O Mercado de Educação Superior Público no Brasil: estrutura e conduta num mercado não-tradicional.

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Resumo: A educação superior é reconhecidamente importante para o desenvolvimento econômico e social de um país. Contudo, características intrínsecas ao produto educação superior e a consequente ação e presença do Estado no setor aumentam consideravelmente a complexidade de se analisar esta indústria. Neste contexto, o presente estudo objetivou analisar a concorrência no setor de educação superior pública no Brasil, com foco em instituições de alta qualidade, utilizando o *modus operandi* de autoridades antitruste ao redor do mundo. Especificamente, o mercado foi investigado em termos de suas características de estrutura e conduta. Os resultados mostram que instituições de educação superior (IESs) públicas enfrentam pressão competitiva de IESs particulares com qualidade elevada. Ademais, os mercados relevantes apresentam escopo geográfico mais amplo, com uma definição regional ou nacional, a depender da especificação de qualidade das instituições. No geral, os mercados não são concentrados e não geram preocupações anticompetitivas. Dentre as condutas praticadas pelas IESs, identificou-se que os processos seletivos independentes, a diferenciação de produto e a discriminação de preços são as ações mais relevantes e comuns entre instituições.

Palavras-chave: Educação superior; educação superior pública; concorrência na educação superior; organização industrial; educação superior e economia industrial.

Código JEL: L22; L32; L33.

Área temática: 1.2 Competição, preços e estruturas de mercado.

Abstract: Higher education is extremely important for economic and social development. However, the higher education product has intrinsic traits that require State intervention in the sector, which hinders the analysis of the industry via traditional methods of the Economics discipline. This study aimed to carry out an analysis of competition in the Brazilian higher education sector, focusing on high quality institutions and using the *modus operandi* of antitrust authorities around the world as a baseline. Specifically, analytical techniques from the field of Industrial Organization have been employed to assess structure and conduct. Results showed that public higher education institutions (HEIs) face competitive pressure from high-quality private HEIs. Additionally, relevant markets present a wider scope, with either regional or national range, depending on schools' quality. In general, markets are not concentrated and do not raise anticompetitive concerns. Independent admissions exams, product differentiation, and price discrimination were identified as the main conducts carried out by schools.

Keywords: Higher education; public higher education; competition in higher education; industrial organization and higher education.

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1. Introduction

From the perspective of Industrial Economics, the higher education industry has not been fully explored albeit this sector plays a major role in the modern economy. Higher education institutions (HEI) educate individuals and contribute to the production and diffusion of knowledge. The beneficial effects of education range from contributing to technological advances, providing a specialized workforce, increasing labor productivity, and increasing individual earnings, to improving community engagement and civic institutions – which justifies the presence of the State in the industry (McMahon, 2009; Hansmann, 2012).

Because of that presence, competition is far from traditional, with public institutions charging lower or no tuition at all. It might seem counterintuitive to talk about competition between public institutions, especially since they do not charge any tuition. Nevertheless, public higher education institutions (HEIs) are competing fiercely for students. Not only amongst themselves but with private institutions as well. Public HEIs might also compete for research grants and other productivity related benefits. Here the focus is exactly on identifying how these institutions compete in a setting where the product price is zero. In that scenario, quality emerges as an important competition variable. The geographical dimension of competition is also key, since proximity might be an important variable on the enrollment decision for students, depending on the geographical range of a particular institution (Hoxby, 1997).

With that in mind, this paper aims at analyzing public HEIs' competition dynamics under the light of the theory of industrial organization and under competition policy practices. In fact, the main objective is to draw from such theories and assess the shape of market structure and common action of players' conduct, drawing from the classical work of Bain (1959) with the Structure-Conduct-Performance (SCP) Paradigm – however, leaving performance for a further publication. Specifically, the objectives here are to define relevant markets in a convincing shape while accounting for the specificities of the public sector, assess market structure, and to identify what conducts are more commonly used by players in the industry.

A take on this subject is further motivated by the lack of relevant analyses of the competition in the public sphere – especially in the case of Brazil's higher education industry. Most studies focus on the private sector and its specificities, focusing mostly on structure. Nevertheless, these studies, alongside competition policy reports and analyses of the private sector constitute a starting point to analyzing the public sector. Also, it is important to note that while the focus of this study is on public institutions, there is still competition between public and private players – so they will be accounted for.

This paper is structured as follows: section 2 provides a brief literature review on industrial organization methods of analyzing markets, based on the SCP Paradigm and with focus on the higher education industry; section 3 puts forward the competitive assessment of Brazil's higher education industry, with focus on public institutions; and section 4 brings our conclusions and further research questions.

