Types of algorithms

7. In its Issues Paper, the AdC highlighted three categories of algorithms that are relevant for competition in digital markets: monitoring algorithms, pricing algorithms and the ensemble of ranking, search and recommendations algorithms.
8. Monitoring algorithms are software used to track the prices and other strategic variables by competitors. The information may be historical or relative to current prices (or

¹ AdC (2019), Issues Paper on Digital Ecosystems, Big Data and Algorithms. Available here.

² The call for information, the contributions by the interested parties and the summary of contributions are available here.

³ AdC (2022), Defence of Competition in the Digital Sector in Portugal. Available here.

other variables). It can be collected through data feeds, application programming interfaces (APIs) and web-scraping and it is accessed on-demand, via, for example, APIs or dashboards.

9. Monitoring algorithms may significantly increase the transparency of the market and, as such, make it easier to initiate and maintain collusive schemes. Still, their overall effect on competition is ambiguous, as they are also the technology behind price comparison services, which may make consumers more sensitive to price and increase competition.

10. In addition, in vertical relationships, monitoring algorithms may aid suppliers in implementing RPMs and other vertical restrictions.

11. Pricing algorithms are algorithms used to set prices automatically, though the criteria for setting prices is defined by humans via hard-coded rules (e.g., match the price of the competitor) or as the outcome of some optimization procedure (e.g., maximize profit). The AdC also considers price recommendation algorithms to be pricing algorithms. Pricing algorithms may set prices based on a wide array of information, such as prices, costs or consumer demand. As such, pricing algorithms are often used jointly with monitoring algorithms.

12. Pricing algorithms may make it easier for firms to collude. Cartels may be initiated and maintained with the aid of pricing algorithms. Additionally, pricing algorithms may significantly increase market transparency, especially if they are simple enough or so similar that firms become predictable in the market. The use of pricing algorithms by a common provider may also create incentives for all parties to enter into a hub-and-spoke scheme⁴, especially in concentrated markets. Finally, more sophisticated pricing algorithms may interact with one another in the market and reach collusive equilibria without being explicitly programmed to do so.

13. The AdC also noted that pricing algorithms, especially the most sophisticated, may be employed in personalized pricing strategies which may grant firms a greater ability to extract surplus from consumers and change the way firms compete in the market. Nonetheless, based on the evidence gathered, the AdC noted that at that stage there was no indication that personalized pricing was a widespread practice in the Portuguese market.

14. Finally, ranking, search and recommendation algorithms highlight a selection of products to customers, determining which products are shown and their visibility. They are often used to exhibit the most relevant products to consumers, help them make decisions by making their choice simpler or give them a more personalized offer. However, because of this, they may divert customers from certain products to others, which may raise competition concerns.

3. Prevalence of monitoring and pricing algorithms in Portugal

15. The AdC has been gauging the prevalence of use of algorithms in Portugal, especially monitoring and pricing algorithms. So far, it has gathered the views of stakeholders in the digital sector about this topic in the following instances:

⁴ In a hub-and-spoke cartel, competitors (spokes) coordinate anti-competitive behavior (e.g., higher prices) through another undertaking (hub), usually upstream or downstream, without communicating directly. In the case of pricing algorithms, the hub would be the algorithm developer and the spokes would be firms selling products online.

- Survey on the use of monitoring and pricing algorithms by firms with an active online presence in Portugal (April 2019);
 - Call for information, including evidence on the use of algorithms in Portugal (November 2021);
 - Survey on the use monitoring and pricing algorithms by online retailers of electronic products and household appliances (November 2021).
16. The responses by stakeholders have given the AdC an overview of the monitoring and pricing algorithms used in Portugal. The main conclusions are summarized below.

3.1. Survey on the use of monitoring and pricing algorithms by firms with an active online presence in Portugal (April 2019)

17. The AdC’s Issues Paper “Digital Ecosystems, Big Data and Algorithms” (2019) included the feedback gathered by the AdC through a survey on the use of monitoring and pricing algorithms which was sent out to a sample of the main firms with an active online presence in the Portuguese market.

18. The goal of this survey was to assess the prevalence of use of monitoring and pricing algorithms in Portugal, as well as to map the main developers of these algorithms in Portugal, by identifying whether these algorithms were developed internally or by third parties and, in the latter case, who were the algorithm developers (see questions in Box 1).

