

**DIRECTORATE FOR FINANCIAL AND ENTERPRISE AFFAIRS  
COMPETITION COMMITTEE**

**Methodologies to Measure Market Competition – Note by Brazil**

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<https://www.oecd.org/daf/competition/methodologies-to-measure-market-competition.htm>

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## *Brazil*<sup>1</sup>

### 1. Market competition in merger control in Brazil and the role of CADE's Department of Economic Studies

1. The Administrative Council for Economic Defense (CADE), as set forth in the Law 12529/2011 which structures the Brazilian Competition Defense System (SBDC), has three main roles: preventive, punitive and educational. Regarding the preventive role, CADE examines and assesses mergers and acquisitions (M&As) – together with other transactions which involve large businesses – which may be cleared unconditionally, cleared subject to remedies, or blocked by CADE. In order to assess the transactions, the antitrust authority must have the means to examine the competition level amongst the market players.

2. Within this context, the Department of Economic Studies (DEE/CADE) is responsible for ensuring rigor and the technical and scientific update of CADE's decisions. It provides support to the General Superintendence and the Administrative Tribunal on the review of mergers and anticompetitive conducts, and carries out competition advocacy activities.

3. The standard analytical tool used by CADE to assess M&A is the definition of the relevant market, encompassing estimations of the market shares of firms and, consequently, the level of market concentration. However, the same tool encloses one of the challenges involved in the enforcement of antitrust policies: a precise definition of relevant markets that determines which competing businesses and regions are relevant for the business under analysis<sup>2</sup>.

4. Furthermore, concentration ratios present other limitations as they do not indicate possible harms related to coordinated effects, portfolio power, acquisition of maverick firms, amongst others. Nonetheless, the regular review process should not be disregarded – as there seems to be a trend towards flexibility – nor should the complementarity provided by other techniques and evidence (see FARRELL and SHAPIRO, 2020).

5. CADE has been using other tools to review mergers and acquisitions with potential competition risks that are not assessed by market concentration indicators, for instance, pricing pressure indicators and mergers simulation (e.g. the upward pricing pressure – UPP; the gross upward pricing pressure – GUPPI; and the Proportionally Calibrated Almost Ideal Demand System – PCAIDS) that can identify the risks of price rises associated to a transaction. Additionally, CADE has been assessing possible coordinated effects, i.e. incentives to the conduct of tacit collusion in the reviewed markets, by using coordinated price pressure index (CPPI) tests.

6. In addition to quantitative methods, the antitrust authority has been using qualitative information in its assessments through market tests. Information regarding, for instance, which competitors are the most relevant and which are their characteristics (rivalry analysis), the structure of costs and profitability, the role of imports, barriers to

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<sup>2</sup> It is noteworthy that the definition of a relevant market is one of the possible analytical tools, which means CADE's decision is not bound to this tool in particular.

entry, diversion ratios, brand relevance and customer perception of the market enrich the analysis of the market power exercised by the applicants of an M&A.

7. Qualitative analyses usually take into account statistical data, which allows for different methodologies to complement each other<sup>3</sup>. Thus, quantitative and qualitative information is being used to assess possible harm to competition derived by mergers and acquisitions, according to the guidelines provided in CADE's Guide for Horizontal Merger Review, as it will be presented below.

## 2. An overview of methodologies to measure market competition

8. As mentioned, the analysis held by the Department of Economic Studies to measure the level of market competition comprise both quantitative and qualitative methods. As to quantitative methods, the Herfindahl-Hirschman Index (HHI)<sup>4</sup> is one of the most used indexes for summary cases by CADE. According to the CADE's Guide for Horizontal Merger Review, the HHI aims to measure the market power in specific transactions and markets. The HHI variation (or delta HHI) may show the causal link between the M&A and competition issues through the market share growth resulting from the M&A.

9. Besides the HHI, there are other variables, indexes and methods to measure the level of market competition. For instance, the CADE's Guide for Horizontal Merger Review summarizes some variables to be considered in rivalry analysis (see Table 1).

