Innovation Concerns in Horizontal Mergers: The Brazilian Experience

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Abstract: This paper discusses the Brazilian Merger Control experience in addressing innovation concerns in the assessment of horizontal mergers. The goal is to investigate how CADE – the Brazilian antitrust authority – has discussed innovation concerns in merger assessment, taking the antitrust literature and the US and European Commission experiences as starting points. We consider as innovation concerns both: (i) cases that are assessed under the standard analysis (focused on product market competition) in which innovation issues are relevant for the assessment of innovation and other (prices mainly) unilateral effects; and (ii) cases assessed under an alternative procedure ("innovation-specific assessment"). To achieve our goal, we discuss the theoretical background of innovation concerns in merger analysis and debate the US and European Commission experiences. Then, we look at cases assessed by CADE between 2015 and 2021 which had a decision by the Administrative Tribunal and debate how innovation concerns are included in the analysis. We find that in 20 cases (22.2%) there were innovation concerns, in which 19 cases were assessed exclusively through the standard analysis and in Bayer/Monsanto (2018) an innovation-specific assessment was used, a limited experience when compared to the US and the European Commission. Although innovation concerns were part of the assessment to some extent, improvements are needed in both the Brazilian Horizontal Merger Guidelines and in the merger procedure itself.

Keywords: Competition Policy; Mergers; Innovation; Brazil; CADE

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Questões de Inovação em Fusões Horizontais: a Experiência Brasileira

Resumo: Este artigo discute a experiência do Controle de Fusões brasileiro na abordagem de questões de inovação na avaliação de fusões horizontais. O objetivo é investigar como o CADE – a autoridade antitruste brasileira – tem discutido as questões de inovação na avaliação de atos de concentração, tomando como ponto de partida a literatura antitruste e as experiências dos EUA e da Comissão Europeia. Consideramos como questões de inovação tanto: (i) casos que são avaliados sob a análise padrão (focada na concorrência no mercado de produtos) em que questões de inovação são relevantes para a avaliação de efeitos unilaterais em inovação e outros (principalmente preços); e (ii) casos avaliados de acordo com um procedimento alternativo ("avaliação específica da inovação"). Para atingir nosso objetivo, discutimos os fundamentos teóricos das questões de inovação na análise de fusões e debatemos as experiências dos EUA e da Comissão Europeia. Em seguida, analisamos casos julgados pelo CADE entre 2015 e 2021 que

tiveram decisão do Tribunal Administrativo e debatemos como as questões de inovação são incluídas na análise. Constatamos que em 20 casos (22,2%) havia questões de inovação, em que 19 casos foram avaliados exclusivamente por meio da análise padrão e em Bayer/Monsanto (2018) foi usada uma avaliação específica da inovação, uma experiência limitada quando comparada aos EUA e a CE. Embora as questões de inovação tenham feito parte da avaliação até certo ponto, são necessárias melhorias tanto Guia de Análise de Fusões Horizontais quanto na própria análise de fusões em si.

Palavras-chave: Defesa da Concorrência, Fusões, Inovação, Brasil, CADE

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1. Introduction[1]

Innovation competition in merger assessment is a challenge for antitrust authorities. From the attempt to define an innovation market by the US Merger Control[2] in the mid-1990s to the recent European four-layer competitive assessment[3], the agencies applied new procedures in order to properly analyze these cases. However, interestingly, these different procedures are not presented in either of the jurisdictions' Horizontal Merger Guidelines (HMG). On one hand, the HMG in the US and EU[4] present what we call as the standard merger analysis, focused on product market competition. On the other hand, these jurisdictions have applied alternative assessments focused on innovation competition which depart from the standard analysis.

The challenges begin by whether the standard analysis applied in product market competition cases could be applied to innovation competition to assess whether an alternative assessment would be needed. If this procedure is applicable, does it need any changes? If not, what is the adequate alternative? [5] Innovation itself make the challenge harder: the outcomes are uncertain and competition through innovation occurs in many different ways, each one demanding a different approach by the authorities. Furthermore, the theoretical background on innovation competition indicates that concentration indexes and market shares, and even the traditional product market definition are less helpful when innovation is at stake.

Despite being a hard task, properly assessing innovation competition cases needs to be a relevant concern to the agencies, as inadequate assessment may undermine innovation incentives. Empirical works by Gilbert & Greene (2015) and Kern, Dewenter & Kerber (2016) show that the US agencies are facing the task and considering innovation concerns – changes in the steps of the standard analysis due to the existence of innovation efforts in the market or the use of an alternative analysis designed to address innovation competition – in around a third of the mergers challenged between 1995 and 2014. The recent shift in European Merger Control after Dow/Dupont (2017)[6] also shows such efforts in the EU. Given that, to our knowledge, no similar empirical exercise has been made for Brazil, we ought to shed light on how Brazilian Merger Control is assessing such cases.

The main goal of this paper is to investigate whether and to what extent the Brazilian Merger Control is addressing innovation concerns in the assessment of horizontal mergers. By innovation concerns here we include not only the cases in which a different procedure from the standard merger analysis was applied to consider the innovation market, firms' ability to compete through innovation and the merger effect on innovation (we will call it "innovation specific-assessment"), but also those when innovation issues were considered to be relevant for the regular assessment of unilateral or coordinated effects. To achieve this goal, we: (i) present the standard analysis of mergers, as well as how innovation may influence each step, with a special look on the US, EC and Brazilian Horizontal Merger Guidelines; (ii) present the theoretical background on the relation between innovation and competition, emphasizing the basic principles which are helpful for the assessment; (iii) present proposals for alternative assessments designed to assess innovation competition from the literature and practice; (iv) present the US and EC Merger Control experiences in addressing innovation concerns, considering its institutional approach and case law, including empirical literature; (v) present the Brazilian institutional framework; and (vi) investigate innovation concerns in Brazilian merger assessment by doing an exercise such as Gilbert & Greene (2015)

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[2] Kern, Dewenter & Kerber (2016) argue that the Innovation Market Analysis (Gilbert & Sunshine, 1995) influenced the 1995 Antitrust Guidelines for the Licensing of Intellectual Property. Gilbert & Tom (2001, p.44) show that the cases challenged on innovation concerns grew from only 4 (3%) in the first half of the 1990s to 47 (17.5%).

[3] There is a great number of publications discussing Dow/Dupont (2017), the first case to be assessed under the four-layer competitive assessment, specifically or its impact on EU Merger Control in general. Check: Petit (2017, 2018a, 2018b), Denicolò & Polo (2018), Mosso (2018), Padilla (2019), Jung & Sinclair (2019), Chadha (2019), Seiler (2019), Kokkoris & Valletti (2020), Kokkoris (2020).

[4] In this paper, when we refer to the European or European Union jurisdiction or experience, we are specifically referring to the European Commission and not the national competition authorities within the European Union.

[5] Katz & Shelanski (2007) and Sidak & Teece (2009) discuss the limitations of the standard analysis when innovation is at stake.

[6] Case COMP/M. 7932 (EC 2017).

and Kern, Dewenter & Kerber (2016), but with important changes to adapt to the Brazilian context. For this exercise we chose to include only at cases decided between 2015 and 2021 as the new search tool for Brazilian antitrust case law presents only cases from 2015 on, which is suitable considering the evolution of the assessment of innovation concerns in the European Commission in that period.[7] Furthermore, given that Gilbert & Greene (2015) and Kern, Dewenter & Kerber (2016) investigate the frequency of innovation concerns among the cases challenged in the US, we consider only cases decided by the CADE's Tribunal (CADE – the Administrative Council for Economic Defense – is the Brazilian competition authority), given that for all these cases there either a recommendation (from CADE´s General-Superintendence) or a final decision (from CADE´s Tribunal) for blocking or approving subject to remedies.[8]

The next section discusses the theoretical background of innovation concerns in Horizontal Merger Control, addressing the standard analysis and innovation-specific assessments, as well as briefly debating the US and EU experiences. The third section discusses the empirical exercises undertaken on the frequency of innovation concerns, mostly in the US but in the EU as well. The fourth section presents the methodology and our results on the investigation on the assessment of innovation in Brazilian Merger Control, also briefly discussing its institutional framework. Finally, the fifth and last section presents the concluding remarks.

