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Algorithmic competition – Note by Brazil

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

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1. Algorithms and Competition

1. In his book "Poems that solve puzzles: the history and science of algorithms"[2], Bleakley (2020) explains that algorithms are hidden methods that computers apply to process information and make decisions[3]. In other words, an algorithm is "simply a set of step by step instructions, to be carried out quite mechanically, so as to achieve some desired result."[4] Algorithms are becoming more prevalent in investigations into anticompetitive conduct and mergers and acquisitions. Pricing, search, and ranking algorithms are often involved in these concerns, which are associated with two primary issues: their design and evolution.

2. Algorithms may be designed to self-preference a company's products or services. For example, a search engine algorithm may rank a company's own products or services higher in search results than those of its competitors. A pricing algorithm in a marketplace[5] may use data from competitors selling in the platform to set prices that favor the company's own products or services. Although self-preferencing is not inherently anticompetitive, and can often be pro-competitive and pro-innovation[6], it can harm competition in certain circumstances.

3. Algorithms may also be designed to facilitate collusion between companies. For example, companies may use algorithms to monitor each other's behavior and enforce a collusive agreement. An algorithm may be designed to detect deviations from agreed-upon prices and trigger a response such as a price change or a warning message.

4. However, algorithms can also evolve beyond their original design as they process new data and information. One way they evolve is through machine learning, which allows them to learn and adapt by using data. This can be relevant when investigating mergers and acquisitions, for example, since combining data sets can improve algorithm performance, generating efficiencies but also potentially increasing barriers to entry.

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[2] Bleakley, C. (2020). Poems That Solve Puzzles: The History and Science of Algorithms. United Kingdom: OUP Oxford.

[3] The author further describes: "The algorithm is the abstract description of what the computer must do. Thus, in solving a problem, the algorithm is paramount. The algorithm is the blueprint for what must be done. The program is the precise, machine-executable formulation of the algorithm. To solve an information problem, a suitable algorithm must be found." (Bleakley 2020, pg. 7)

[4] A History of Algorithms: From the Pebble to the Microchip. (2012). Germany: Springer Berlin Heidelberg.

[5] About self-preferencing in marketplaces, see Hagiu, Andrei and Teh, Tat-How and Wright, Julian, Should Platforms Be Allowed to Sell on Their Own Marketplaces? (May 7, 2020). RAND Journal of Economics, Forthcoming, available at SSRN: https://ssrn.com/abstract=3606055 or http://dx.doi.org/10.2139/ssrn.3606055

[6] https://www.clearygottlieb.com/-/media/files/cpi--hoffman--final-pdf.pdf

5. Another way algorithms can improve is through optimization, such as with genetic algorithms[7], inspired by natural selection. They evolve potential solutions over multiple generations to find the best one. However, because the result is unpredictable, there are concerns about algorithms coming to display anticompetitive behavior, such as collusion.

6. Algorithms are often associated with online markets such as search engines and online shopping. However, their use is becoming widespread in various industries as data[8] availability and processing capacity increase. Two recent cases in Brazil that dealt with pricing algorithms occurred in the airline market and the liquid fuel market.

7. This paper examines cases across multiple industries, investigated by the Administrative Council for Economic Defense (CADE), in which algorithms played a direct or an indirect role through their design or evolution. The paper begins by discussing cases involving pricing algorithms. It then explores cases connected to search and ranking algorithms. Finally, it summarizes the key findings and implications of these cases.

2. Cases involving Pricing Algorithms

2.1. Investigation of Algorithmic Collusion in the Airline Industry

8. The first case examined is an investigation of anticompetitive conduct in the airline industry that involved possible collusion by means of pricing algorithms. In 2019, members of the Brazilian parliament requested CADE to investigate the large increase in airplane ticket prices, fuel prices, and aviation taxes in the states of Rio Grande do Norte, Bahia, and Tocantins.

9. The three major Brazilian Airlines Companies, Gol, Azul, and Latam, were investigated for abusive pricing. As stated by CADE's investigation unit, the Office of the Superintendent-General, "for price increases to constitute a competition offense [in Brazil], they should be caused by previous, demonstrably illegal conduct"[9]. Thus, the unit probed into theories of harm that considered unilateral and coordinated conduct.

10. The Department of Economic Studies (DEE) conducted quantitative and qualitative research based on the airline companies' data. The analysis demonstrated that average ticket prices showed a growing trend in the last years, although the price of different routes increased at different rates. However, rather than relating to anticompetitive conduct, this trend seemed connected to the high levels of market concentration—which had further risen with the exit of the airline Avianca from the market—and to the increase in the companies' costs, especially the cost of fuel.