2. Literature Review

2.1 The SCP Paradigm

The SCP Paradigm's main components are: (i) basic conditions of supply and demand; (ii) market structure; (iii) conduct; and (iv) performance. Figure 1 illustrates the causalities between each variable:

Figure 1: The SCP Paradigm's Causalities
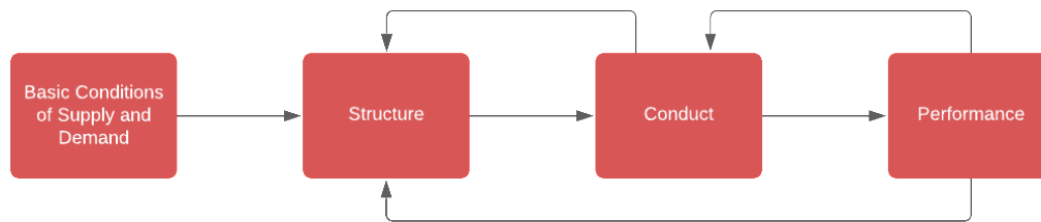
Source: elaboration by the author.

The **basic conditions of supply** consist of any important intrinsic traits of the product that is commercialized in the market, such as the inputs (that is, what resources are used to produce the good in question, how is their market configured and how does that affect the industry in question?), the technology used to produce it (the technical and technological features of the organization of the productive process), its durability, value to weight ratio, as well as the legal and regulatory framework surrounding the product in question, and other traits such as risk and importance to other sectors. On the other hand, the **basic conditions of demand** consist of the product's price elasticity of demand (a rise in price affects demand in what way?), what are its substitute goods (are the closely substitute goods?), the growth rate of demand, cyclical and seasonal characteristics, buying methods and market types. When combined, these factors are of great influence on the structure of the market (Hasenclever and Torres, 2012).

In turn, **market structure** assessment begins with the definition of relevant markets, which constitute the exact geographic space and product specifications within which competition takes place. Formally, an antitrust, or relevant market, is defined as "a collection of products or services, and a geographic region, that would form a valuable monopoly" (Baker, 2007, p. 133). The importance of proper relevant market definition stems from its effect on the inference of market power. Given a specific antitrust market, defining it more narrowly greatly overstates the potential market power held by firms, and vice-versa. Therefore, efforts must be made to correctly measure the correct scope of relevant markets (Massey, 2000).

Product market refers mainly to the perception of consumers regarding what products are substitutable (demand substitution) based on product characteristics. There is also supply substitution, used more often by European authorities, which concerns the possibility of outside firms entering the market in a timely manner without incurring elevated costs (Baker, 2007; Elizalde, 2012). However, there is greater focus on demand substitution (Massey, 2000; Baker, 2007).

Geographic market definition can be quite relevant, especially for services that require the presence of the consumer, like healthcare or presential education since supply is not able to move around geographically. Therefore, "identifying the set of market participants", in other words, which players effectively exert competitive pressure on one another, "is critical for defining the relevant geographic markets (and vice versa)" (Elzinga and Howell, 2018).

On that note, the **hypothetical monopolist test** is the empirical method usually applied for the exercise of market definition for both dimensions: product and geographic. The test consists of assessing whether a hypothetical monopolist would be able profitably raise prices through a significant but sufficient non-transitory increase in price (a SSNIP between 5 and 10%), assuming a product market and a geographic market definition. If consumers deviate to other areas or other products, then the scope of test is widened until the monopolist can profitably raise prices (Baker, 2007; Motta and Salgado, 2015). While prices are not a trustworthy tool for the sector in hand, the algorithm of the hypothetical monopolist test can be used: start with small markets and

product definitions, and slowly widen these definitions to see whether consumer tend to deviate to other areas or products.

Antitrust analyses rarely focus on **supply-side substitution**, with it being more of a complementary factor, and place greater importance on demand-side substitution. One case where it might be relevant is when the production process of different products is similar to the point of allowing firms to seamlessly switch between producing one or the other (Motta and Salgado, 2015). After all, the product must be substitutable for consumers, and this is what most antitrust agencies use when determining relevant markets, since it gives a greater sense of possible market power. This is probably one of the most important parts of analysis, given that a relevant market definition that is too narrow or too broad might not provide a clear picture of the competitive process in a certain market (Baker, 2007). It all comes down to how consumers perceive a product in relation to others regarding how similar they are. For example, one might think that all HEIs provide the same product: higher education. Nevertheless, each institution provides a set of courses with varying degrees of substitution between them, and at different quality levels.