By the end, we find that innovation concerns were addressed in only 20 cases assessed by the Tribunal in recent Brazilian Merger Control (22.2% of total cases addressed by the Tribunal), with only one being assessed on an innovation-specific assessment and the other 19 being assessed exclusively through the standard analysis, a limited experience when compared to the US and EU. Even the ones assessed in the standard analysis presented timid innovation concerns. Recommendations towards both improving the assessment of innovation concerns in the standard analysis and developing an innovation-specific assessment which considers the specificities of the Brazilian economy are some of the final thoughts presented by the end of the paper.

2. Innovation Concerns in Horizontal Merger Control: theory and international experience

Competition is a complex subject and to have a proper overview on how this process takes place we have to consider the firms' behavior in the market, considering its strategies beyond setting prices and/or quantities, such as increasing (or even decreasing) the quality of a product, offering a larger variety of colors, bundling, or tying the product with another one, etc. Among the many decisions a firm may take to offset their competitors, a fundamental one is engaging in innovation efforts, which may result in developing new or improved processes and products, resulting in higher demand and/or profit margins for the successful innovator. For Schumpeter, competition has a passive side, the static price competition, in which firms adjust their prices to increase their profits and an active side, the dynamic innovation competition, responsible for changing the economic structure itself (Schumpeter, 1942).

Innovation concerns plays a dual role in merger analysis: (i) innovation can affect the assessment of a merger when the merging parties compete within a product market, affecting the assessment of merger effects on prices, quantity, quality (and innovation), etc. by creating barriers to entry, lowering production costs, or diminishing the ability to coordinate on prices, for example. It may include or not merger effects on innovation within the product relevant market; and (ii) innovation competition also appears in merger analysis in a way that it may be necessary to delimitate an innovation relevant market, consider the firms with the capabilities to compete through innovation, and evaluating the merger effect on innovation ("innovation specific-assessment"). For instance, suppose that two firms engage in innovation efforts towards developing a product which addresses a need not yet met, i.e., creating a new product market.

[7] Todino, Walle, Stoican (2019) discuss how three cases from 2014 and 2015 show gradual changes which culminates in the four-layer competitive assessment in Dow/Dupont.

[8] As better discussed in section 4, many cases are approved by the General Superintendence (SG), the investigative body of CADE and are not addressed by the Tribunal.

2.1. Standard analysis of horizontal mergers: innovation concerns in the step-by step procedures of merger effect

The standard analysis of horizontal mergers focuses its assessment on competition within a relevant product market, i.e., a market composed by firms supplying competing goods and services. The current paradigm that guides competition policy assessment – the post-Chicago approach – focuses its procedures in Merger Control on whether there would be short-run price increases in the post-merger scenario: short-run price effects. The focus on price competition is supported by the goal pursued by competition authorities of maximizing economic efficiency, frequently understood as static allocative efficiency[9]: the farther prices are from the perfect competition equilibrium, the greater the deadweight loss is and, therefore, welfare is diminished. The authorities look at the net effect of the merger by counterbalancing the potential anticompetitive effects and countervailing efficiencies, the negative and positive effects on welfare, respectively. Although the authorities consider other mergers effects, such as quality and innovation, price effects are the main concern to most antitrust authorities (Budzinski, 2008, p. 301). However, even when undertaking the standard analysis and addressing price effects, innovation concerns may appear in different phases of the assessment.

Regarding the standard procedure itself, we can discuss the steps jurisdictions usually take. CADE divides its merger procedure into six steps: (i) relevant market definition, (ii) level of concentration, (iii) unilateral effects (including assessment of entry, rivalry, and portfolio power), (iv) buyer power, (v) coordinated effects and (vi) efficiency gains (CADE, 2016). It is possible to say that the Brazilian Horizontal Merger Guidelines, the US, and EU HMG follows similar standards of analysis when considering price effects, so we will present these steps and how innovation concerns may appear in their standard analysis.

Relevant market definition is usually the first step in merger assessment. This process is usually undertaken through the Hypothetical Monopolist Test (HMT) to check if a hypothetical monopolist would be able to profitably apply a small but significant non-transitory increase in price (SSNIP) – if the answer is yes, the market is well defined, if not, the test is remade adding other products/geographic areas to the hypothetical monopolist until the price increase is profitable (Department of Justice & Federal Trade Commission, 2010, p. 7-15).

The analysis of the level of concentration is undertaken with screening purposes, by assessing the market power of merging parties and the increase of market concentration due to the merger. In most cases the authorities look at the firms' market shares and concentration indexes such as the Herfindahl-Hirschman Index (HHI)[10] as larger firms in more concentrated markets would be less likely to reduce prices or increase quality. Higher shares also indicate cost advantages or attractiveness of the firm's product in non-price factors (Department of Justice & Federal Trade Commission, 2010, p. 15-19).

However, this relation between structural factors and prices is weaker when differentiated products are at stake. With homogenous products, there is a direct relation in the Cournot model (which is based on homogenous products) between market power and the HHI which supports the screening role of structural factors. When we discuss differentiated products, other factors are considered related to the substitutability between the parties' products, such as the cross elasticity of demand and diversion ratios[11] (CADE, 2016a, p. 36-37).

As when product differentiation is at stake, the existence of innovation efforts in the market also downsizes the role of concentration and market shares in determining the merger effect, as they can be volatile and with low explicative power of firm's ability to compete and market power when firms are highly innovative. Furthermore, the relation between concentration and innovation is not definitive in the

[9] Static allocative efficiency is a concept based on a Pareto criterion: an allocation of resources is considered Pareto-efficient if there is no other allocation possible in which at least another agent is worse off (Hovenkamp, 1994, p. 75). Although other efficiency criteria may be discussed such as productive or dynamic (Motta, 2004), Budzinski (2008, p. 301) emphasizes static allocative efficiency as the main goal in the current post-Chicago approach.

[10] The Herfindahl-Hirschman Index is calculated by summing the squared markets shares of all firms in the product market and used as an indicative of the level of concentration in that product market.

[11] The diversion ratio is a fraction of sales diverted to another producer due to a price increase (Department of Justice & Federal Trade Commission, 2010, p. 21).

literature.[12] The most recent version of the US and European Horizontal Merger Guidelines mention that the role of shares needs to be adjusted when there is innovation, often referred in the guidelines as the situation in which there is the adoption of a new technology (Department of Justice & Federal Trade Commission, 2010, p. 16-17; European Commission, 2004, p. 6).

The next step in merger analysis is addressing unilateral effects, related to the increased ability of the firm in exercising its market power individually. Such market power can be exercised through higher prices, less innovation (which we will focus in the next section) and quality. As discussed, authorities usually focus their assessment on short run price effects. In this step of merger assessment, factors such as rivalry (the intensity of competition between firms) and entry (the conditions of entry in the relevant product market) are investigated by the authorities and play an important role, as the existence of significant barriers to entry and low rivalry may facilitate exercising market power both individually and in a coordinated way. Innovation may be at stake when considering entry conditions, such as when a high volume of investment is needed to entry in R&D (European Commission, 2004, p. 12; CADE, 2016a, p. 27) and when discussing rivalry, as firms may compete more or less intensely regarding innovation, such as firms which continuously challenge the market by bringing innovation. As we will discuss in the next subsection, the US HMG also debates and lists unilateral innovation effects.

As there is no discussion of innovation concerns when looking at the existence of powerful buyers, we can move to the assessment of coordinated effects, the fifth step, which investigates whether there would be incentives for firms to engage post-merger in coordinated interaction in the relevant market. Innovation concerns are at stake here as coordination is considered to be less likely if the market is characterized by innovation (European Commission, 2004, p. 10; Department of Justice & Federal Trade Commission, 2010, p. 26). There is also the argument that coordinated behavior may reduce innovation (CADE, 2016a, p. 40).