**Table 1. Rivalry Analysis**

ANALYSED VARIABLE	IN MARKETS WITH INTENSE RIVALRY
<i>Market concentration</i>	There is low market concentration
<i>Price variety</i>	Some players have similar prices for their products, and no agent has more pricing power than the rest. If a player prices differently, it usually indicates a higher pricing power than the market average (not disputed through rivalry) or that the player is part of a different niche markets.
<i>Profit margins</i>	The profit margin is low, as the price is almost the same as the marginal cost.
<i>Market share variance</i>	High market share variance, due to all players being involved in market contestability.
<i>Price elasticity of demand</i>	The price elasticity of demand is high.
<i>Cross elasticity of demand</i>	The applicants have many similar competitors or close substitutes (i.e. with high cross elasticity of demand).
<i>Price elasticity of supply</i>	The price elasticity of supply is high as, on the one hand, consumers are very responsive to price variation and, on the other, competitors will respond to any small price rise releasing a great number of goods in the market.
<i>Increase in demand</i>	Market growth is intense and prevents the stability of players' market shares.

<sup>3</sup> A case example is the Technical Opinion 29/2017 (SEI 0379075) regarding the Merger no. 08700.002155/2017-51 (Applicants: Companhia Ultraz S/A and Liquigás Distribuidora S/A) that, considering qualitative information obtained by investigations, reviewed, amongst other aspects, the quantitative level of market competition through calculations of dynamic market shares, costs, profit margins of the market, and individual profit of players.

<sup>4</sup> The explanation for the calculation of the HHI is mentioned in our Guide for Horizontal Merger Review, section 2.4.2, which is available in both English and Portuguese at <<https://cdn.cade.gov.br/Portal/centrais-de-conteudo/publicacoes/guias-do-cade/Guide-for-Horizontal-Merger-Review.pdf>> and <<https://cdn.cade.gov.br/Portal/centrais-de-conteudo/publicacoes/guias-do-cade/guia-para-analise-de-atos-de-concentracao-horizontal.pdf>> respectively.

<i>Productive assets</i>	There is no need for specific assets or assets that are exclusive to a few market players (or to the applicants).
<i>Conduct oversight</i>	It is not possible for competitors to monitor each other's conduct, both in terms of sales volume and pricing.
<i>Vertical integration and portfolio</i>	Competitors have the same degree of vertical integration, with similar portfolios.
<i>Presale and post-sale services</i>	Should it be relevant, competitors have similar presale and post-sale services.
<i>Access to efficient distribution and logistics services</i>	Competitors have, in general, the same access to efficient distribution and logistics services.
<i>Credit access</i>	Competitors have the same sort of credit access.
<i>Dedicated costumers and points of sale</i>	There are only a few already dedicated sales and a few exclusivity and loyalty contracts between clients and suppliers, or between points of sale and suppliers.
<i>Economies of scale and scope</i>	Every market player has the same economies of scope and scale and, thus, incur in the same production costs (they may even be more efficient than the applicants).
<i>Use of idle capacity</i>	Competitors have a way to increase their production in the short term to accommodate a possible diversion of demand, without incurring major costs.

Source: CADE's Guide for Horizontal Merger Review (2016).

10. In addition, some tests are related to the possibility of post-merger price rises, such as GUPPI (gross upward pricing pressure)<sup>5</sup> and the UPP (upward pricing pressure)<sup>6</sup>, which analyse the effects of an M&A. The latter, in contrast to the former, takes into consideration whether the efficiencies of the transaction offset the incentive to increase prices post-merger, derived from the diversion of customers from one merged firm to another, in terms of profit margins (WERDEN, 1996; O'BRIEN and SALOP, 2000). The interpretation of the test concerns whether the UPP value is positive or negative. If the test is positive, there is pressure for price rise; if it is negative, the opposite. Besides, it is worth mentioning that the UPP test is related to the incentive to post-merger price rise. Both GUPPI and UPP can be used more robustly or simply as a screening method. The market shares of the firms involved in the transaction can be considered as a proxy for the diversion ratio, which depends directly on the definition of the relevant market. However, a more robust analysis with an econometric estimation of a firm's own and cross-price elasticity dismisses the need for a pre-defined relevant market.