Product differentiation is a defining factor when determining relevant markets, since two products (or services) that appear to be the same – for example, two business administration courses in different institutions – might be seen by consumers as having completely different characteristics, based on some difference in its aspects. Product differentiation is quite relevant when defining the relevant market, as has been exposed, but it also gives the producers of a particular product that consumers see as differentiated a certain margin to impose price increases. That is because product differentiation must be analyzed through the eyes of the consumers, and it occurs if consumers perceive two possible products as different. In that case, producers may be able to impose higher prices, because they face a steep residual demand curve (Losekann and Gutierrez, 2012). However, one must remember that "some product differentiation or gradation in quality is permissible within a properly defined market" (Baker, 2007).

Now, turning to **market concentration,** one can infer as to the competitive dynamics in a market looking at its concentration indexes. One can interpret indexes to infer if there is a dominant firm in the market, e.g., if there is one firm with most of the market and a competitive fringe of smaller firms, if the market is an oligopoly there are a few firms with large market shares, or if it is close to a perfect competition market, with many firms showing low market shares.

Finally, relevant market delimitation is especially important when calculating a concentration index, because if close substitutes are not considered, then the index will lack in realism and provide biased conclusions (Resende, 1994). Nevertheless, concentration indexes are still particularly useful as analytical tools. These indexes are measured through the **market share** of firms, which is defined as firm i's sales divided by total sales in the market:

$$\text{ms}_i = \frac{sales_i}{total\ sales} \qquad (2.1)$$

Where ms_i is the market-share of firm i, $sales_i$ is the total sales of firm i, and $total\ sales$ refers to the total sales in the industry's relevant market.

The $\boldsymbol{n}$**-firm concentration ratio index** (**CR**$_n$) is defined as the sum of market shares, in decimal or percentages, of the n biggest firms in an industry:

$$CR_n = \sum_{i=1}^{n} ms_i \qquad (2.2)$$

While it is useful to assess the degree of concentration of a given number of players in an industry, it says nothing about the relative market share of the n firms and ignores the market shares of firms outside the

n biggest firms. Because of that, it does not capture changes outside these biggest *n* firms, such as a mergers, or if a smaller firm is gaining market share (Resende, 1994; Shy, 1995). Remember that Bain's work concluded that a CR_8 higher than 70% showed a positive correlation with elevated profits over time, indicating market power. Other works[1] tend to use the CR_4 as measure, with benchmarks of possible market power varying around 40% and 60% (Tremblay and Tremblay, 2012). Antitrust authorities do not commonly rely heavily on the CR_n to make conclusions, using it as a starting point for market power assessment, unless the operation constitutes a clear merger to monopoly or merger to a very tight oligopoly.

As a matter of fact, the authorities tend to prefer the **Herfindahl-Hirschman Index** (**HHI**), which provides a fuller picture of the market, since it encompasses all firms (*n*) in the relevant market:

$$\text{HHI} = \sum_{i=1}^{n} ms_i^2 \qquad\qquad (2.3)$$

The HHI ranges from *1/n* (which tends to zero when n approaches a considerably high number) to 1 if expressed in decimals and *1/n* to 10,000 if expressed in percentages, with *n* being the number of players in the relevant market. This index is preferable to the CR_n because it decreases when the total number of firms *n* rises and increases if there are firms with greater market share. Since it is a squared index, it puts greater emphasis on bigger market shares, being more useful when assessing market power. When the HHI is close to zero, it would mean that the market is close to perfect competition, and when the index approaches 1 or 10,000, the market is approaching a perfect monopoly. Therefore, the Herfindahl-Hirschman Index depends both on the number of companies *n* operating in the market and on their relative market shares, with bigger firms weighing more (Resende, 1994; Shy, 1995). One interesting result is that the HHI equals *1/n*, n being the number of firms in the market, when the market is a symmetric oligopoly – that is, when all firms have the same market share (Tremblay and Tremblay, 2012).

In fact, Brazil's antitrust authority, Cade (*Conselho Administrativo de Defesa Econômica*), determines that markets are not concentrated if the HHI is less than 1,500 points, moderately concentrated if it is between 1,500 and 2,500 points, and highly concentrated if it is greater than 2,500 points (Brazil, 2011; Cade, 2016). This notion varies between agencies, but not to a great extent. Figure 2 summarizes the indexes presented and their respective benchmarks:

Figure 2 - Concentration Indexes

Index	Description	Specification	Benchmark
Market share	Share of the total market held by a player	$\text{ms}_i = \dfrac{sales_i}{total\ sales}$	$ms > 20\%$
CR_n	Share of the total market held by the *n* biggest players	$\text{CR}_n = \sum_{i=1}^{n} ms_i$	$CR_4 > 40\%$; $CR_8 > 70\%$
HHI	Sum of the squared market shares of all the players in a market	$\text{HHI} = \sum_{i=1}^{N} ms_i^2$	Moderately concentrated: $1.500 < \text{HHI} < 2.500$ Highly concentrated: $\text{HHI} > 2.500$

Source: elaboration by the author.