Finally, the last step of the traditional merger procedure is looking at possible countervailing efficiencies, which can offset or attenuate anticompetitive effects. They are the procompetitive side of mergers, as the merged entity may face increased incentives and ability to compete by combining their activities. Incremental cost reductions may reduce or reverse unilateral effects, as well as making coordination less likely or effective when it creates a maverick[13] firm or provides incentives for an existing maverick to lower prices. It is important that they are merger-specific, i.e., would not be achievable without the merger (Department of Justice, Federal Trade Commission, 2010, p. 29-31). Innovation-related efficiencies may be considered as increases in the ability to innovate due to synergies when complementary capabilities get together, making R&D efforts more efficient (Bena & Li, 2014, p. 195), or when there is a transfer of technology between firms (Federico, Scott Morton, & Shapiro, 2020, p. 134).

It is important to add that CADE also discusses the elimination of a maverick, defined as firms which "…usually have low production costs and prices, pushing market prices down, or are inventive firms that foster ongoing innovation in their industry" (CADE, 2016a, p. 47) which may, among other effects, reduce innovation.

After discussing the steps of the standard merger analysis and the innovation concerns present on each step, we can conclude that the Brazilian Horizontal Merger Guidelines discusses innovation concerns in only few steps. First, innovation effects are considered as the agency mentions slower pace of innovation as a possibility of innovation effects. Second, when discussing entry conditions, a high level of investment needed in R&D is considered a barrier to entry (CADE, 2016a, p. 27). Third, regarding coordinated effects, CADE expresses concerns that a merger might reduce innovation due to coordinated behavior (p.40). Fourth, among the types of efficiencies considered by the authority, innovation being introduced into a product or process is considered (p. 44). Fifth, the elimination of a maverick may lessen innovation (p. 47). The EU 2004 Horizontal Merger Guidelines is also timid when it comes to innovation concerns, including elements such as: (i) considering less innovation as anticompetitive effects; (ii) the revision of the role of

[12] The well-known Arrow-Schumpeter controversy indicates two different positions on the relation between structure and innovation, as Arrow (1962) presents a model which indicates that competitive firms have higher incentives to engage in innovation efforts to escape competition than monopolists, while Schumpeter (1942) emphasizes that larger firms would be more likely to innovate. This debate has both theoretical and empirical work, but the latter did not provide a definitive answer to this debate.

[13] A maverick is a firm with disruptive behavior, regarding prices or other variables, including innovation (CADE, 2016a, p. 47).

market shares as indicators of competitive significance; (iii) a discussion on a dual effect of mergers on innovation when debating innovation effects, pointing out that innovation makes coordination harder; (iv) innovation and R&D as barriers to entry, and; (v) R&D and innovation-related countervailing efficiencies (European Commission, 2004). The US 2010 HMG discusses innovation when: (i) relativizing the role of shares and concentration indexes; (ii) discussing that enhanced market power may be manifested through less innovation; (iii) presenting unilateral innovation effects (better addressed in the next subsection); (iv) discussing that coordination may be less likely, (v) debating countervailing efficiencies (Department of Justice & Federal Trade Commission, 2010).

2.2. Innovation Concerns in Horizontal mergers and innovation-specific assessments: basic principles and the US and EU experiences

Whenever firms compete through innovation efforts to bring new or improved products, services, and processes to capture away and protect sales from each other, we can consider that there is innovation competition (Federico, 2017, p. 671). This form of competition can occur in different ways, as innovation itself is a multi-sided process, with different faces. First, as discussed in the previous subsection, firms which compete in the same product market may engage in innovation efforts. Second, innovation competition is also at stake when there is no product market and firms are engaging in competing innovation efforts. The first case may be addressed by the standard analysis, while the second needs a different approach. There are a few proposals for assessing innovation competition departing from the standard analysis, taken from the literature and practice. We will refer to them as *innovation-specific assessments*.

In this subsection we will discuss how the US and EU experiences address these cases which would demand an innovation-specific assessment regarding both their guidelines and practice, as well as briefly presenting proposals for innovation-specific assessment. However, we first need to make some comments about innovation competition, especially regarding its basic principles for assessment.

First, we need to define harm to innovation, also called as *negative innovation effects*. In this paper we will consider it as post-merger reduction in innovation incentives, i.e., if after the merger, the merged entity and/or its rivals are less likely to engage in innovation efforts, we can consider that the merger is harmful to innovation[14] and the authorities need to intervene, either blocking the merger or imposing antitrust remedies.[15] However, arriving at such conclusion is not an easy task.

Second, when innovation competition is at stake, we can investigate the existence of negative innovation effects in a similar way as the assessment of increases in pricing pressure through the *business-stealing principle*. The existence of a perspective of losing profitable sales to a successful innovator places innovation-related business-stealing effects between the two rivals. The more substitutable the products are and the higher the price/cost margin is, the higher are the business-stealing effects (Federico, Scott Morton, Shapiro 2020, p. 128-129). This perspective of losing sales to a successful innovator may provide firms incentives to innovate. When merger takes place, such innovation externalities are internalized and, therefore, innovation incentives are diminished, resulting in unilateral innovation effects (Federico, Scott Morton & Shapiro, 2020, p. 130-132).[16]

Third, Kokkoris & Valletti (2020, p. 233-234) list two channels in which negative innovation effects may occur: (i) less incentives to continue product development, possibly delaying and/or interrupting these innovation efforts; and (ii) less incentives to begin new innovation efforts, resulting in less innovation in

[14] Another way of assessing harm to innovation is the through the elimination of parallel research efforts, the Diversity Argument, connected to the evolutionary approach (Jorde & Teece, 1990; Farrell, 2006; Sidak & Teece, 2009). A greater number of innovation efforts increases the probability of at least one getting to the market, allowing a better functioning of the role of the market as a selector of innovation and, as Farrell (2006) states, a diversity of approaches is beneficial in itself.

[15] Antitrust remedies are conditions imposed by the authorities to approve a merger.

[16] The use of a mechanism similar to the estimation of unilateral price effects for innovation can be also found in Farrell & Shapiro (2010, p. 33-34) and Shapiro (2012, p. 363-365). In the first paper the authors introduce the innovation diversion ratio, measuring the extent of the diversion of the firms' profits after their rivals' innovation. This index may be applied to measure the extent of the innovation related business-stealing effects between the parties. In the second paper, Shapiro list the principles which guide the relation between innovation and competition, Contestability, Appropriability and Synergies. According to the Contestability Principle, innovation incentives are connected to the perspective of gaining or protecting sales.

the future. These channels are similar to the unilateral innovation effects present in the 2010 US Horizontal Merger Guidelines, as the HMG includes a subsection dedicated to innovation on the unilateral effects section, mentioning two channels of innovation effects: (i) if a merging party is engaging in innovation efforts that could divert sales from the other and (ii) when firms have similar innovation capabilities which could capture sales from each other, resulting in a longer-term innovation harm (Department of Justice & Federal Trade Commission, 2010, p. 23-24). We will discuss innovation effects more deeply in the next subsection, after presenting the basic principles of innovation competition, but it is important to state that even in a standard analysis regarding product market competition, unilateral effects may be addressed.

Fourth, proceeding to the innovation-specific assessments, we can start by discussing relevant market definition. As discussed, the standard analysis focuses its assessments on product market competition. To build an assessment which investigates innovation competition outside the product market, an alternative is to define an *innovation market*, composed of the firms which have the necessary innovation efforts and/or capabilities to be considered as rivals. Furthermore, the assessment of competitive significance in this innovation market would need to be done by considering the extent of the firms' capabilities, indicators of the strength of the firms in an innovation market. Using the firms' capabilities in steps of merger assessment may be referred as the *capabilities* principle. Authors such as Gilbert & Sunshine (1995), Katz & Shelanski (2007), Sidak & Teece (2009), Kerber (2017) and Lyra & Pires-Alves (2022) may be associated with the use of this principle, favoring a Capabilities Approach. In Dow/Dupont (2017), the EC proxied the competitive significance of the merging parties through patents and new active ingredients, indicators of the firms' capabilities.

Fifth, the assessment of innovation effects also needs to differ from short run price effects when it comes to the time horizon of merger effects. When innovation incentives are diminished, welfare may be affected in multiple time horizons as the interruption of a pipeline product can have a medium to long run effect and the reduced incentives to engage in innovation efforts in the future may harm welfare in a long- and unforeseeable-time horizon. The need to address innovation effects in multiple time horizons can be referred as the *dynamic effects principle*.