19. The AdC selected a set of 38 companies with an active online presence in Portugal, selling a diverse range of products, including general retail, specialized retail (e.g., electronic products or clothing), as well as transportation services. These firms were selected according to their prominence and they are among the largest online retailers selling a specific category of products and services.

Box 1. Questionnaire sent to firms regarding the use of monitoring and pricing algorithms (AdC’s Issues Paper “Digital Ecosystems, Big Data and Algorithms”, 2019)

In April 2019, the AdC made a survey on the use of monitoring and pricing algorithms by firms, including the following questions:

- (i) Do you systematically track the online prices of your competitors?
- (ii) If you systematically track the online prices of your competitors, which methods do you use?
 - Software that tracks prices
 - Purchase of information on prices from a third party
 - Another method (specifying which)
- (iii) If you use software to track the online prices of your competitors, how is that software developed?
 - Internally
 - By third parties (specifying the third parties)
 - Both internally and externally (specifying the third parties)

- (iv) Do you use software to set the prices of your products automatically?
- (v) If you change your online prices automatically, how is the algorithm you use developed?
 - Internally
 - By third parties (specifying the third parties)
 - Both internally and externally (specifying the third parties)
- (vi) If you use software to track the online prices of your competitors, do you adjust your own prices in response to changes in the online prices of your competitors?
 - Yes, manually
 - Yes, automatically
 - Yes, both manually and automatically
 - No

20. The AdC found that, in 2019, 37% of the surveyed companies reported using software to monitor their competitors' online prices and, among these, 78.6% reported that they adjusted their online prices in response to changes in the online prices of their competitors.

21. As for pricing algorithms, in 2019, 8% of firms reported using software to automatically set their prices. In addition, considering only companies which were using software to monitor their competitors' online prices, only 7% adjusted prices using pricing software.

3.2. Call for information, including on the use of algorithms in Portugal (November 2021)

22. Given the AdC's focus on the digital sector and the importance of ensuring competition in a context of digital transition, the AdC launched a call for information to all interested parties in November 2021.

23. The main aim of the call for information was to identify possible barriers to entry and expansion in the digital sector in Portugal, including firms' strategies that may hinder competition.

24. The call for information included specific questions on algorithms, asking stakeholders about the prevalence of use of algorithms in Portugal, whether the use of algorithms raised any competition concerns and how they expected the use of algorithms to evolve in the future (see Box 2 for the specific questions on algorithms).

Box 2. Questions on algorithms included in the AdC's call for information (November 2021)

- Are there any examples of the use of algorithms by firms that you believe the AdC should pay attention to? If yes, why?

- In your opinion, are there other pertinent benefits or concerns related to algorithms that you feel are important to highlight, in addition to those identified in this document?
- With regards to the prevalence of monitoring and prevalence algorithms, are the figures referred to, in this document, in line with your perception?
- How do you expect the use of these type of algorithms to evolve in Portugal?
- Is there any situation that has raised competition concerns associated with the use of algorithms?

25. The AdC received 10 contributions to the call for information, including from sector regulators, academia, consumer protection associations and undertakings active in the digital sector.

26. Regarding the prevalence of use of algorithms, the stakeholders responding to the call for information noted that the data presented by the AdC on the use of monitoring and pricing algorithms in its Issues Paper “Digital Ecosystems, Big Data and Algorithms” (2019) were consistent with their perception. In addition, some respondents noted they expected the prevalence of use to increase over time.

27. Some contributions to the call for information voiced additional concerns regarding pricing algorithms. Some showed concern over the possibility that algorithms may change prices according to the characteristics of consumers or to the moment when searches are made. Regarding dynamic pricing algorithms, some stakeholders noted that prices may be updated based on information such as supply and demand, and that there is a risk of lack of transparency when showing prices to consumers.

28. In addition, some stakeholders highlighted concerns regarding algorithms that may shape users’ choices. They noted search algorithms tend to lack transparency and may reflect the interests of the platforms, raising barriers to entry and expansion with a negative impact on competition and consumers. Other techniques mentioned by stakeholders include, for example, designing websites in ways that influence consumer choices, namely with regards to their privacy (so-called “dark patterns”⁵).

29. Regarding online advertising, some responses noted there was a risk that some price auctions and its underlying algorithms may be biased in favor of some bidders. The investigation opened against Google (see Box 3) for a possible abuse of dominance in digital advertising focused on this competition concern.