However useful these indexes may be for inferring market power, concentration does not hold a causal relation to market power. Some industries are clearly more prone to concentration precisely because of their

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[1] Scherer (1970), Shepherd (1997), and even the Department of Justice and Federal Trade Commission, according to the earlier Merger Guidelines, up until 1982.

structural characteristics, like for example the presence of economies of scale or a minimum efficient scale, and the technology employed (Scherer, 1970), as has been said before, which calls for caution when assessing any industry only by its concentration indexes.

In fact, one can find a relationship between market power and concentration through a specific formulation of the Lerner Index (L). If we express the price-cost margin as a behavioral parameter θ, which increases when competition decreases, that is, when p becomes greater than marginal cost (MC) and tends to zero when $p = MC$, and remember that the HHI equals $1/n$ in a symmetric oligopoly, we can get a very useful form of the Lerner Index (Tremblay and Tremblay, 2012):

$$L = \frac{\theta . HHI}{E_p^d} \qquad\qquad (2.1)$$

This equation expresses that market power increases when: (i) concentration (HHI) increases; (ii) when the price elasticity of demand (E_p^d) decreases; and (iii) when competition becomes less fierce (q increases). This specification of the index may be quite useful because it uses variables that are relatively easy to estimate and can provide a good picture of competitiveness in the market (Donsimoni *et al.,* 1984; Tremblay and Tremblay, 2012).[2]

That said, competition policy is concerned with what generates market power and how it affects social welfare. First, not every monopoly or oligopoly is certain to yield and exercise market power. Firms are constantly seeking to innovate to obtain monopoly profits, and that is a perfectly legal way of getting them, just as making efforts to increase efficiency, etc. Therefore, competition policy is concerned with situations in which firms obtain market power by carrying out anticompetitive actions, or when they exercise that market power. It is also important to note that competition policy tends to favor the maximization of consumer welfare, putting greater weight on it over producer welfare.

Closing the main variables of market structure, we have **barriers to entry**. Their main causes are scale economies, sunk costs, minimum efficient scale and absolute cost advantages, in addition to advantages related to product differentiation, expenses with propaganda or capital requirements (Tirole, 1988; Shy, 1995). These barriers are important because they dictate the possibility of potential competition, meaning players entering the market if the find it beneficial, which would increase the degree of competition.

Variables of **conduct** translate the *actions* taken by players in a competitive setting. In other words, studying player's conduct is an attempt to understand *competition* itself inside a market, in contrast to a theoretical competitive setting or model. Here, the aim is to identify ways players interact with each other while they attempt to achieve their goals and maximize their target functions. Of course, the basic conditions, structure and even performance might influence these actions.

2.2 Empirical Review

Most studies dealing with the higher education product stress the presence of **peer effects** and **information asymmetry**, in addition to regulation, of course. Peer effects relate to fact that consumers (students) are also inputs in the production process to a school, and the higher a student's quality, the higher the school's final quality level. In fact, peer effects create a considerable incentive for HEIs to capture the best students they possibly can (McPherson and Winston, 1991; Rothschild and White, 1995). On the other hand, the higher education good is an experience good, meaning that one must buy said good to fully assess its quality. In turn, the choice of purchase is rather costly since students usually take four years to graduate. This

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[2] See Donsimoni *et al.,* (1984) for more on the Lerner Index and ways to calculate market power in an entire market.

would be the only direct way to gauge a HEI's quality – that is where the information asymmetry comes from (McPherson and Winston, 1991; Salerno 2004).

In terms of market definition, a common point in the literature is that markets for high-quality higher education are wide, usually regional and sometimes national (Hoxby, 1997; Weisbrod *et al.,* 2008). A useful process to determine relevant markets in higher education is to (Becker and Round, 2009): first, start with the exact object of study (course, program, institution, and so forth) and the purpose of the inquiry; in fact:

> "it is easy to talk about the 'market for higher education', but this expression belies the many smaller, more specialized markets that exist. […] So two schools in the same state, or even in the same community, may be poor substitutes for each other, but each may be an excellent substitute for schools in distant locations. *A school that is perceived as unique in some material way is at least partially insulated from competition, which gives schools an incentive to seek out a market niche and advertise it."* (Weisbrod *et al.,* 2008, p. 46)

Second, identify substitutes in terms of supply and demand - In terms of **supply substitution,** the current precedent set by antitrust authority for the undergraduate market is that product market consists of the individual courses offered by institutions. In terms of supply substitution, since teachers can be hardly employed outside their general area of expertise, it makes sense. Special attention must also be paid to applied courses that require expensive facilities and equipment, which constitute a necessity for the supplying of these courses and can hardly be used to other ends as well.