We can now turn to discuss the US experience with innovation-specific assessment. Even though there were innovation concerns way back in Dynamics/United Electric Coal Companies (1974)[17], the first dynamic aspects of merger assessment in the US appeared in the 1992 edition of the Horizontal Merger Guidelines (Glader, 2006, p. 60-68). Furthermore, the mid-90s were a turning point for innovation concerns for US competition policy as shown by Gilbert & Tom (2001, p. 44): in the first half of the decade only four cases were challenges by the US agencies with innovation concerns (3% of all cases challenged by the agencies), rising up to forty-seven in the second half (17.5% of all cases). This increase in the assessment of innovation concerns is connected to the Innovation Market Analysis (Gilbert & Sunshine, 1995).

The Innovation Market Analysis is an early proposal of merger assessment connected to the capabilities principle, an alternative step-by-step procedure applicable to competition between R&D efforts, such as pipeline competition, and presents some advances towards considering the firms' capabilities in the assessment. The five steps of assessment begin with: (i) identifying the firms' overlapping R&D activities; followed by (ii) considering alternatives sources for such R&D and (iii) downstream marketed and potential products capable of exerting competitive pressure on the merging parties. Then (iv) the analyst needs to look at the effects of the merger in R&D and should do so by considering the share of the merged entity in the total R&D expenditure in that innovation market and any other evidence of impact in competition. As in product market cases, the assessment ends by (v) discussing countervailing efficiencies, although here they need to be related to R&D and increase the likelihood or value of innovation (Gilbert & Sunshine, 1995, p. 594-597). The IMA would be applied in the specific situation in which firms have rival R&D efforts being undertaken and proposes an alternative step-by-step procedure so that relevant markets would include firms which engage in alternative R&D activities that constrain the merging parties' exercise of market power, as well as firms which could acquire the necessary assets for R&D in short notice. Its influence in the US Merger Control may be seem in the inclusion of innovation markets, in a very similar fashion to the proposition of Gilbert & Sunshine (1995), in the 1995 Antitrust Guidelines for the Licensing

[17] US v. General Dynamics Corps., 415 U.S. 468 (1974).

of Intellectual Property. In 2010, the US released a new edition of its Horizontal Merger Guidelines and innovation plays a large role in merger assessment in the standard analysis, as discussed in the previous subsection, but there is no innovation-specific assessment described in the guidelines despite the inclusion of innovation markets in the Guidelines for Licensing IP.

Since the creation of the 1989 European Commission Merger Regulation, innovation played a minor role in merger assessment in the EC.[18] As discussed, the 2004 Horizontal Merger Guidelines introduces a few elements related to innovation, but the great shift occurred when the EC came up with a new procedure when assessing Dow/Dupont (2017): the four-layer competitive assessment.[19] This assessment considers the different ways in which there is innovation competition and analyses the firms' capabilities in some steps of the procedure. The EC looks at four sources of overlaps between the firms, regarding: (i) price/product competition involving incumbent products; (ii) price/product competition considering late-stage pipeline projects (an overlap between a marketed product and a late-stage pipeline product or between late-stage pipeline products); (iii) innovation competition involving pipeline products in earlier stages (which depend on innovation incentives to finish developing); (iv) innovation competition related to capabilities to innovate in certain innovation spaces[20] (European Commission, 2020, p. 5-6). In Dow/Dupont (2017), besides the traditional product market overlaps, the EC also found overlaps between: (i) early pipeline projects and lines of research and (ii) global R&D integrated organizations, i.e., firms with the necessary capabilities to exert competitive pressure.

Besides the IMA, a proposal from the literature which influenced the US Merger Control, and the four-layer competitive assessment, directly applied by the EU, we can take a moment to list two innovation-specific assessments which apply the principles listed in this subsection and take a step further towards properly addressing innovation effects, including accounting for the specificities of the different patterns of innovation competition. Federico, Scott Morton & Shapiro (2020) identify three patterns of innovation competition: (i) when there are pipeline overlaps - either a product-to-pipeline (a merging party has a marketed product and the other has a pipeline competitor) or a pipeline-to-pipeline overlap (both merging parties have pipeline products towards creating products which will be competitors if they get to the market); (ii) overlaps in capabilities (merging parties have similar capabilities) and; (iii) acquisition of potential competitors by dominant firms. The first two patterns are similar to the third and fourth layer of the European four-layer competitive assessment.

Lyra & Pires-Alves (2022) propose the faces of innovation competition framework. They also present a (i) category related to pipeline competition – innovation competition through ongoing innovation efforts for developing new products – however including innovation efforts which do not occur through pipeline stages. Furthermore, they also discuss a category related to similar (ii) overlaps in capabilities. Unlike the previous framework, they also add (iii) a category for innovation competition within the product market through continuous innovation efforts.

Some observations about the four-layer competitive assessment and the proposals of Federico, Scott Morton & Shapiro (2020) and Lyra & Pires-Alves (2022). First, as in Katz & Shelanski (2007, p. 65-66), the three propositions consider that when pipeline products are close to market launch, there is no innovation effects, as there is no risk of discontinuation of the pipeline projects, so authorities should focus on price effects. Second, the three propositions consider the business-stealing and dynamic effects principle, as they assess unilateral innovation effects through a similar mechanism to the assessment of unilateral price effects and consider such effects in different time horizons. Third, Lyra & Pires-Alves (2022) also try to advance in using the capabilities principle in the assessment, advocating for the use of capabilities in different steps of the assessment. Fourth, the four-layer competitive assessment does not seem to be applicable for cases in which there is innovation competition within the product market, through continuously engaging in innovation efforts, as in one of the faces of innovation competition in Lyra &

[18] Glader (2006) presents an overview of the assessment of innovation concerns in the European Commission.

[19] The Commission did not use the term four-layer competitive assessment in Dow/Dupont but used it in other two cases assessed under this framework: Bayer/Monsanto (2018) and AbbVie/Allergan (2020).

[20] We can understand the notion of competition over innovation spaces as competing over discovery targets, i.e., widening the reach of the analysis of overlaps involving pipeline competition to look at competition in steps before pipeline stages, such as the discovery and development phases (Petit, 2018b, p. 5-6).

Pires-Alves (2022). Fifth, I third and fourth layers in the four-layer competitive assessment, as well as two categories in Federico, Scott Morton & Shapiro (2020) and Lyra & Pires-Alves (2022) consider innovation competition involving pipeline products and capabilities/lines of research. and, as in the US case, the innovation effects fit in the two channels mentioned by Kokkoris and Valletti (2020). When the EC looks at pipeline products which are not close to market launch, the concern is related to a possible discontinuation and/or interruption of a specific innovation effort. When they consider possible overlaps related to similar capabilities to innovation, there is a general concern that the merger could bring together two (or more) out of a few firms capable of investing in innovation in an industry, resulting in less innovation efforts in the future.

In this section we had a brief overview of the theoretical and practical aspects of the assessment of innovation competition in horizontal mergers in which competition occurs outside the product market and, therefore, demands an innovation-specific assessment. We discussed the basic principles of the assessment of such innovation competition cases, presented assessments which influenced the US and EU Merger Control and other two frameworks taken from the literature. By looking at the HMG from the two jurisdictions, we can conclude that an appropriate assessment is lacking. In the next section we discuss the empirical assessment of innovation concerns in Merger Control in order to provide inputs for the debate of the Brazilian assessment of innovation concerns in mergers in section 4.