11. Another possible method is merger simulations, as the PCAIDS (Proportionally Calibrated Almost Ideal Demand System)<sup>7</sup>, which regards the simulation of the effect of the transaction on the price for customers (EPSTEIN and RUBINFELD, 2001). The most significant hypothesis of this model, innovating to the original AIDS created by Deaton

<sup>5</sup> Example of mergers using the GUPPI model: Merger 08700.002155/2017-51 (Applicants: Companhia Ultragaz S/A and Liquigás Distribuidora S/A), Merger 08700.006444/2016-49 (Applicants: Ipiranga Produtos de Petróleo S/A and Alesat Combustíveis S/A), Merger 08700.002165/2017-97 (Applicants: Votorantim S/A and Arcelormittal Brasil S/A).

<sup>6</sup> Example of mergers using the UPP model: Merger 08700.002155/2017-51 (Applicants: Companhia Ultragaz S/A and Liquigás Distribuidora S/A), Merger 08700.001846/2020-33 (Applicants: Hapvida Assistência Médica Ltda. and Plamed Plano de Assistência Médica Ltda).

<sup>7</sup> Example of mergers using the PCAIDS model: Merger 08700.002165/2017-97 (Applicants: Votorantim S/A and Arcelormittal Brasil S/A), Merger 08700.002155/2017-51 (Applicants: Companhia Ultragaz S/A and Liquigás Distribuidora S/A), Merger 08700.001846/2020-33 (Applicants: Hapvida Assistência Médica Ltda. and Plamed Plano de Assistência Médica Ltda), and Merger 08700.002346/2019-85 (Applicants: Athena Saúde Espírito Santo Holding S/A, Casa de Saúde São Bernardo S/A and São Bernardo Apart Hospital).

and Muellbauer (1980), is the proportionality of the price rise to the market share of the firm in the market under analysis. The PCAIDS simulation takes into consideration the rivals' response, assuming that they will maximize their post-merger profits, and controls the change in post-merger elasticity levels, which may even consider efficiencies.

12. A complementary competition analysis can be based on possible coordinated effects, such as the Coordinated Price Pressure Index (CPPI)<sup>8</sup>. In sum, the greater the delta CPPI (i.e., the difference between post-merger and pre-merger CPPI), the greater the potential for coordination (MORESI et al., 2011).

13. Moreover, in many cases, relevant qualitative data can be obtained about competition, market entry and portfolio power, including during market test. In some cases, when the definition of the relevant market is not well defined, different scenarios can be considered and analysed, as illustrated in the next section.

14. Similarly to other authorities, CADE has faced challenges with competition enforcement, given the complexity of certain business models, such as platforms, multi-sided markets, network effects, and economies of scale and economies of scope. Thus, the enforcement of antitrust policies in these highly dynamic markets is more difficult, particularly regarding the assessment of market power. Given the challenges, CADE has been concerned with keeping its team technically and scientifically up-to-date, carrying out specific studies (by engaging consultancies<sup>9</sup>) that address issues related to digital markets, data protection, the performance of multilateral organisations, amongst others.

### 3. Measuring market competition: case examples

15. In this section, we present four case examples that evidence how CADE carries out its market competition analysis according to the particularities of the transaction or market at issue. Amongst the examples, there are cases in which the quantitative information enables the appliance of economic models and indicators to measure competition level; and cases that require the design of different scenarios for the analysis, including information from qualitative analyses.