Additionally, in the absence of price, **quality** and prestige take a leading role when considering **demand substitution**. In fact, prospective students might not consider the same course in different institutions as substitutes. This happens not only with specific courses, but at the institutional level. In that regard, public and non-profit institutions tend to present higher levels of quality, for the simple fact that they are not maximizing profits, but rather their stated mission, usually related to quality and access (Massy, 2004; Weisbrod *et al.,* 2008). And perhaps more important, even with a price difference, institutions need not be substitutable to every single student to widen the relevant market:

> "It has to be born in mind that not the average consumer's perspective is decisive, but that *a significant number of the marginal consumers considering a course or an institution as an alternative is sufficient to broaden a market*." (Gideon, 2017, p. 71, *emphasis added*).

Considering that, we turn to the third item, which is the definition of **relevant geographic market** – which, as has been said before, can be considered regional or national, depending on the quality level specified.[3] The fourth item is **potential competition**, which raises the question of **barriers to entry**. The industry does present elevated barriers to entry, caused by high information asymmetry, high economies of scale and sunk costs, great necessity for specialized labor, in addition to the strong regulation and legislation surrounding the sector. Finally, the fifth item on the checklist is to account suppliers to the HEIs. However, due to the lack of data on the subject, this item could not be analyzed.

In terms of **conduct,** the main actions carried out by HEIs are price discrimination and product differentiation, as well identified attempts to exert local geographic dominance through independent admission's processes.

3. The Public Higher Education Industry in Brazil

This section applies the theoretical framework exposed earlier to the public higher education industry in Brazil, addressing how schools compete for students in a setting with such a high price differential. Data utilized consists of the Higher Education Census (*Censo da Educação Superior* or CENSUP) for the year of

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[3] For empirical studies regarding the definition of relevant geographic markets or the assessment of a school's "radius", see: Leppel (1993), Hoxby (1997), McMillen *et al.,* (2007), Weisbrod *et al.,* (2008), Alm and Winters (2009), and Elzinga and Howell (2018).

2018 only, made available at the website for the *Instituto Nacional de Estudos e Pesquisas Educacionais Anísio Teixeira* (INEP).

Schools analyzed here are those that grant undergraduate degrees in presential modality, and meeting a certain level of quality. A college is the first classification a HEI receives. Colleges are usually centered around one area of knowledge and have no organizational autonomy in the sense that the courses and activities offered must be approved by the Ministry of Education (MEC). University centers, on the other hand, are given organizational autonomy but are not required to produce research or offer extension activities, which is the prerequisite of universities. In addition to that, in order to be granted the status of university, a HEI must have one third of its faculty with a master's or a PhD degree, as well as on a full-time regime.

3.1 Basic conditions and barriers to entry

This section applies the theoretical framework exposed earlier to the public higher education industry in Brazil, addressing how schools compete for students in a setting with such a high price differential. Firstly, **regulation** plays a major role in defining basic conditions. Specifically, Law 9394/96 sets the directives and baselines of national education. Article 43 provides the mission statement of higher education in Brazil, which emphasizes cultural and academic diversity, research, and integration with local communities. Additionally, the **legislation** determines that education in public schools will be completely free of tuition at all levels of education. new public HEIs must be created by law, which is a complex and bureaucratic process. This is even more relevant if considered that public HEIs do not usually compete directly with their private counterparts – although there are exceptions – because of the difference in quality. That might result in diminished competition in geographic terms, which will be further explored. There is also intense course accreditation and regulation, which in conjunction with scale economies, contribute to elevated barriers to entry (Brazil, 1996; Weisbrod *et al.,* 2008; Teodorovicz and Leandro, 2015).