Box 3. AdC’s opening of an investigation into Google (2022)

On May 17, 2022, the AdC opened an administrative offence proceeding against Google for a possible abuse of dominance in online advertising.

⁵ Dark commercial patterns may be defined as “business practices employing elements of digital choice architecture, in particular in online user interfaces, that subvert or impair consumer autonomy, decision-making or choice. They often deceive, coerce or manipulate consumers and are likely to cause direct or indirect consumer detriment in various ways, though it may be difficult or impossible to measure such detriment in many instances”. See OECD (2022), “Dark commercial patterns”, OECD Digital Economy Papers, No. 336, OECD.

The AdC collected indicia of possible self-preferencing behaviours by Google at various stages of the ad stack – the value chain for online advertising space.

The AdC's investigation focused on the possibility that Google used information, not accessible by its competitors, on online advertising auctions. Using that information, Google might have adjusted its bids to outbid its competitors and win the most auctions possible, thereby reducing its competitors' ability to win and their incentives to participate in future auctions. In addition, it is possible that Google limited the development of competing auction technologies.

On July 27, 2022, the European Commission informed the AdC that it intended to extend the scope of its own investigation on Google to include the practices and markets under investigation by the AdC in Portugal.

Under the rules of the European Competition Network, the initiation of a case by the European Commission relieves the competition authorities of the Member States of their competence to initiate or proceed with an investigation on the same facts.

On September 6, 2022, AdC closed the investigation which, since then, has been conducted by the European Commission.

3.3. Survey on the use monitoring and pricing algorithms by online retailers of electronic products and household appliances (November 2021)

30. In November 2021, the AdC also conducted a survey covering a sample of 86 online retailers specialized in electronic products and household appliances in Portugal. The sample was aimed at retailers of all sizes, both the major retailers and one-store firms that also sell online.

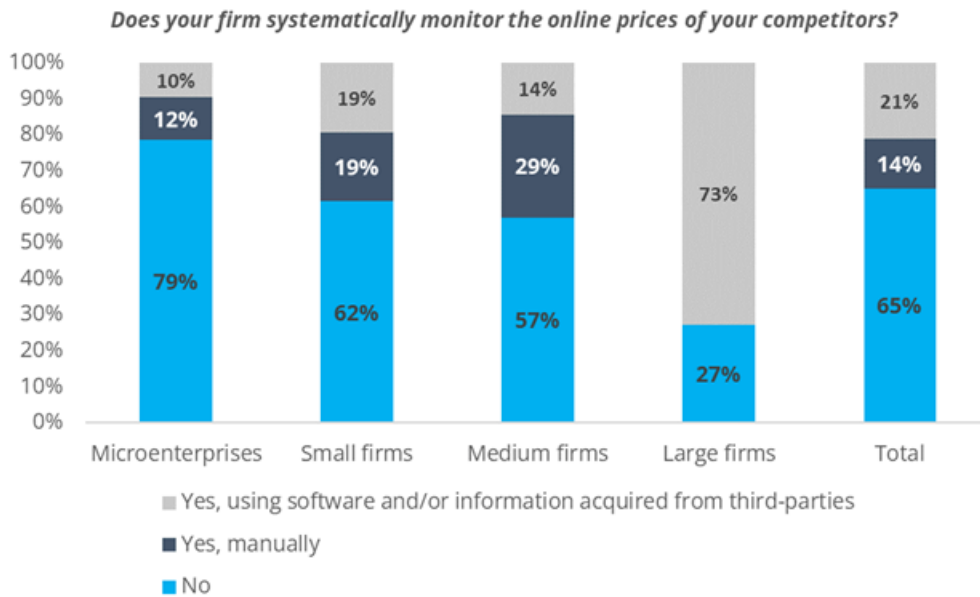
31. The survey included a section specifically on the use of monitoring and pricing algorithms by these online retailers. The goal of this section was to assess the prevalence of use of monitoring and pricing algorithms in Portugal, as well as to identify whether these algorithms were developed internally or by third parties and, in the last case, who were the algorithm developers. The questions were largely identical to those included in the 2019 survey (see Box 1).