3. Empirical Assessment of Innovation Concerns in Merger Control: Literature Review

Recently, some studies regarding the frequency of innovation-based concerns in mergers were published. Gilbert & Greene (2015) looks at the frequency of merger challenges by both US competition authorities - the Federal Trade Commission (FTC) and the Antitrust Division of the Department of Justice (DoJ) - and their relation to harm to innovation between 2004 and 2014. They undertake their assessment of the frequency of innovation-related challenges by considering whether the terms "innovation" or "research and development" were mentioned to describe either the marketplace or competitive effects, which is their criteria for having innovation-based concerns. The authors also mention that the US agencies do not always use these two terms and may refer to harm to product development or design without explicitly referring to innovation or R&D. Their algorithm excludes these cases to avoid including cases not related to innovation or R&D (p. 1932 – 1934). They are also not concerned on whether the case was assessed under an innovation-specific assessment or under the standard analysis but include both cases as innovation concerns may be either at relevant market definition (present only in innovation-specific assessment, as it would be an innovation market) and competitive effects (present in both types of assessment). When it comes evaluating whether harm to innovation was mentioned or discussed, the authors use the following criteria: if the agency states that the decrease in competition would harm innovation without elaborating the nature of such harm, innovation is only mentioned. If the agency elaborates on the nature of that harm, it is discussed. In the latter, the authorities mention that innovation benefitted from competition in that market (p. 1940-1941). They find that from the 250 mergers challenged by the authorities, in 84 of them harm to innovation was alleged (33.6%) (p. 1932-1933).[21] In roughly half of these 84 cases, the agency merely mentions that the merger would harm innovation and in the rest of them, they elaborate further on the nature of such harm (p. 1940-1941). The authors also study the relation between innovation-related challenges and R&D intensity, finding that the higher the R&D intensity is, the higher is the rate of mergers challenged based on innovation concerns (p. 1935). Furthermore, they also study the relation between R&D intensity and the mentioning or discussing of harm to innovation and the differences between the agencies.

Kern, Dewenter & Kerber (2016), similarly, investigate how often the DoJ and the FTC investigated innovation concerns in merger assessment between 1995 and 2008. As in Gilbert & Greene (2015), Kern, Dewenter & Kerber (2016) consider cases in which innovation was mentioned at either market definition and/or competitive assessment. For market definition, they mention that typical words are "the research,

[21] The authors also discuss the differences between the two agencies in several topics. Regarding the frequency of innovation concerts, the FTC challenged 164 mergers in this period, with 54 of them alleging harm to innovation (around 32.9%). The DoJ challenged only 86 cases, with 30 alleging harm to innovation (around 34.9%) (Gilbert & Greene, 2015, p. 1933).

development, manufacture and sale of…" and for competitive assessment they consider explicitly claimed innovation effects (p. 377). However, unlike, Gilbert & Greene (2015) the authors also investigate whether despite the criticism of the IMA, innovation-specific assessments were applied. Their criteria for an innovation-specific assessment is the presence of innovation concerns in relevant market definition. They investigate not only the frequency of innovation concerns but associate it with innovation intensity (low, moderate, and high R&D intensity). Both Gilbert & Greene (2015) and Kern, Dewenter & Kerber (2016) mention that the main source of data were the FTC and DoJ's complaints, although other documents were also investigated. They find that from the 399 mergers challenged during that period considering both agencies, 135 had innovation aspects mentioned at relevant market definition and/or anticompetitive effects, around 33.8%. In those 135 cases, 341 markets were analyzed, with 18 of them having only price concerns. So, in 323 relevant markets innovation aspects were considered, of which 222 had innovation aspects in relevant market definition or innovation markets (around 68.8%) and 255 in anticompetitive effects (around 78.9%). In 105 relevant markets out of the 323 with innovation aspects there were innovation incentives arguments (around 32.5%) and in 23 markets diversity arguments were mentioned (around 7.1 %).[22] Furthermore, in only 162 markets (around 50.2%) HHI and/or market shares were considered as concentration measures, while in 124 markets (around 38.4%) the number of firms was considered (according to the authors a more adequate measure of concentration for innovation) and non-quantitative concentration measures were present in 81 relevant markets (around 25.1%) (p. 377-389).[23]

Mosso (2018) discusses innovation in the EU Merger Control. The paper discusses different aspects of the EC framework for innovation competition cases, along with discussing specific mergers in a qualitative way. However, the author briefly mentions some statistics for the 2015-2017 period. During these three years, the EC received more than 1070 merger notifications, intervening in only 73 cases (around 6.8%). Innovation concerns were present in 10 of these cases (around 13.7% of the cases in which there was intervention) (p. 6). They refer to two common types of cases with innovation concerns among the ten identified: merger with pipeline products and with innovation at earlier stages (p. 6-7). It is interesting to point out that this period ends in 2017, year in which Dow/Dupont took place and represents a shift in the assessment of innovation effects in the EU with the introduction of the four-layer competitive assessment.

4. Innovation Concerns in Brazilian Merger Control

As discussed throughout the paper, the US, EU, and Brazilian Horizontal Merger Guidelines use only the standard analysis and, to some extent, address innovation concerns, with the first one going further than the others by defining unilateral innovation effects. However, practice shows a different scenario for the US and the EU, as Kern, Dewenter & Kerber (2016) identify that innovation-specific assessments were applied in the US Merger Control, while the four-layer competitive assessment applied by the European Commission in Dow/Dupont (2017), Bayer/Monsanto (2018) and AbbVie/Allergan (2020) is also an innovation specific assessment. As far as we know, there are no works investigating the assessment of innovation concerns for the Brazilian Merger Control. In this section, we will undertake such task.

The first subsection will briefly present the main features of the Brazilian Merger Control institutional framework, while the second one will present the methodology and the third presents the results and discussion.

4.1. Brazilian Merger Control Framework

The role of the Administrative Council of Economic Defense – CADE – as the Brazilian Competition authority is currently defined by law 12,529/2011, which came into force in May 2012. Its framework is also supported by several documents, including the Guide for Horizontal Merger Review (2016), the Brazilian Horizontal Merger Guidelines (HMG).

[22] For a brief presentation of the diversity argument, check *supra* note 14

[23] The authors also discuss: (i) the differences between both US Agencies in all the issues assessed; (ii) difference of the topics assessed over time (comparing the 1995-2003 and 2004-2008 periods) and (iii) the relation of innovation concerns and R&D intensity.

The assessment of mergers is first undertaken by its investigative body, the General Superintendence (SG), which first defines whether the merger should be assessed under the simplified or ordinary procedure. According to Resolution n. 2/2012[24], cases with minor potential to undermine competition may be subject to the simplified procedure, with a faster decision by the SG. The cases not considered eligible to be assessed under the simplified procedure will be analyzed under the ordinary procedure, which includes a deeper investigation of the potential effects of the merger on competition. The SG may approve the cases without remedies, recommend blocking the case or recommend its approval under conditions. The last two option implies that the case needs to have the final decision by the CADE´s Tribunal, an administrative body composed by six commissioners and the president. Furthermore, even when the SG decides that a merger should be approved, the case may still go to the CADE´s Tribunal ("Tribunal") if either another player (or a regulatory agency) appeals or upon application by one of the commissioners.[25]

4.2. Methodology

As discussed in section 2, the Brazilian HMG indicates that innovation takes part in merger assessment through the standard analysis in the discussion of entry conditions, coordinated effects, efficiencies and elimination of maverick firms, and there is no discussion of innovation-specific assessments. Furthermore, innovation effects are mentioned in the beginning of the HMG, as a slower pace of innovation is considered as one type of anticompetitive effect. Finally, it is worth mentioning that Law 12,529/2011 considers that, among the conditions for approving a merger, is pursuing technical development, a goal which could be associated with innovation.

In this paper, we will investigate whether and to what extent innovation concerns were considered in the merger analysis, searching for cases in which there were innovation specific assessments or in which innovation was discussed for each step of the traditional assessment, including innovation effects and innovations concerns that affected the analysis of price (and other) effects of the merger.

Thus, our research will be different from the ones found in the literature for the US and EU jurisdictions, as we expected that innovation will be at stake in only a small number of cases and that innovation-specific assessment will rarely be used. Therefore, instead of looking just at the frequency of cases with innovation concerns, we will dig deeper how innovation issues were considered in each step of the assessment, being that innovation-specific assessment or not. We apply a broader criterion than the one applied by Gilbert & Greene (2015), which considers innovation concerns in market definition and in the competitive effects and similar to Kern, Dewenter & Kerber (2016), which consider it in market definition and competitive assessment.