11. The data also showed price parallelism among companies as to several routes. However, this was considered a case of conscious parallelism, as no evidence of anticompetitive behavior was found. Conscious parallelism occurs when firms adopt similar commercial policies, such as prices and conditions of sale. However, under conscious parallelism, each player develops their individual economic rationale based on

[7] https://pdxscholar.library.pdx.edu/cgi/viewcontent.cgi?article=1126&context=compsci_fac; Mitchell, Melanie, "Life and evolution in computers." Santa Fe Institute Working Paper 2000-01-001 (2000)

[8] As Sedgewick and Wayne explain, "Algorithms go hand in hand with data structures—schemes for organizing data that leave them amenable to efficient processing by an algorithm." in Sedgewick, R., Wayne, K. (2014). Algorithms: Part I. United Kingdom: Pearson Education.

[9] Doc. SEI No. 1015097.

their strategic interaction with the other competitors, without the plus factors of communication or explicit agreement between them. The lack of evidence of coordination between the players precluded the antitrust authority from punishing the practice. Since there were no plus factors in place, the Authority could not distinguish mere interdependent behavior in the market from unlawful concerted practices punishable by competition legislation.

12. The investigation also probed into the possibility of collusion through pricing algorithms. There were three causes of concern: commercial aviation industry has a history of using dynamic pricing, firms' information about prices and quantities is easily accessible due to sectoral regulations, and only a few companies operate each route.

13. To help investigate this aspect, CADE's Department of Economic Studies (DEE) designed a questionnaire about the use of algorithms. Companies were asked for specific information about whether they collected data on prices and quantities offered from other competitors, used machine learning to process the collected data, delegated their pricing process to some degree, and had a team specialized in data analysis.

14. The three companies under investigation denied using any machine learning techniques or pricing algorithms in their pricing process. However, they all admitted to monitoring the prices of competitors constantly throughout Brazil. The firms explained they did so by hiring a specialized company to collect real-time information, which they used to inform their pricing strategy.

15. CADE considered that even if the companies under investigation were using pricing algorithms to determine their commercial policies, CADE's ability to take punitive actions would be limited by the lack of robust evidence of an agreement between the companies. In other words, even if the companies were actually using pricing algorithms, without evidence of an agreement or coordinated action between them aimed at achieving a collusive result, CADE would likely be facing a situation of tacit collusion—a lawful practice, which cannot not be penalized by the competition authority. Since no such evidence was found, the case was dismissed.

16. Despite the fact that, nowadays, tacit collusion is not punishable by itself, this position might be challenged in Brazil in the future. The Department of Economic Studies' Technical Opinion mentioned that, in recent years, several studies related to the negative potential of algorithms on competition have been published, such as: Mehra (2015)[10]; Rubel (2016)[11]; Ezrachi and Stucke (2016, 2017)[12]; Oxera (2017)[13]; Woodcock (2017)[14];

[10] MEHRA, Salil K. Antitrust and the robo-seller: Competition in the time of algorithms. Minn. L. Rev., v. 100, p. 1323, 2015.

[11] RUBEL, Alan. The Black Box Society: The Secret Algorithms that Control Money and Information, by Frank Pasquale. Cambridge: Harvard University Press, 2015. 320 pp. ISBN 978–0674368279. Business Ethics Quarterly, v. 26, n. 4, p. 568-571, 2016.

[12] EZRACHI, Ariel; STUCKE, Maurice E Virtual Competition: The Promise and Perils of the Algorithm-Driven Economy. Harvard University Press, 2016. EZRACHI, Ariel; STUCKE, Maurice E. Artificial intelligence & collusion: When computers inhibit competition. U. Ill. L. Rev., p. 1775, 2017.

[13] OXERA. When Algorithms Set Prices: Winners and Losers. Discussion paper. 2017.

[14] WOODCOCK, Ramsi. The bargaining robot. CPI Antitrust Chronicle (May 2017), 2017.

Ohhlhausen (2017)[15]; OECD (2017)[16]; Schwalbe (2018); CMA (2018)[17]; Gal (2018)[18]; Calvano (2019)[19], Assad, Clark, Ershov and Xu (2020)[20], among others. The opinion highlights that there is still little empirical evidence of algorithmic collusion in scenarios in which there is no human action. However, as highlighted by Resende (2021) [21], studies such as that by Assad et al. (2020) [22] provide some evidence that the adoption of pricing algorithms can promote tacit collusion. In light of this challenge, CADE remains vigilant and may update its approach in the future.