The National Education Plan (Law 13.005/2014, *Plano Nacional de Educação, PNE*) is the piece of legislation that sets the goals and strategies for the education sector. The effect of the law on the conduct of players, especially public institutions, must not be undermined. For example, it sets the goal of increasing enrolments and the shares of these new enrolments in the public sector (Brazil, 2014). Enrollments have increased 950% from 1996 to 2018, and most of that increase has been absorbed by the rise of a massified (and generally lower quality) private sector – although the total number of enrollments has grown for public institutions as well. Despite the growth in enrollments, there are high economies of scale, the regulatory requirements, and especially the fact that creating new public universities at a high quality level is almost impossible translate into elevated **barriers to entry** for the industry.[4]

3.2 Relevant Markets

Turning to **relevant market definition,** product market definition will be carried out, followed by geographic market definition. For the specific case of Brazil, the classic SSNIP hypothetical monopolist test (small but significant and non-transitory increase in price) is not a good option, since tuition is free for public institutions. That does not mean it is not useful either. One can use a part of its algorithm, even without calculations. Specifically, one can start with small markets and test them against a hypothetical consumer choice, widening the markets as seems fit. Combining this algorithm with Becker and Round's (2009) checklist provides a robust result for market definitions.

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[4] Nevertheless, there is great variance across the years int the players that compose relevant markets according to the quality rating considered. That happens because the *Índice Geral de Cursos* (IGC), MEC's composite quality index, varies according to the evaluations in a given period of time. Therefore, barriers to entry constitute a complex topic in this industry. Relevant market definition applied to Brazil will be further explained in its respective section.

In terms of **product market definition**, firstly we know that students (consumers) choose between HEIs according to several criteria: tuition price, school quality, the student's grade on admissions, distance to the student's hometown etc. In terms of supply substitution, although these types of institutions might differ in terms of managerial autonomy, they mostly provide *undergraduate degrees*, which is the focal point of this analysis. On that note, it is safe to assume that the dynamics of competition – in other words, the interaction between institutions and their incentives to capture the best students – does not vary greatly between specific courses. Also, when dealing with public institutions the number of courses that do not overlap is usually small. Public institutions offer a diverse set of courses, and the occasional one that differs from what other institutions are offering is usually attributed to a specific specialization of that institution. Nonetheless, the majority of the public institutions studied here offer the same courses – courses with high demand, fiercely disputed by prospective students. Then, when devising the general framework of the industry, it can be useful to look at the sector with no in-depth course division. Finally, when making the choice between public universities, students might be seeking to enroll in the institution of the highest quality – in accordance with their grades in the selection exams. And since tuition is free, a great share of the students would be willing to move to other cities, depending on the distance to their base location, their socioeconomic background, and the quality of the institution.

Therefore, the argument here is that product market definition is determined mainly according to the **quality level** of institutions. This is not to say that different courses do not make each a different product market definition, and some examples of specific courses will be analyzed at markets. However, the main point here is that, in general terms for the industry, we can use a wider scope for this market, focusing on quality. The measure used here to devise markets according to quality is the "General Course Index", or *Índice Geral de Curso* (henceforth, IGC), which is a composite index of quality ranging from one to five.

Nonetheless, product market must be paired with **geographic market** in order to constitute a relevant market. Concerning this junction of geography and product, it is clear that students will be willing to move further away the higher the quality of the HEIs they wish to enroll. Therefore, I propose three scopes of relevant markets for the industry: (i) a municipal, IGC = 4 and 5 market; (ii) a regional, IGC = 4 and 5 market for the southeastern region; and (iii) a national, IGC = 5 market.

3.3 Concentration

3.3.1 Municipal Markets

Firstly, we must stress that concentration indexes will be calculated according to the number of students enrolled in each school. In this section, the municipal markets of Rio de Janeiro, Belo Horizonte, and São Paulo will be analyzed. Starting with an exploratory exercise, the Rio de Janeiro market is quite illustrative of how choosing the right specification is so important. If we determined a definition of absolute highest quality, the market would only have four players, with one of them (UFRJ) holding 97,2%, in an almost effective monopoly, with a CR_4 of 100% and an HHI of 9448 points. However, students that are located in the city of Rio de Janeiro might be compelled to explore other options of schools, even going to lower quality. Additionally, another reservation to be made regarding this scenario is that, in this scope, the correct product market definition would be to analyze course by course, since EEFTESM provides only one course, FGV supplies five and IME supplies 10, versus 84 from UFRJ. Product markets could be divided into three groups, according to these institutions: nursing is the first, administration, economics, law, social sciences, and mathematics is the second, and the third is made of the ten courses in the area of engineering offered by IME.[5] An analysis of different product markets will be made at the end of this section. Therefore, we see that the correct specification is that of an IGC of four and five for municipal markets.

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[5] These courses are: civil engineering, chemical engineering, electric engineering, engineering of materials, mechanical engineering (involving weaponry and vehicle engineering), electronic engineering, and communications engineering.