So, to find out the cases in which innovation concerns were considered by CADE, we searched for innovation terms in CADE's recent jurisprudence.[26] We considered every case in which a final decision was taken up from 2015 to 16 November 2021, the time frame available when this data was gathered, which is suitable considering the evolution of the innovation concerns in the Europe Commission.[27] The following terms in Portuguese were searched: "innovation", "innovator", "innovative", "research and development",

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[24] The resolution explains that the possibility of assessing a case under the simplified procedure is dedicated to cases with minor potential to harm competition. The decision to apply this procedure is discretionary, but need to fit cases such as when: (i) a joint venture is formed to act in a market in which there is no horizontal or vertical relation to the parties; (ii) when the acquirer did not previously act in the markets affected by the merger or the ones vertically related; (iii) the merged entity would have 20% or less market share when there is a horizontal overlap; (iv) the merged entity would have 30% or less market share in any of the affected markets when there is vertical integration.; (v) mergers which result is a variation of less than 200 point in the HHI (if the resulting market share is less than 50%); and (vi) other cases not addressed by the previous criteria but considered simple enough by the SG (CADE, 2012, p. 3-5).

[25] According to the Statutes of CADE, if the SG approves a merger, within 15 days another player (or a regulatory agency if the sector is regulated) may appeal and a member of the Tribunal may request that the case is sent to the Tribunal (CADE, 2021, p. 41)

[26] We based our research in the recently created case law search tool, through which it is possible to search for terms. See https://jurisprudencia.cade.gov.br/pesquisa

[27] Check *supra* note 7.

"pipelines", "patent", "patented" along with its plural and gender variations.[28] The documents considered were commissioners' votes and the cases reports made by the General Superintendence. We added a filter to include only mergers decided in the Tribunal.

Furthermore, as briefly discussed in the introduction, given that both Gilbert & Greene (2015) and Kern, Dewenter & Kerber (2016) explore the frequency of innovation concerns only among the cases which were challenged in the US, we consider that it makes sense to discuss only cases assessed by the Administrative Tribunal. These cases are the ones which demanded further investigation and had not been approved on a first round by the SG. Although the Brazilian Merger Control system is different from the US, this methodological choice makes the choice of cases similar to these two works. Summing up, we considered the cases in which either the General-Superintendence or the Tribunal recommended or decided to impose restrictions to the merger. We are also including few cases which were sent to the Tribunal upon application by one of the commissioners and under an accepted appeal to assess the case by another player.[29]

After this process we opened the documents to manually discard all the ones in which despite mentioning one of the terms, they were not considered in the assessment. A frequent situation for discarding the case was the word innovation appearing in a generic description of which are the possible outcomes of an increase in concentration in the beginning of the analysis of the likelihood of anticompetitive effects section, without considering innovation after all.[30] By applying these criteria, we ended up with 38 cases after this first filter.

As in 18 out of the 38 cases the term "innovation" was briefly mentioned without playing a role in the standard procedure, we can also take out these cases from the discussion. In 12 of them innovation is only briefly mentioned without having a role in any step of the assessment, such as: (i) when the parties' description includes innovation (the company declares that it is an innovative player or that it engages in R&D or has R&D centers); (ii) when the market is considered as innovative, being based on innovation or having potential to grow based on innovation; or (iii) when the motivation for the mergers, as alleged by the parties, is related to innovation (such as improving its R&D).[31] The 18 cases represent situations where, despite mentioning innovation which could mean that assessing innovation concerns were potentially important, the authority did not actually consider innovation in any step of the assessment. This is a first indication that the Brazilian agency has still some ground to cover when it comes to innovation-related mergers. In the other 6 cases, innovation is cited in either relevant market definition or entry analysis just to mention that there are no innovation concerns. In one of them it is stated that there is no innovation in the relevant market, while in five of them, that there are no patent-related barriers to entry.

The next subsection discusses the 20 cases left[32] (presented below in Table 1), the ones in which there were innovation concerns.

[28] The exact terms searched in Portuguese are: *inovação, inovações, inovador, inovadores, inovadora inovadoras, inovativo, inovativos, inovativa, inovativas, pesquisa e desenvolvimento, pipeline, pipelines, patente, patentes, patenteado, patenteados, patenteada, patenteadas*.

[29] For the cases which went to the Tribunal due to being contested, we included the ones which the court considered the appeal and assessed it in its merits (even the cases in which the final decision was the same as the one presented by the SG).

[30] Of the 38 cases, 6 were assessed by the Tribunal due to an appeal of a player and 5 were sent to the Tribunal after a commissioner requested. We also discarded a case in which the assessment occurred before 2015 and the case was reopened.

[31] One of these twelve cases - Capsugel/Genix (2015 – Case 08700.009711/2014-78) - does not meet any of these three criteria, however it is almost a merger to monopoly and such level of concentration could, among other effects, reduce R&D (even though such harm is not investigated), so we included in this first group.

[32] Among the 20 cases, only Brink's/Rodoban (2018) was assessed by the Tribunal due to an appeal by a rival. The other nineteen either the SG recommended blocking/approving under conditions or called to the Tribunal by a commissioner.

Table 1 - Mergers with innovation concerns decided by CADE's Administrative Tribunal (2015-2021) - Parties, Case Number, Year and Sector

Parties	Year	Case Number	Sector
Dabi Atlante/Gnatus	2015	08700.001437/2015-70	Dental Products
Tigre/Condor	2015	08700.009988/2014-09	PVC Solutions
Continental/Veyance	2015	08700.004185/2014-50	Automotive
GSK/Novartis	2015	08700.008607/2014-66	Pharmaceutical
SBT/Record/Rede TV!	2016	08700.006723/2015-21	Media and entertainment
Reckitt Benckiser/Hypermarcas	2016	08700.003462/2016-79	Sexual Welfare
Saint-Gobain/SiCBRAS	2016	08700.010266/2015-70	Construction Materials
Halliburton/Baker Hughes	2016	08700.007191/2015-40	Oil and Gas
Bradesco/Banco do Brasil/Santander/Caixa Econômica/Itaú	2016	08700.002792/2016-47	Financial
Itaú/Citibank	2017	08700.001642/2017-05	Financial
Ipiranga/Alesat	2017	08700.006444/2016-49	Oil and Gas
John Deere/Monsanto	2017	08700.000723/2016-07	Agricultural Machinery
Brink's/Rodoban	2018	08700.000166/2018-88	Logistics and Security
Itaú/XP	2018	08700.004431/2017-16	Financial
Bayer/Monsanto	2018	08700.001097/2017-49	Biotechnology
International Business Machines Corporation (IBM)/Red Hat	2019	08700.001908/2019-73	Software
Disney/Fox	2019	08700.004494/2018-53	Media and entertainment
Stone/Linx	2021	08700.003969/2020-17	Financial Services
Danfoss/Eaton	2021	08700.003307/2020-39	Hydraulic components
Hypera/Takeda	2021	08700.003553/2020-91	Pharmaceutical

Source: own elaboration

As we can see from the table, the cases represent different sectors, indicating that innovation concerns may be at stake in different situations including both the sectors which innovation traditionally occurs through pipeline stages such as Pharmaceutical and Biotechnology and potentially in innovation markets and sectors that innovation occurs in non-formal channels, such as media and entertainment.

4.3. Results and Discussion

We now proceed to investigate the other 20 cases. In that period, the Tribunal judged a total of 90 cases, so these 20 cases represent around 22.2% of all cases assessed by the Tribunal. We need to be careful, however, when comparing to the empirical exercises presented in the last subsection, as our criteria is broader. We include here both the cases in which there was an innovation-specific assessment and when there were only innovation issues considered in the steps of analysis of unilateral or coordinated effects (in price mostly).

We found one case in which an innovation-specific assessment was applied: Bayer/Monsanto (2018).[33] As discussed in section 2, an innovation-specific assessment is applied when in a merger there is competition outside the product market, in an innovation relevant market. The assessment departs from the standard analysis and looks at innovation effects in the given innovation market. It is the only case in which *the relevant market* was defined on innovation grounds, i.e., there were innovation markets defined besides traditional product markets.[34]

Innovation concerns related to innovation-specific assessment were also at stake in Bayer/Monsanto in the analysis of concentration indexes (the explanatory role of concentration indexes and shares is reduced), in entry conditions (when discussing the necessary time to enter in the market through R&D), in

[33] Case 08700.001097/2017-49.