#### 3.1. Ipiranga and Alesat<sup>10</sup>

16. The CADE's Department of Economic Studies (DEE), in the Technical Opinion 5/2017, analysed potential competition effects resulting from the acquisition of Alesat by Ipiranga in the markets of distribution and resale of fuel. As to distribution, the markets for grade C gasoline, diesel fuel and hydrous ethanol were defined in the state geographic dimension. In the product dimension, products were considered for analysis as a "set of fuels". Regarding resale, the DEE analysed the market structure considering the number of service stations. The geographic dimension was settled as municipal or neighborhood level depending on the number of inhabitants at the municipal level. Descriptive analyses of the

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<sup>8</sup> Merger no. 08700.006444/2016-49 (Applicants: Ipiranga Produtos de Petróleo S/A and Alesat Combustíveis S/A) is an example of M&A in which the CPPI method was used.

<sup>9</sup> There are several technical cooperation projects with PRODOC/UNDP, whose products are related to Competition in the Digital Economy.

<sup>10</sup> Merger 08700.006444/2016-49 (Applicants: Ipiranga Produtos de Petróleo S/A and Alesat Combustíveis S/A), blocked on 8 August 2017.

markets involved in the transaction were carried out, as well as simulations of unilateral and coordinated effects for resale and distribution.

17. As to the quantitative methods of assessment applied in this technical opinion, the Coordinated Price Pressure Index (CPPI) of MORESI et al. (2011) have been adopted for the test of coordinated effects. The CPPI test takes into account the extent to which firms are willing to engage in a Parallel Accommodating Conduct (PAC). It regards an example of coordination in which a firm increases prices expecting others to do the same.

18. Regarding the analysis of unilateral effects, the model adopted was the GUPPI, proposed by SALOP and MORESI (2009). The test presumes competition in prices and differentiated products, but it does not presume efficiencies in the calculation, such as in the mathematical formula of the UPP proposed by Farrel and Shapiro (2010). Broadly, the purpose is to ascertain the possibility of post-merger price rises. In this calculation, values above 5% already raise competition concerns.

19. Carrying out the simulations, a total amount of 468 markets at resale have been analysed, to which the majority did not present considerable unilateral effect issues (GUPPI). However, applying the test of coordinated effects (CPPI), the majority of the markets present increased incentive for post-merger parallel accommodating conduct (PAC) collusion. Thus, results showed evidence of a potential increase in collusion due to the transaction. The General Superintendence suggested challenging the case to the Tribunal, which unanimously decided for blocking the transaction on 8 August 2017.

### 3.2. Naspers Ventures B. V., Rocket Internet SE and Delivery Hero AG<sup>11</sup>

20. The transaction regarded the acquisition, by Naspers, of a shareholding corresponding to 13% of the shares of Delivery Hero, which was previously held by the Rocket Group. The review of the transaction indicated the existence of a market that had already been previously dominated by iFood (held by Naspers), which was the first mover in Brazil. However, regarding the reviewed transaction, in particular, it was observed that PedidosJá (held by Delivery Hero) is a company with a small market share in the Brazilian market, which does not present the ability to keep up with the strong growth of the online food ordering segment.

21. Economic opinions submitted by the Applicants and supported by the Department of Economic Studies suggest that PedidosJá is not a significant rival for iFood, whereas UberEats, operating with food delivery, is a potential rival. The analyses were divided into four topics: financial information, as well as acquisition and retention of new customers; marketing expenses for attracting new customers; the impact of iFood's website overloads on the amount sold by PedidosJá; and, the impact of UberEats entering the market.

22. The Department of Economic Studies presented some considerations on the geographic segmentation of the data and selection of some control variables. As the Applicants promptly provided the estimation routines and the database, the DEE was able to carry out other restricted-access alternative estimations. The results showed valid evidence indicating that PedidosJá is not an actual rival and UberEats is a potential relevant rival for iFood.

23. Thus, on 8 March 2018, the General Superintendence suggested the unconditional clearance of the transaction, considering that the acquisition of PedidosJá would not

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<sup>11</sup> Merger 08700.007262/2017-76 (Applicants: Naspers Ventures B. V., Rocket Internet SE and Delivery Hero AG), unconditionally cleared on 9 March 2018.

substantially change the market power of iFood. Any market power of iFood would predate the transaction. Therefore, the transaction would not harm the competitive environment.