Table 1 summarizes the results of all municipal markets combined, accounting for geographic and product definition, as well as the number of players and concentration indexes:

Table 1: Summary of Municipal Relevant Markets

Market	Geographic	Product	n	Private	Public	CR4	CR8	HHI
1. Municipal RJ	City of Rio de Janeiro	IGC = 5 and 4	19	23,0%	77,0%	66,8%	88,0%	1412
2. Municipal BH	City of Belo Horizonte	IGC = 5 and 4	8	50,5%	49,5%	98,4%	100,0%	4032
3. Municipal SP	City of São Paulo	IGC = 5 and 4	27	80,8%	19,2%	87,7%	95,1%	3532

Source: elaboration by the author based on data by INEP (2018).

Adding institutions of IGC = 4 to **Rio de Janeiro's market (Market 1)** makes it less concentrated, but it could still be considered a concentrated market when accounting for the CRs. UFRJ is still the biggest player in the market, with approximately 24,5% market share. However, there are new considerably big players, both public and private. UFF comes second with 18% and, while located in the neighbor city of Niterói, most of its *campi* are just a 20-minute ferry ride away from downtown Rio, under the 20km range. Being a high-quality, large, and diverse institution, it must be accounted for. Unicarioca and PUC-Rio appear as the two biggest private players, and as the only private players with a market share higher than 2%. There are a few big players and many smaller ones, with larger players being mostly public HEIs, with the exception of Unicarioca and PUC-Rio. This points to a tendency of symmetry between certain players, namely these two groups: one composed of big public institutions, and the other composed of small private institutions.

Moving to **Belo Horizonte (Market 2)**, despite the greater equilibrium between the public and private sectors, there are only eight players in the market. Not only that, but the four biggest players hold 98,5% of the market. Additionally, the HHI is considerably higher than the 2.500 points, at 4.032 points, which translates into a very concentrated market. This could be considered an effective oligopoly. The largest player– by a small margin – is PUC Minas (45,08%), a private school. It is followed closely by UFMG (44,25%), the main public school in the state. Together, only these two players hold a combined market share of 89,33%, which is very high. The third biggest player is CEFET/MG, with 4,93% of the market, followed by ESDHC, with 4,17%. Three schools with a share lower than 1% complete the market.

Turning to the **city of São Paulo (Market 3)**, there are 27 players in the market, and it is still a highly concentrated market, with a CR_4 of 87,65% and a CR_8 of 95,09%, this relevant market stands in between Rio de Janeiro (as the less concentrated) and Belo Horizonte (with a CR_8 of 100%). The biggest player in the market is by far UNINOVE, with 153.407 students and 56% of the market. This is the biggest player for all markets in the year of 2018, and it is a private school. USP comes as a distant second, with 14,73%, followed by Mackenzie, with 11,36%. The private sector holds almost 81% of the market in the city of São Paulo, that being by far the highest share amongst the capital cities studied here. Additionally, approximately 34% of students in private school receive funding aid or scholarship. It is worth noting that USP is considered by many universities rankings as the best institution in the country. Being prestigious and highly selective, it is not the biggest public university in the country. In fact, while public institutions do not hold a great share of the city of São Paulo, the scenario changes when assessing a wider definition.

3.3.2 Regional Markets

The composition of this relevant market in terms of number of institutions and number of students provides interesting insight. Here, the number of enrollments is quite balanced between public and private institutions. However, when accounting for the number of institutions according to ownership, the share of private institutions is of 73,8% and of public institutions is of 26,2%. Consequently, the average size of public institutions, at 14.670 students, is indeed higher than that of private institutions, at 5.052. That might be because

public institutions tend to provide more courses, in average. This reflects the private sector's tendency to provide courses that are more cost-effective and are more applicable to the market. Additionally, high quality private institutions tend to be specialized in certain niches or courses. Table 2 summarizes the results for the regional markets:

Table 2: Summary of Regional Relevant Markets

Market	Geographic	Product	n	Private	Public	CR4	CR8	HHI
4. Regional SE	Southeastern Region	IGC = 5 and 4	144	49,2%	50,8%	28,7%	43,0%	386,62
5. Regional SE: Public	Southeastern Region	IGC = 5 and 4, Public	39	0,0%	100,0%	35,4%	56,2%	531

Source: elaboration by the author based on data by INEP (2018).

This scenario (**Market 4**) yields a market that is not considered concentrated by any benchmarks. The CR_4 is below 40%, CR_8 is below 70%, and the HHI is well below 1.500 points. In fact, this scenario is interesting because it encompasses important regional players in the private sector as well as in the public sector, providing a glimpse into their competitive dynamics.