[34] The definition of many of the markets assessed in this case had words such as the "development of", "improvement of" and "licensing of".

rivalry (when debating how rivalry occurs on innovation grounds and the share of R&D expenditures is mentioned as an indicator of the competitive significance of firms). Finally, in this case analysis, there is a debate on the existence of unilateral innovation effects, presenting a completely new approach in Brazilian case law. The General Superintendence mentions, in the report, four possible innovation effects related to soy and cotton seeds regarding: (i) specific ongoing innovation efforts, resulting in the possibility of discontinuation, interruption or redirecting such efforts; (ii) a long-term reduction of incentives for the firms to engage in new innovation efforts; (iii) a possible reduction in incentives for other players to engage in R&D efforts; (iv) a reduction in innovation incentives for other players enter in the market due to higher barriers to entry as result of the merged entity's dominant position.[35] The two channels of negative innovation effects listed by Kokkoris & Valletti (2020) were assessed, both the potential reduction in new innovation efforts in the future and the potential delay and/or interruption in product development. Finally, countervailing efficiencies were debated in Bayer/Monsanto.

It is worth mentioning that Bayer/Monsanto was assessed by the European Commission using the four-layer competitive assessment, which addresses similar effects as the ones listed by the General Superintendence. Throughout its assessment, the SG discussed many innovation aspects due to an economic report presented by the parties which discussed the assessment of innovation competition for this case, including the need of a capabilities-based assessment (CADE, 2017b).

From now on, we look on whether innovation concerns were discussed in each step of the assessment for cases addressed exclusively through the standard analysis. We found that to be the case in the other 19 cases. Among those, negative unilateral innovation effects were discussed in 5 cases, all of them related to the second channel of Kokkoris & Valletti (2020): less incentives to begin new innovation efforts. We will briefly present them.

In *SBT/Record/Rede TV!* (2016)[36] three television networks created a joint-venture to license television channels to cable TV companies, and one commissioner[37] expressed concerns regarding the fact that the joint-venture was not considering the creation of new content and could reduce the introduction of innovation while another commissioner argued despite not mentioning that the joint-venture would invest in new content, the companies would need to engage in efforts towards creating new content anyway to challenge Globo, the market leader.

In *Disney/Fox* (2019)[38], a global acquisition of Fox by Disney, movie theater chains argued that there could be a post-merger reduction in innovation regarding movies. It is important to notice that in both these cases the concerns were related to innovation in audio-visual which could be considered innovation towards horizontal differentiation. The effects investigated by the General Superintendence[39] would be related to a post-merger reduction in new innovation efforts within the product market.

In *Itaú/XP* (2018) [40], Itaú, a traditional Brazilian bank, acquired a minority shareholding of XP, a financial company, considered as a maverick (an innovative firm that contested the market with lower prices), working as a two-sided platform for investments. Its position as an innovative player limited the role of the HHI during the assessment and a commissioner[41] expressed concerns about a potential elimination of an innovative maverick, especially considering that the acquirer was a traditional bank, with a possible reduction of innovation after the merger. It is important to notice that throughout the assessment, the General Superintendence mentioned that it still lacked the proper tools to assess innovation concerns in mergers, stating that other jurisdictions were still developing such procedures.[42]

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[35] CADE (2017b, p. p. 129-144) for the innovation effects related to biotechnology on soy seeds (p.99-108) and biotechnology on cotton seeds.

[36] Case 08700.006723/2015-21.

[37] Vote of Commissioner Cristiane Alkmin Junqueira Schmidt in Case nº 08700.006723/2015-2 (SBT/Record/Rede TV!) (Schmidt, 2016).

[38] Case 08700.004494/2018-53.

[39] Report No. 11/2018 in Merger Case nº 08700.004494/2018-53 (Disney/Fox) (CADE, 2018).

[40] Case 08700.004431/2017-16.

[41] Vote of Commissioner Cristiane Alkmin Junqueira Schmidt in Case nº 08700.004431/2017-16 (Itaú/XP) (Schmidt, 2018).

[42] Annex to the Report No. 24/2017 in Merger Case nº 08700.001097/2017-49 (Itaú/XP) (CADE, 2017a, p. 57-60).

In *John Deere/Monsanto* (2017)[43], John Deere acquired Precision Planting, a division of Monsanto. The General Superintendence debates how rivalry occurs through innovation when looking at the US DOJ's complaint on the case and their competitors concerns.[44] A possible outcome of the merger, according to CADE, would be a reduction in innovation.

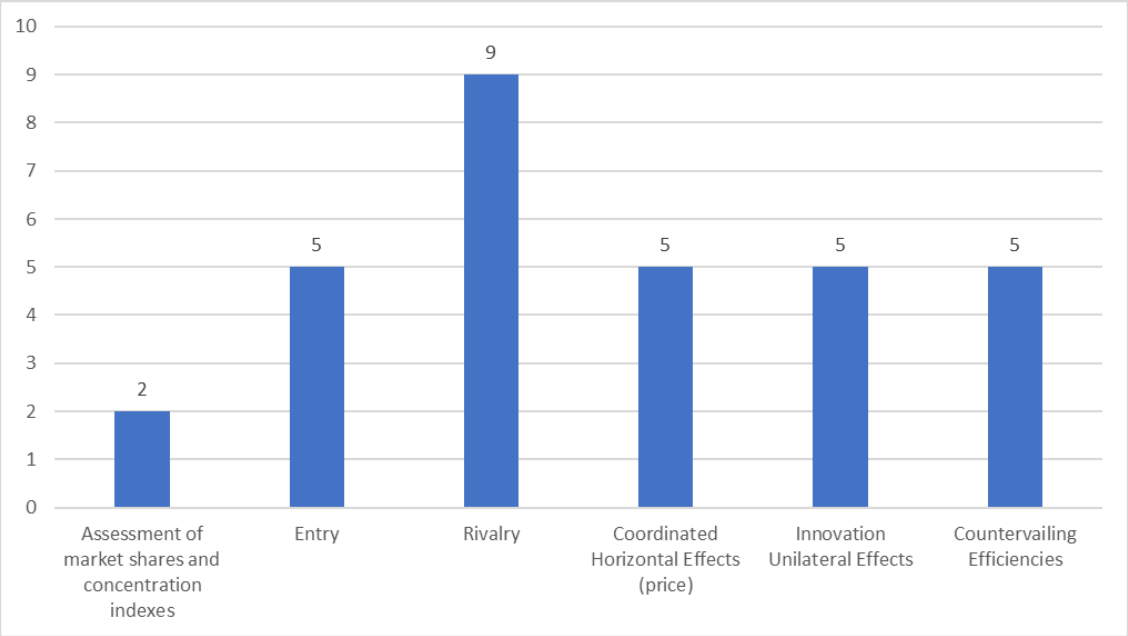
In *Halliburton/Baker Hughes* (2016)[45], the General Superintendence considers that there is innovation competition, and that the merger could reduce innovation efforts in the future.[46]

Countervailing efficiencies, positive innovation effects, are discussed in five cases: Stone/Linx (2021)[47], John Deere/Monsanto (2017), Reckitt Benckiser/Hypermarcas (2016)[48], Tigre/Condor (2015)[49], Bradesco/Banco do Brasil/Santander/Caixa Econômica/Itaú (2016)[50].

We can now proceed to discuss the steps in which there were innovation concerns in the standard analysis when considering for other merger potential effects (price mainly) for the nineteen cases assessed exclusively the standard analysis. Figure 1 represents the number of cases in which innovation plays a role in each step of assessment in the standard analysis

[43] Case 08700.000723/2016-07
[44] Report No. 13/2016 in Merger Case nº 08700.000723/2016-07 (John Deere/Monsanto) (CADE, 2016b).
[45] Case 08700.007191/2015-40.
[46] Technical Note No. 41/2015 in Merger Case nº 08700.007191/2015-40 (Halliburton/Baker Hughes) (CADE, 2015).
[47] Case 08700.003969/2020-17.
[48] Case 08700.003462/2016-79.
[49] Case 08700.009988/2014-09.
[50] Case 08700.002792/2016-47.