### 3.3. Nike and Centauro<sup>12</sup>

24. This transaction regarded the acquisition by SBF (Centauro) of the total shares of Nike do Brasil, which is currently held by Nike Galaxy Holding B.V and Nike Group Holding B.V. The transaction comprised the acquisition of all contracts and assets of Nike Brasil, allowing SBF to operate not only as a distributor of Nike do Brasil but also as a controller for the operation of its online and physical store.

25. The transaction involved horizontal overlap on the retail of sporting goods and vertical integration amongst the downstream activities of Centauro on the retail of sporting goods and the upstream activities of Nike in the market of sporting goods distribution.

26. As mentioned before, the DEE can be formally requested during merger reviews by both the General Superintendence and the Tribunal of CADE to issue technical opinions with economic statements to substantiate their decision-makings, as observed in the previous examples. Moreover, the DEE, as an advisory body, can assist in the analysis of economic aspects, even when a technical opinion is not issued within the formal process.

27. In the present example, the DEE did not issue a technical opinion on the case file. However, it made contributions to develop scenarios related to the market of premium sports shoes, defining this segmentation based on the data regarding the sales of sports shoes by SBF in the last five years, according to the economic opinion submitted by the applicants.

28. The DEE included in the analysis the outliers that have been suppressed in the analysis submitted by the Applicants, as it considered relevant to observe the behaviour of prices outliers, which could suggest more expensive products and, thus, a possible premium line of sports shoes. Consequently, the DEE presented the percentage of the brands' share on the value traded of Centauro's sports shoes, considering possible scenarios for both premium and non-premium lines. For all cases, the market of sports shoes comprised both online and physical stores.

29. Therefore, the development of different scenarios for the market of premium sports shoes, by making combinations of both prices and average profit margins, was significant to determine which brands were actual effective rivals for Nike. The DEE also made some considerations relating average prices and average margins with the amount sold for each quartile considered, confirming the scenario adopted by the General Superintendence as the most restricted possible, which comprised only the following eight brands: Adidas, Asics, Mizuno, NB, Nike, Puma, Reebok and Under Armour (therefore, excluding the brands Diadora, Fila and Olympikus from the previous scenario).

30. Furthermore, it has been observed that Nike could reach a share greater than 30% in the retail market of premium sports shoes, even in a more restricted scenario, comprising only Nike and its seven main rivals, which required a more detailed analysis on vertical integration by the General Superintendence. The transaction was unconditionally cleared by the General Superintendence and later reviewed by the Tribunal of CADE after an appeal from an interested third party. On 10 November 2020, the Tribunal of CADE unanimously cleared the transaction subject to behavioural remedies.

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<sup>12</sup> Merger 08700.000627/2020-37 (Applicants: Grupo SBF S/A and NIKE do Brasil Comércio e Participações Ltda), cleared subject to remedies on 11 November 2020.

### 3.4. Ultragas and Liquigás<sup>13</sup>

31. Merger case 08700.002190/2017-71 reviewed the transaction involving Companhia Ultragas S.A. (Ultragas) and Liquigás Distribuidora S.A. (Liquigás), both distributor companies of Liquefied Petroleum Gas (LPG). During the review of competition effects of the merger, the DEE issued 3 technical opinions, namely: Technical Opinion 29/2017, Technical Opinion 1/2018, and Technical Opinion 15/2018. The first technical Opinion was issued at the request of the General Superintendence and, along with the other two notes presented at the Tribunal, reviewed the remedies proposed by the companies involved in the transaction.<sup>14</sup>

32. In this case, the first technical opinion was requested by the General Superintendence to contribute to the assessment of the transaction and its anticompetitive effects. The DEE analyzed the definition of relevant market by the transaction, the market competition level, the unilateral and coordinated effects resulting from the merger, and possible efficiencies deriving from the transaction consummation.

33. Thus, in the Technical Opinion 29/2017, the DEE held a qualitative analysis to assess the competition level, the efficiencies deriving from the merger, and the incentives increase for coordination in the markets of LPG distribution.