2.2. Discussion on Algorithmic Collusion in the DECISION BY THE OFFICE OF THE SUPERINTENDENT-GENERAL

17. In the decision of the case described above, the Office of the Superintendent-General carried out a specific discussion on algorithmic collusion. In this discussion, it acknowledged the increasing competition concerns over the use of algorithms. The ruling deemed the categorization proposed by Ezrachi and Stucke (2016)[23] valuable. The authors identified four possible scenarios in which algorithms could be used for collusion: Messenger, Hub and Spoke, Predictable Agent, and Digital Eye.

18. In the first scenario, known as ***Messenger***, the algorithm functions simply as a tool to carry out a collusive agreement. In this case, the members of an arrangement explicitly decide to act in a coordinated manner and to use the algorithm only to execute their strategy. For the competition authority, there is no dilemma in this situation. It is sufficient to demonstrate that there was an agreement to use the algorithm to coordinate prices or quantities.

[15] Ohhlhausen, Should We Fear The Things That Go Beep In the Night? Some Initial Thoughts on the Intersection of Antitrust Law and Algorithmic Pricing, 2017. https://www.ftc.gov/system/files/documents/public_statements/1220893/ohlhausen_-_concurrences_5-23-17.pdf

[16] OECD. Algorithms and Collusion: Competition Policy in the Digital Age. 2017

[17] Competition and Markets Authority (CMA). Pricing algorithms. Economic working paper on the use of algorithms to facilitate collusion and personalised pricing. 2018.

[18] GAL, Michal, Algorithms as Illegal Agreements (May 2, 2018). Berkeley Technology Law Journal, Forthcoming, Available at SSRN: https://ssrn.com/abstract=3171977

[19] CALVANO, Emilio et al. Artificial intelligence, algorithmic pricing, and collusion. American Economic Review, v. 110, n. 10, p. 3267-97, 2020

[20] ASSAD, S.; CLARK, R.; ERSHOV, D.; XU, L. Algorithmic Pricing and Competition: Empirical Evidence from the German Retail Gasoline Market, CESifo Working Paper, nº 8521. 2020 Schwalbe, Ulrich, Algorithms, Machine Learning, and Collusion (June 1, 2018). Available at SSRN: https://ssrn.com/abstract=3232631 or http://dx.doi.org/10.2139/ssrn.3232631

[21] RESENDE, G. M. Precificação e colusão algorítmica: evidências e

implicações para concorrência. Revista Consultor Jurídico, 2021.

Available in: < https://www.conjur.com.br/2021-mai-28/defesa-concorrencia-precificacao-colusao-algoritmica-evidencias-implicacoes-concorrencia>

[22] ASSAD, S.; CLARK, R.; ERSHOV, D.; XU, L. Algorithmic Pricing and Competition: Empirical Evidence from the German Retail Gasoline Market, CESifo Working Paper, nº 8521. 2020

[23] Ezrachi, A., Stucke, M. (2016) Virtual Competition, Harvard University Press, Harvard, MA

19. The Messenger scenario is similar to previous investigations by CADE in which software or systems were used as a messenger, such as in the ATPCO and Adesbo cases described below. As CADE's Chief Economist[24] explains, "Schwalbe (2018) mentions that cartel members have employed and will always employ the available technology to form cartels - be it telephone, email, computer software, among others. In this case, the technology used is different (i.e., through algorithms), but current Brazilian competition legislation is more than enough to tackle and punish this type of conduct." [25]

2.2.1. ATPCO system as a messenger

20. In August 1999, several newspapers reported that five days after a meeting between the presidents of the four largest airlines in Brazil (Varig, TAM, Transbrasil, and VASP), the ticket prices for the Rio-São Paulo route simultaneously increased by 10%. As a result, Administrative Proceeding No. 08012.000677/1999-70, known as the "ATPCO Case," was initiated on March 28, 2000, to investigate a possible cartel between these airlines.

21. The investigation concluded that the price increase was not merely a case of conscious parallelism. Evidence revealed that the companies had shared tariff data through the ATPCO System, an airline tariff data system ran by the Airline Tariff Publishing Company (ATPCO). In it, an airline could enter a fare change notification that would only be visible to other airlines (not passengers) for an initial period of three days. If the other competitors did not follow suit, the company could withdraw its notification.

22. In September 2004, CADE determined that the four companies had colluded to increase tariffs. Each airline was fined 1% of its revenue earned from the affected route in 1999 and was prohibited from setting fares and publishing fare changes in advance. On March 23, 2005, a Cease and Desist Agreement was signed between CADE and ATPCO. Under the agreement, ATPCO agreed not to use tools that facilitate the rapid exchange of information between competitors.