32. Around 21% of respondents reported that they systematically monitor the prices of their competitors using monitoring software and/or by acquiring price information from third-parties. Additionally, 14% of respondents reported that they manually monitor the online prices of their competitors (e.g., by consulting the websites of their competitors, or using price comparison platforms).

33. The AdC also found that price monitoring was more frequent among large retailers. While most respondents (65%) indicated that they do not systematically monitor the prices of their competitors, 73% of the large retailers reported that they do systematically monitor these prices.

34. The type of monitoring also tends to change with the size of the firms. The large firms who monitor the prices of their competitors (73%) reported that they use software and/or information acquired from third-parties for such monitoring. On the other hand, within micro, small and medium-sized firms that systematically monitor the prices of their competitors (29%), 55% reported that they monitor those prices manually.

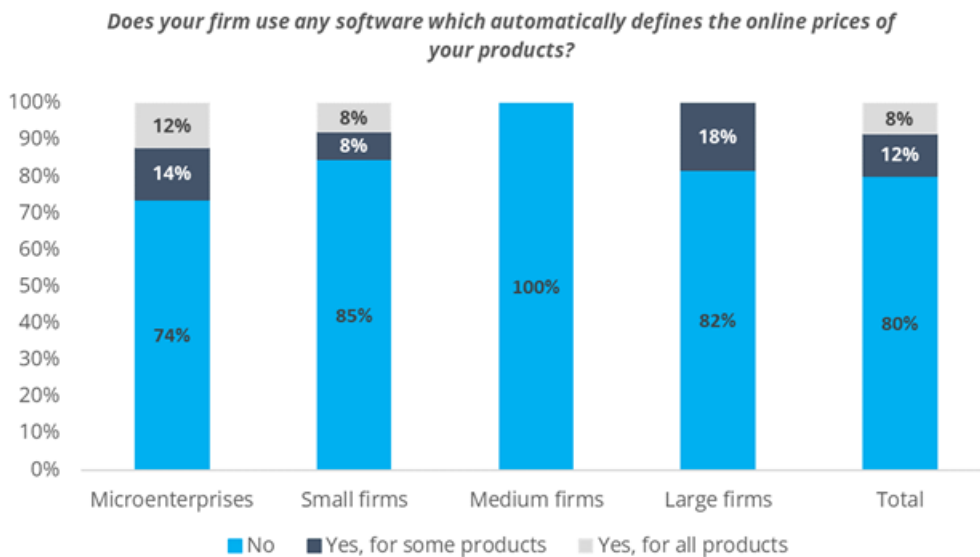
Figure 1. Monitoring of competitor online prices by retailers



Source: responses to the AdC questionnaire; SABI platform.

35. As for pricing algorithms, 20% of firms reported using software to automatically set their online prices: 12% did it for some of the products and 8% for all their products. From a total of 17 retailers which replied that they use software to automatically set prices, only 3 reported that this software takes the prices of their competitors into account. It was not possible to establish a link between the size of the firm and the use of pricing algorithms.

Figure 2. The use of software to automatically set online prices



Source: responses to the AdC questionnaire; SABI platform.

36. The results regarding the use of algorithms are generally in line with the results obtained in the 2019 questionnaire, available in the Issues Paper “Digital Ecosystems, Big Data and Algorithms”. Nonetheless, the sample of firms is markedly different in the two questionnaires, namely in terms of their economic sector and size. The sample from April 2019 encompassed all sectors of the economy and was mostly composed of large firms. The differences between the two questionnaires make it more difficult to assess how the use of algorithms has evolved.

4. Concluding remarks

37. Since 2018, the digital sector has been one of the AdC priorities. Within the digital sector, the AdC has among other issues studied the different types of algorithms, including monitoring, pricing, ranking, search and recommendation algorithms.

38. In particular, the AdC focused on how firms use algorithms in the Portuguese market, especially algorithms used for monitoring competitors and for setting the pricing of the company’s own products.

39. The evidence gathered by the AdC indicates that the usage of monitoring algorithms in Portugal is relatively widespread, in particular among large retailers active online. Pricing algorithms are also used by companies active in the Portuguese market, but to a lesser extent.

40. Stakeholders have raised a number of concerns relating to the use of algorithms, including regarding the extent to which companies using algorithms may determine what consumers see online and influence their choices, the lack of transparency regarding the usage and objectives of algorithms, as well as the use of so-called “dark patterns” to affect consumer decision-making.