34. In this technical opinion, it was calculated the Compensating Marginal Cost Reduction (CMCR), as developed by FROEB and WERDEN (1998), and the marginal cost reduction of merging firms to compensate for the price rise effect. Furthermore, in this note, the UPP was estimated based on two models: FARREL and SHAPIRO (2010) and SCHMALENSEE (2009). The main difference between the two models calculating the UPP is due to FARREL and SHAPIRO (2010) consider the marginal cost change would occur only in one of the merging firms, whereas SCHMALENSEE (2009) considers the change would occur in both firms. The GUPPI calculation presented by SALOP and MORESI (2009) was another method to measure the unilateral price rise pressure.

35. In preparing Technical Opinion 29/2017, the DEE made use of other two models for merger simulation, which were the previously mentioned PCAIDS (EPSTEIN; RUBINFELD, 2001) and the Generalized Pricing Pressure (GePP) suggested by JAFFE and WEYL (2013). The GePP is an alternative option to the traditional UPP.

36. Upon completion of all calculations and analyses, the DEE concluded that the unilateral and coordinated effects deriving from the merger would result in competition concerns. Thus, the General Superintendence decided to direct the case to the Tribunal of CADE, with a suggestion that the transaction should be blocked.

37. During the transaction review by the Tribunal, aiming at mitigating competition concerns derived from the transaction, the petitioners submitted a remedy proposal that was reviewed by the DEE. At first, the DEE held a qualitative analysis, considering the description of the remedy proposed by the petitioners and the market shares of the firms participating in the market. Furthermore, Technical Opinion 1/2018 performed CMCR, UPP and PCAIDS calculations considering different scenarios; in each scenario, the assets would be divested to different players. At last, the DEE concluded that the divestiture

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<sup>13</sup> Merger 08700.002155/2017-51 (Applicants: Companhia Ultragas S.A. and Liquigás Distribuidora S.A.), blocked on 6 March 2018.

<sup>14</sup> The other two technical opinions (Technical Opinion 42/2017 and Technical Opinion 13/2018) were issued in response to petitions lodged by the petitioners.

proposed by the merging firms would not be satisfactory to mitigate the competition concerns deriving from the merger.

38. The Technical Opinion 15/2018 reviewed a second remedy proposal submitted by the merging firms. In this note, the DEE calculated the UPP based on the models of FARREL and SHAPIRO (2010) and SCHMALENSEE (2009) and calculated the CMCR. The results showed again that the proposed remedy was not satisfactory to mitigate the competition concerns. Lastly, the Tribunal decided by the majority of votes for blocking the transaction.

#### 4. Final considerations

39. This document was aimed at offering an overview of the methods used by CADE and, more specifically, by the Department of Economic Studies to assess the level of competition in highly concentrated markets.

40. Market concentration indicators, obtained from the definition of relevant markets, are important analysis tools and are still the most adopted. However, when it comes to indicating market power, they have certain limitations. Thus, CADE uses additional tools to review transactions that threaten competition in ways these indicators cannot detect. CADE mostly uses economic tools to identify the risk of price rises brought about by a transaction or the risk of potential coordinated effects (e.g. incentives to collusion in the markets). Some examples of economic tools used include the Upward Pricing Pressure (UPP); the Gross Upward Pricing Pressure Index (GUPPI); the Proportionally Calibrated Almost Ideal Demand System (PCAIDS) to mergers simulation; and the Coordinated Price Pressure Index (CPPI). The CADE's Department of Economic Studies has been trying to deepen its analyses by applying methodologies to look into these effects, especially by examining different scenarios and efficiencies.

41. Another important aspect that should be mentioned is the importance of having access to complementary qualitative and quantitative information, as it has been described in CADE's Guide for Horizontal Merger Review. This approach allows the DEE to be more accurate when defining relevant markets, detecting barriers to entry, understanding brand relevance, diversion ratios, etc. As a consequence of this, the Brazilian competition authority seems to have made progress in its merger review procedures, addressing different factors by using complementary methods to measure market competition.

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