2.2.2. Criar software as A Messenger: The Adesbo Case

23. In Administrative Proceeding No. 08012.011791/2010-56, CADE found the defendants guilty of a cartel that used software to monitor and control an anticompetitive agreement in the market for driving schools and driver licensing agents in Santa Bárbara D'Oeste, state of São Paulo.

24. The investigations revealed that, between 2002 and 2011, ADESBO (The Association of Driving Schools and Driver License Agents in Santa Bárbara D'Oeste) and the software company Criar were involved in an agreement aimed to divide the market, coordinate prices, constrain new entrants, and exercise coercive power on cartel members.

25. ADESBO hired the software company Criar to develop a system for student enrollment in driving schools and the allocation of medical and psychological tests taken by driving students. This was allegedly done to comply with regulations that required the equitable distribution of medical and psychological exams. However, ADESBO used the system to divide the market, share sensitive information, issue invoices based on agreed prices, establish entry barriers, and regulate the market. The software used tables with prices determined by the cartel members during ADESBO meetings and forwarded them

[24] https://www.competitionpolicyinternational.com/wp-content/uploads/2021/10/LatAm-Column-October-2021-Full.pdf

[25] Schwalbe, U. (2018) Algorithms, machine learning, and collusion. Journal of Competition Law & Economics: 14, Issue 4: 568–607

to Criar. Therefore, the system served as a tool to fix prices and payment conditions. Driving schools and dispatchers used the software to generate payment invoices for their customers whereas ADESBO used it to monitor the cartel. Criar was responsible for updating the system with new pricing tables and ensuring its proper functioning.

26. In 2016, CADE's Tribunal convicted the driving schools, driver license agents, ADESBO, and Criar for anticompetitive conduct and prohibited the software. Among those found guilty, Criar faced the highest fine due to the significant role of their software in coordinating the cartel, as illustrated below by an excerpt of the vote of the rapporteur of this case.

27. "Of the numerous points that violate competition legislation in this section, I highlight a few. The first is Criar's consent to make a system with commercially sensitive data established 'in agreement with the driving schools[1]' and to formalize it as a contract and an information technology system. The second is the use of this system to monitor driving schools in Santa Bárbara D'Oeste, considering that payments could only be made through invoices issued by the system. With this centralization, it was possible to know how many students were enrolled in each driving school through simply dividing the value earned by each driving school by the fixed prices. Thirdly, the system was explicitly managed by Criar by means of a contract executed with ADESBO, which extended to driving schools via an adhesion contract." (Doc. SEI No. 0159349, paragraph 109).

2.2.3. Uber Case

28. In Administrative Proceeding No. 08700.008318/2016-29, CADE investigated Uber's potential anticompetitive practices, such as a hub-and-spoke cartel, influencing the adoption of concerted practices and resale price maintenance.

29. Regarding the hub-and-spoke cartel hypothesis, The investigation focused on an alleged collusion between agents (drivers), with Uber playing the role of a hub. In other words, it analyzed whether Uber's practice of centralizing operational decisions and even setting prices charged by all drivers, leading to parallel conduct, could be considered a hub-and-spoke cartel.

30. First, the Office of the Superintendent-General determined that Uber and its drivers did not operate in the same market and were not direct competitors. As a result, the possibility of a horizontal cartel was dismissed.

31. In terms of the potential hub-and-spoke cartel, the investigation unit observed that the platform did not act to facilitate communication between its drivers. Moreover, the unit found no activities between Uber (as a facilitator of the cartel) and the drivers (as competing players) with the intention of concerted practices. As there was no agreement to fix prices, control supply, divide the market, or fraud public bidding in the terms established by the Brazilian Competition Law, the situation did not meet the fundamental requirement for any kind of cartel.

32. The analysis concluded that the app operated to optimize demand and supply for individual passenger transportation services, without discrimination against other competing ride-hailing companies in the sharing economy market. Therefore, the probe ascertained that, in Uber's business model, there was no exchange of competitively sensitive information, nor any agreement, or collusion between partner drivers due to Uber's actions. Additionally, the market in which Uber operates did not have the structural characteristics for collusion.

33. The other hypotheses of anticompetitive conduct were also dismissed after analyses considering per se rules and the rule of reason. These took into account the efficiencies and

benefits that Uber brought to the market and consumers through its significant restructuring of passenger transportation services in the country.