Figure 1 - Merger cases decided by CADE's Administrative Tribunal (2015-2021) with innovation concerns in each step of assessment assessed exclusively under the standard analysis



Source: own elaboration

First, in 2 cases innovation played a role in the *assessment of market shares and concentration indexes*. While in John Deere/Monsanto (2017) innovation is only mentioned as the reason for John Deere's leadership, in Itaú/XP (2018), XP's role as maverick makes the use of the HHI less important.

Second, in 5 cases there was a discussion on whether innovation-related aspects would affect *entry conditions*: patents (5), R&D expenditures (2), necessary time to enter the market through innovation (1) were mentioned.

Third, in 9 cases innovation played a role in *rivalry assessment*. In 3 of them there was a discussion on whether one of the firms was a maverick (along with aggressive behavior in other variables such as prices) - a concern present in the Brazilian HMG, as discussed in section 2 - and in the other 6 there was only a discussion on whether rivalry was innovation-based or if rivalry would stimulate innovation in the market.

Fourth, when it comes to coordinated effects in price, the Brazilian Guide for Horizontal Merger Review (2016) lists factors which make coordinated effects more likely and 2 of them are related to innovation: (i) technological homogeneity amongst firms; (ii) technological stability of products and processes (CADE, 2016a, p. 43-44). In 5 cases the effect of the firms' innovation efforts on coordinated effects likelihood was discussed, specifically debating whether there the market would be characterized by innovation, which could offset coordinated behavior, as mentioned in the Brazilian HMG.

When it comes *to unilateral innovation effects*, as presented above, CADE discussed it in 5 cases. Finally, as presented, in five cases countervailing efficiencies were discussed. It is important to recall that efficiencies related to innovation are mentioned in the Brazilian HMG, as discussed in section 2.[51]

Table 2 presents in which steps of the assessment each case had innovation concerns, including both Bayer/Monsanto (2018) – assessed under an innovation-specific assessment – and the cases assessed exclusively under the standard analysis.

[51] Another comment is that in four cases (including Bayer/Monsanto) there is innovation-related non-horizontal effects discussion regarding market foreclosure, which is not the object of this paper.

Table 2 – All Innovation concerns identified in mergers decided by CADE's Administrative Tribunal (2015-2021)

	Innovation market delimitation	Assessment of market shares and concentration indexes	Entry	Rivalry	Coordinated Horizontal Effects (price)	Innovation Unilateral Effects	Countervailing Efficiencies
GSK/Novartis (2015)					■		
Dabi Atlante/Gnatus (2015)				■			
Tigre/Condor (2015)					■		■
Continental/Veyance (2015)			■				
SBT/ Record/RedeTV! (2016)				■		■	
Halliburton/Baker Hughes (2016)			■	■		■	
Bradesco/Banco do Brasil/Santander/Caixa Econômica/Itaú Unibanco (2016)							■
Reckitt Benckiser/Hypermarcas (2016)			■				■
Saint-Gobain/SiCBRAS (2016)					■		
Ipiranga/Alesat (2017)				■	■		
John Deere/Monsanto (2017)		■		■		■	■
Itaú/Citibank (2017)				■			
Brink's/Rodoban (2018)					■		
Bayer/Monsanto (2018)	■	■	■	■		■	■
Itaú/XP (2018)		■		■		■	
Disney/Fox (2019)				■		■	
IBM/Red Hat (2019)				■			
Stone/Linx (2021)							■
Danfoss/Eaton (2021)			■				
Hypera/Takeda (2021)			■				

Source: own elaboration

5. Concluding Remarks

The assessment of innovation concerns in horizontal mergers cases is a challenge for antitrust authorities. The standard analysis procedure may be applied to address innovation competition and merger innovation effects when there is product market competition. The US, EU and Brazilian Horizontal Merger Guidelines are focused on the standard analysis and, at different levels, present such innovation concerns in a few steps of the assessment. The US HMG goes further than the other two and define unilateral innovation effects and the two channels in which they might occur.

However, there are cases in which innovation effects cannot be properly addressed by the standard analysis, when it is necessary to delimitate an innovation market and competition is strictly undertaken in this dimension and not in the product market. In this case, we need an innovation-specific assessment. The Innovation Market Analysis influenced the US Merger Control while the EU applied a new assessment in three cases since 2017: the four-layer competitive assessment. Although such procedures are not in the Horizontal Merger Guidelines in these jurisdictions, empirical works, especially for the US, show that innovation-specific assessments were undertaken. The application of such assessments is important, and they need to consider the principles of innovation competition – business-stealing, capabilities, and dynamic effects principle - and the specificities of the different ways in which innovation competition might occur.

The Brazilian Merger Control framework is focused on the standard analysis - as shown in its HMG and, following the European HMG, only briefly mentions the possibility of effects on innovation, considering innovation in a few steps of the analysis of potential merger effects on other variables (mostly price), such as the assessment of entry conditions, coordinated effects, the elimination of mavericks and efficiencies. With that in mind we undertook an exercise to assess the Brazilian case law to check to what extent CADE assessed innovation concerns. We found that innovation concerns were at stake in 20 cases from 2015 to 2021, 22.2% of the cases decided by the Tribunal, and appear in different steps of the assessment, and with only one being addressed on an innovation-specific assessment, a limited experience when compared to the US and EU.

As discussed, surprisingly, *Bayer/Monsanto* (2018) was the only case in which an innovation-specific assessment was applied. Furthermore, it is the only case in which the delay/interruption of innovation efforts channel of innovation effects was discussed, which is expected given the relation of this channel with innovation markets: the focus is on the effects on specific innovation efforts. The other cases in which negative innovation effects were discussed are related to the less incentive to begin innovation efforts channel, which is also expected given that competition occurs within the product market and effects would be related to a reduction in innovation incentives in the product market.

In Bayer/Monsanto, many topics for debate in innovation comes either from looking at past European case law in market definition and as a response to a report brought by the parties. It is also worth emphasizing that this case was also assessed on an innovation-specific assessment in the EU (the four-layer competitive assessment). In other cases, we also identified that the debate of innovation concerns was undertaken following the assessment of the same cases in other jurisdictions. In John Deere/Monsanto (2016), most of the debate on innovation comes from looking at the US DoJ's complaint on the case. In *Itaú/XP* (2018), a local case not assessed in other jurisdictions, it was recognized the need to address innovation concerns, but confessed that it still lacked the appropriate tools to undertake it.

Part of the timid assessment on innovation competition may be related to the fact that Brazil is a developing economy and many innovation efforts from firms which engage in mergers in Brazil are undertaken outside of Brazilian territory. However, Itaú/XP represents a case of an innovation-intensive merger between two Brazilian companies, showing that considering innovation competition is a necessary effort for CADE. Furthermore, although an isolated case, the assessment of Bayer/Monsanto (2018) was a first experience in the assessment of innovation concerns and a good opportunity for CADE to discuss internally innovation-specific assessments, as other innovation competition cases might not have been properly assessed.

It is important to leave a final note that CADE is far from being still when it comes to changing its procedures to adapt to ever-changing markets. Recently, the authority undertook efforts to catch up with

international jurisdictions in the assessment of mergers in digital markets.[52] Furthermore, it also important to emphasize that we only searched for cases assessed by the Administrative Tribunal. To have a complete analysis of the authority's position in innovation-related concerns, we need to also consider cases which were only assessed by the General Superintendence. Undertaking such task is a first recommendation for a research agenda.

A second and final recommendation for further research is building a framework for the assessment of innovation competition that not only adapts the standard analysis procedure and develops an innovation-specific assessment in similar grounds to international jurisdictions, but also that considers the specificities of innovation in Brazil. A proper framework would avoid reductions on innovation incentives in an economy which needs to protect its innovation efforts to catch up with developed economies. A first and easier step would be changing the Horizontal Merger Guidelines to include innovation concerns such as unilateral innovation effects and to include the two channels of innovation effects, following the US HMG. As discussed, although still timidly, these two channels are already being assessed by CADE.

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[52] The latest working paper on digital markets was published by CADE in August 2021 and can be found in https://cdn.cade.gov.br/Portal/centrais-de-conteudo/publicacoes/estudos-economicos/cadernos-do-cade/plataformas-digitais.pdf .

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