34. In the ***Hub and Spoke*** scenario described by Ezrachi and Stucke, an agent provides an algorithm (hub) shared by players (spokes) in a given market. The hub collects data from the spokes and determines the optimal price or quantity to maximize group profits. The challenge for authorities is to prove that the agents intended to use the hub's services for collusive purposes. This scenario resembles a discussion that took place at CADE when analyzing the Uber[26] case, in which the authority considered the possibility of a hub-and-spoke cartel that soon after was dismissed.

35. The third scenario described by Ezrachi and Stucke, ***the Predictable Agent***, demands even more of the antitrust authority. In this scenario, economic agents independently adopt algorithms developed to react dynamically to the actions of other competitors. According to the authors, if the other actors also use similar pricing algorithms, the result of this interaction will be anticompetitive. In this case, algorithms can serve to reach an understanding that is not explicitly negotiated but arises with machine learning, which detects and punishes rivals' deviations and creates a classic scenario of tacit collusion.

36. The authors state that the greatest difficulty in these cases is that the anticompetitive results do not require an explicit agreement between the companies: it is enough that they adopt algorithms built to react to other players' actions.

37. In the investigation of the airline companies discussed above, CADE acknowledged that, although only one airline declared to have a team specialized in data analysis, the hypothesis of the use of pricing algorithms based on machine learning was still feasible for the entire market, which compares to the Predictable Agent scenario.

38. Finally, in the classification proposed by Ezrachi and Stucke, the most difficult situation is the ***Digital Eye***, in which companies simply adopt an algorithm and configure it to maximize profits; and the software, by self-learning and trial and error, finds the way to do it. According to the authors, if other players also use similar pricing algorithms, this interaction will lead to anticompetitive outcomes. Hence, the algorithms can serve to achieve an understanding that is not explicitly negotiated but arises from the machine's learning to detect and punish deviations from rivals, creating a classic scenario of tacit collusion.

39. In this case, it is extremely difficult for the antitrust authority to prove the elements of intentionality and coordination between the economic agents since there is no contact between them and the anticompetitive result, if any, is the outcome of computational calculations that can, among other possibilities, choose price parallelism.

40. Finally, the decision also cites the OECD, who recognizes the current challenges algorithms pose for competition authorities:

41. "From an enforcement perspective, one has to distinguish between cases where algorithms are used by competitors as an ancillary tool to a wider collusive arrangement falling within the traditional reach of competition rules on anti-competitive agreements, and cases where algorithms allow firms to align business conduct in what looks very much like conscious parallelism, a conduct with is not illegal under competition rules. While in

[26] See Cordeiro Macedo, Alexandre, O CASO UBER E AS POSSÍVEIS PRATICAS RESTRITIVAS À CONCORRÊNCIA: COLUSÃO OU CONDUTA UNILATERAL? (Uber: Collusion, or Unilateral Conduct?) (December 23, 2018). Available at SSRN: https://ssrn.com/abstract=3305603 or http://dx.doi.org/10.2139/ssrn.3305603

the first case the challenges for agencies are related to detecting possible anti-competitive cases, understanding the technology and collecting evidence to meet the required legal standard, the second scenario raises more difficulties because the current legal standard does not allow intervention with the traditional rules on anti-competitive agreements between competitors."[27]

2.3. Ipiranga's Consultation

42. In 2021, CADE addressed another case involving the use of pricing algorithm. The company Ipiranga consulted the authority (Administrative Proceeding No. 08700.002055/2021-10) regarding its new policy "Baixou, Ganhou", which included the use of a pricing algorithm in the liquid fuel market.

43. In the consultation, Ipiranga explained that it already had a pricing system where it offered a sell-in price for its retailers, who were free to choose their sell-out price for the end consumer. Ipiranga's sell-in price was defined based on market research and analysis of internal resources from the company.

44. If a retailer were to contact Ipiranga to negotiate a discount on the sell-in price, they would inform the intended sell-out price and inquire about the sell-in price Ipiranga could offer. Ipiranga clarified it did not give discounts to retailers who planned to raise their sell-out prices. Instead, the company would give discounts only to those aiming to be more competitive and willing to offer a lower sell-out price to consumers, with the expectation of increased sales volume.

45. Ipiranga also explained that these negotiations were usually conducted by sales consultants, who usually received requests for lower prices from retailers (despite having limited decision-making power) and faced a high degree of exposure to both themselves and Ipiranga.

46. Ipiranga alleged that, under the new policy, it would suggest a maximum sell-out price for each retailer, calculated automatically by algorithms. The platform would provide an individualized maximum sell-out price suggestion for each retailer based on their unique characteristics, using a common methodology. Thus, it would offer the same sell-in price for each sell-out price within the respective micro market, considering the specificities of each reseller.

47. Ipiranga stated that the goal of the policy was to reduce both wholesale and retail prices by offering discounts or simultaneous price reductions. By suggesting maximum prices to retailers, Ipiranga aimed to help them identify the most competitive sell-out price in their micro markets more rapidly. Ipiranga claimed this was particularly important due to the limited rationality of resellers in setting prices, influenced by their incomplete information, especially regarding market context and unpredictable changes in input prices in the international market with repercussions in Brazil.

48. The Tribunal of CADE unanimously determined the new price negotiation policy to be legal. Moreover, the case did not raise competition concerns regarding the suggestion of a maximum price because:

- Resale prices would be a suggestion, not an imposition;
- Suggestions would regard the maximum (rather than minimum) price;
- Ipiranga would unilaterally promote and develop the policy;

[27] OCDE. Algorithms and collusion: competition policy in the digital age. 2017. P 51

- Non-adoption of suggestions would not result in retaliation;
- The price suggestion would consider the specificities of each reseller.

49. The Rapporteur Commissioner of the case recognized that algorithms could assist consumers in making decisions by comparing prices and quality, predicting market trends, and speeding up the decision-making process. This could lower transaction costs, reduce biases, rationalize choices, and increase the buyer's power.

50. However, there were risks associated with using the automated system, including the possibility of increased coordination and tacit collusion between players. Algorithms could lead to price parallelism among Ipiranga's brand gas stations and other gas stations. The Rapporteur Commissioner considered that, as the system provided personalized pricing for each gas station, it mitigated the risks of price coordination. In addition, the Rapporteur found that competition risks derived from the use of the automated pricing system were low in the specific case and the following safeguards determined by CADE could mitigate them:

- The price suggestion must always be lower than the resale price being charged;
- The price suggestion must be individualized based on the specificities of resellers and their location;
- The algorithmic system and the database used to feed it must remain unique and exclusive to Ipiranga.

51. Finally, considering the innovative nature of using algorithms to suggest maximum prices for retailers individually and the potential for unpredictable adverse effects resulting from the use of this new technology, the authority modified the binding period of this Consultation's response to two years–which ends in June 2023.

52. The Rapporteur Commissioner acknowledged that there are several companies in Brazil, including Aprix, that offered similar services; and expressed greater concern about the consolidation of price and decision-making data by retailers of different brands (i.e. inter-brand competition data) rather than about distributors having data on price and decision-making of their exclusive retailers[28].

3. Cases involving Search and Ranking Algorithms

53. The second group of cases involves search and ranking algorithms.

3.1. Microsoft – Yahoo

54. The first case[29] dates to 2009. The transaction consisted of a cooperation agreement between Microsoft and Yahoo. On one hand, Microsoft would exclusively provide technology for Yahoo's algorithmic (organic) and paid search services, and non-exclusively provide contextual advertising services. On the other hand, Yahoo would become the exclusive global manager of relationships and sales for the premium search advertisers of both companies. The agreement was expected to last for 10 years.

55. The Tribunal of CADE unanimously approved the transaction without conditions. The Rapporteur Commissioner highlighted the importance of economies of scale for the

[28] SEI 0929300, par. 134

[29] Administrative Proceeding no. 08012.006419/2009-94

search engine market, where successful search engines attract more customers, allowing the algorithm to improve and provide even better results. As such, the merger between Microsoft and Yahoo was considered an effective way to achieve the necessary scale to challenge Google's dominant position in the market, rather than limiting innovation and growth by each companies' autonomous behavior.

56. The Rapporteur also pointed out that before the deal, Microsoft used Yahoo's search platform and that after the transaction, Yahoo would use Microsoft's search platform. That is, both before and after the merger, there was a single mechanism effectively being used for the searches made via the platforms of both applicants, in a way that the proposed deal would simply replace the player that received and processed such searches.

57. This case is worth mentioning because it provides insight into the evolution of the search engine industry, which is also undergoing significant changes with the advancement of artificial intelligence like ChatGPT. It also portrays the ongoing in-depth discussions about algorithms taking place within CADE's case law.

3.2. Google Shopping

58. The Google Shopping case[30] was a landmark in CADE's case law. In 2011, the price comparison websites Buscapé and Bondfaro filed a complaint against Google for anticompetitive behavior related to organic search and access to Product Listing Ads (PLA). The organic search algorithm ranks website pages based on different criteria and users' query, resulting in a combination of paid and organic search results. PLAs are ads that display an image of a specific product along with its price and the name of the store selling it.

59. The theory of harm consisted in Google leveraging its market power in the general search engine market to the adjacent market of comparison shopping services. This could lead to the exclusion of competitors in the comparison shopping services market, reducing competitive pressure and increasing Google's dominance.

60. Thus, the complaint focused on two main aspects. The first concerned the possibility of Google's algorithm being biased, favoring Google Shopping in its main general search page and demoting competitors from prominent positions in organic search results. The second concerned the alleged refusal of Google to sell photo ad space (PLAs) to competitors or its sale under abusive conditions, in which Google required rivals to provide sensitive data. The claim was that Google could use the sensitive data to gain a competitive advantage for its Google Shopping products, thereby increasing its dominance over rivals in the price comparison market.

61. Upon request of the Office of the Superintendent General, the Department of Economic Studies (DEE) conducted an analysis on the effects of the practice at issue. It considered that said conduct would result in less visibility for price comparison websites, reducing their traffic. However, upon conclusion of the analysis, the DEE determined that traffic decrease derived from changes in consumer behavior, particularly with the emergence of marketplaces such as Amazon, rather than to anticompetitive alterations to Google's algorithm. Furthermore, another price comparison site, Zoom, had an increase in traffic since 2011. Consequently, the data required by Google for advertising in Product Listing Ads (PLAs) was deemed reasonable in ensuring consumer reliability in PLA services and no evidence was found suggesting that the conduct had any effect on the costs

[30] Administrative Proceeding no. 08012.010483/2011-94

and prices of rivals. Against this backdrop, the Office of the Superintendent General recommended the case dismissal and that Google start accepting price comparison services in PLAs.

62. At the trial session, two Commissioners of the Tribunal voted for the case dismissal, citing a lack of anticompetitive effects. However, other two Commissioners voted for finding the company guilty based on the potential anticompetitive effect of the conduct, which could increase Google's dominance and result in higher prices for end consumers. The President of CADE casted the final vote to dismiss the case, arguing that a conviction based on potential effects in a case involving market developments (such as the entry of marketplaces) would effectively remove any limitations on the authority's actions. This would make it more difficult for companies to assess their compliance with competition law when considering actions that might affect rivals. As a result, CADE dismissed the case in 2019.

63. This case is noteworthy due to the thorough investigation that was conducted into the history of changes to Google's algorithms. The company was asked to provide descriptions of its various algorithms, including the diversity algorithm (which was allegedly designed to promote diversity in Google's search results but was not implemented in Brazil), the Panda algorithm (which focused on demoting sites with little original content or content from third parties), and their implementation history. Even though CADE did not audit the algorithms per se, the review carried out aided the authority in assessing the effects of the conduct and associating these effects with the introduction of new algorithms or changes in existing ones.

3.3. iFood

64. The third case[31] example focuses on exclusivity agreements but indirectly involves algorithms. In 2020, the digital platform Rappi alleged that iFood was abusing its dominant position in the online food ordering market by imposing exclusivity obligations to a significant number of prominent restaurants associated with high-value brands and considered essential in the respective market. The exclusive contracts offered advantages and discounts to restaurants, had extensive deadlines, and exiting and violation penalties.

65. After the investigation launching, the Brazilian association for bars and restaurants (Abrasel) also claimed that iFood was using its dominant position to adopt practices that harmed bars and restaurants. Given the relevance of iFood's user base, restaurants were compelled to sign exclusivity agreements with the platform. Allegedly, the practice resulted in barriers to entry to competing platforms and iFood leveraging its dominant position to adjacent markets.

66. Although the exclusivity contracts could be beneficial to some restaurants by creating a competitive advantage for them, the Office of the Superintendent General also observed that exclusivity could imply iFood captured restaurants considered strategic to any food service platform. In this case, exclusivity clauses would increase the switching costs of a restaurant that eventually intended to stop its exclusive partnership with iFood (switching costs). This would increase rivals' costs and make their portfolio of bars and restaurants less attractive to consumers.

67. As a result, the authority imposed an interim measure prohibiting iFood from entering new contracts with exclusivity clauses or renewing existing contracts with exclusivity clauses for more than one year. In 2023, the company signed a cease and desist

[31] Administrative Investigation no. 08700.004588/2020-47.

agreement with the Tribunal of CADE. The agreement restricted the use of exclusivity clauses. In sum, iFood could not sign or renew contracts with restaurant chains of over 30 units, and the exclusivity period was limited to two years for chains with less than 30 restaurants.

68. The case relevance regards how ranking algorithms can raise anticompetitive concerns in industries beyond traditional search engines, even when the algorithms themselves are not the primary focus of the investigation. In the market test CADE carried out, respondents reported that ranking algorithms could be used to penalize restaurants that did not enter into exclusivity agreements or to favor those that did. The following transcribed responses illustrate this.

69. "The downside [of integrating other marketplaces] is reflected in the low priority and exposure that a marketplace may give to restaurant chains that do not operate under exclusivity. For example, a platform's algorithm may present a non-exclusive restaurant option lower down on the list presented to customers, which tends to reduce the sales of that restaurant. Also, the non-exclusive restaurant may appear as "closed" on the platform, even though it continues to operate, simply because it may be more advantageous for the marketplace to operate with exclusive stores, (…). When the restaurant operates under exclusivity agreements, the platform tends to increase its exposure and give it operational priorities, for example on rainy days, which usually increases the revenue from delivery sales of that restaurant unit or chain." (Pizza Hut, Document SEI No. 1127007, par. 10 and 11)

70. "There is no transparency in the rules for ranking restaurants. The algorithms used on the platform are obscure even for iFood's consulting team. We have noticed online closure of non-exclusive establishments by iFood quite often, especially when there is a shortage of delivery personnel in the stores' region. Restaurants that hold exclusivity agreements do not face this problem." (Document SEI No. 1123660, par. 21)

4. Final Remarks

71. The case examples illustrate that discussions about algorithms have increased considerably at CADE. Similarly, there has been a growing number of cases involving digital platforms. Even when there is no explicit mention to algorithms, cases involving digital platforms may require careful consideration regarding the potential risks associated with algorithmic competition. This is because digital platforms often employ algorithms to enhance their functionality. The application of algorithms varies among different digital platforms, but common uses include matching users (such as in ride-sharing or dating apps), recommending content (on social media or streaming services, for instance), personalizing user experiences (such as in ad targeting), and optimizing operations (such as pricing).

72. Key concerns include algorithmic collusion, the sharing of sensitive information, anticompetitive self-preferencing, and gathering of large amounts of data through M&A transactions. Framing these issues within traditional theories of harm seems less of a challenge than finding evidence of algorithmic antitrust violations or finding strategies to prevent them. The sharing of sensitive information has been a recurring issue in many M&A deals involving platforms[32] and companies usually implement measures such as

[32] For example, Administrative Proceeding No. 08700.003130/2021-51 regarding an investment agreement. The involved companies were LDC, Amaggi, Cargill, Sartco, Dalablog, Carguero and Green Net. LDC, Amaggi, Cargill, Sartco, and Dalablog operated in the same or complementary

compliance programs, *firewalls* and digital Chinese Walls[333435] to mitigate anticompetitive concerns.

73. However, given the rapid pace of technological development, identifying the most effective tools for this purpose can be challenging. Sharing information on measures adopted by other jurisdictions and evaluating their effectiveness can be relevant to preventing competition harm while avoiding unnecessary burdens on firms and their transactions. This approach can help competition authorities keep up with the evolution of algorithms to promote a healthy business environment for both firms and consumers.

activities related to the grain market. Their activities include producing, storing, processing, transporting, and commercializing different grains. Carguero is a joint venture founded by LDC and Amaggi that provide integrated road freight intermediation services for shippers and carriers through a digital platform (available via website or app. Green Net is a company owned by Dalablog that provides electronic payment services related to road freight and tolls. The transaction raised concerns related to the sharing of sensitive information, which was mitigated upon the case review.

[33] See for example Administrative Proceeding No. 08700.001901/2021-76, which consisted of a joint venture between BASF, Monsanto do Brasil, Du Pont do Brasil, Dow and Syngenta Seeds. The joint undertaking aimed at developing an intellectual property recognition system for monitoring and retaining unpaid royalties on soybeans, delivered and traded by farmers at delivery points, containing transgenic events ('traits') protected by intellectual property rights (SEI 0919115, par. 12)

[34] Another example is Administrative Proceeding No. 08700.002327/2018-78, which involved a joint venture between Votorantim, Tigre, and Gerdau to develop a digital platform for operating a customer loyalty program in the civil construction materials sector called 'Juntos Somos Mais'. One primary competitive concern was the potential use of the platform to share information that could facilitate coordinated action by companies operating in different markets but serving the same clients (resellers of construction materials). However, it was determined that the companies' rivals also had similar programs (individually), and a Chinese wall was already included in the NewCo creation contract. As a result, CADE approved the deal without restrictions.

[35] In addition, Administrative Proceeding No. 08700.004426/2020-17, which consisted of the acquisition of J3 Operadora Logística by Bus Serviços de Agendamentos ("ClickBus" platform). The case involved online travel agencies' platforms. The Parties signed a merger control agreement with CADE that included measures to prevent the sharing of sensitive information.