For example, PUC MINAS is the biggest provider in the state of Minas Gerais, with 4,6% of the southeastern market, well above UFMG's 3,26% (the second biggest player in Minas Gerais). This is important because usually the biggest players in a state are public institutions, and this shows a situation in which a private institution has the prestige and size to rival public institutions. In fact, Minas Gerais is a large state with many localized prestigious public institutions, outside of the capital, Belo Horizonte. For example, UFJF (1,85%), UFU (2,04%), UFV (1,38%), UFOP (1,21%), UFSJ (1,19%), and UFLA (1,01%) might all be considered substitutes, since they provide mostly the same courses, but are spread out between different sub-regions.

Turning to Rio de Janeiro, PUC-Rio is also considerably large, with a market share of 1,5%. However, Unicarioca is the biggest private player in the state, with 1,54% market share. As these institutions provide a wide array of courses, they do rival with big public institutions, but perhaps to a lesser extent, since market shares show that they are not able to capture as many students as the public institutions in the region. In fact, in Rio de Janeiro, UFRJ (4,6%), UFF (4,25%), UERJ (3,02%), and UFRRJ (1,64%) are the biggest players – all public – followed by Unicarioca (1,54%) and PUC-Rio (1,5%).

The biggest public players in the state of São Paulo are USP (5,38%), UNESP (3,74%), Unicamp (1,79%), UFABC (1,45%), UFSCAR (1,29%), and UNIFESP (1,1%). Located in the capital are USP, UNESP, and UNIFESP, as the other three (Unicamp, UFABC, and UFSCAR) are located in other large urban areas. Once again, there is a pattern of prestigious public universities spread out through the state, covering different geographic sub-regions.

The state of São Paulo provides an interesting insight into competition because of the existence of many relatively big private institutions. Examples are Uninove (14,1%), Mackenzie (3,04%), Unioeste (1,78%), PUC-SP (1,39%), and Uniararas (1,07%). Uninove may be an outlier case, as it is focused on mass education, which is usually related to lower quality. Nevertheless, with an IGC = 4, it makes the list.

These institutions offer a wider option of courses when compared to other private players and could rival public institutions. This group of institutions also presents considerable geographic capillarity, since only PUC and Mackenzie are placed in the capital. On the other hand, there are other smaller, specialized private players, such as ESPM (0,46%) and FGV (0,29%), that are located in the capital and are particularly competitive when assessing the courses they offer.

Around 40,5% of students from private schools receive funding or aid. This number is quite elevated when one considers the size of this market. Also, it provides further support to the argument that private

institutions can at least, offer aid and funding to students that are enrolling in schools. Therefore, in terms of student decision and its effect on market definition, one can argue that private and public schools can be seen as substitutes.

However, it is not clear whether the smallest private institutions have the capability of providing funding with such consistency. Also, it is hard to pinpoint student decision concerning the substitutability between a private IGC = 4 school and a public IGC = 4 school. In fact, on the one hand, smaller private institutions that are not as prestigious as the more established players may not be able to provide student support or may not be considered good substitutes to public institutions. On the other hand, the bigger private players tend to be less concerned with quality. That is why a separation has been made between a specification of the market accounting for all HEIs and one where only public HEIs are considered.

Accounting only for public institutions (**Market 5**), one sees that the biggest institutions are mainly located in metropolitan areas, especially for the small – in size – state of Rio de Janeiro, which shows no institutions outside of its metropolitan area. An interesting trend in São Paulo is the existence of many traditionally technical schools offering degrees at a bachelor's level.

Another interesting fact is the large concentration of students in the capital and dispersion of big institutions in other important cities of the São Paulo state. This tendency is even more intense in Minas Gerais, where UFMG is relatively small when compared to the big institutions of the other states, but Minas Gerais presents the highest number of relatively big institutions spread out through the state. Finally, UFES and IFES are the only schools in the state of Espírito Santo that fit this market, being comparable in size to secondary institutions in other states.

We see yet another non-concentrated market, with a CR_4 of 35,41%, a CR_8 of 56,21%, and an HHI of 531,94 points, raising no anticompetitive concerns. This table makes the distinction between the biggest, capital cities institutions, and other big but regional institutions, easier. While the biggest institutions have well over 30.000 students, the others tend to vary between 10.000 and 30.000. Interestingly, one can argue for the existence of a competitive fringe, made of smaller institutions, with at most 6.000 students, especially in Minas Gerais and São Paulo.

3.3.3 National Markets

In terms of national markets, four specifications have been analyzed, all of them with the highest IGC quality rating of five. The first national market makes no distinction between courses, while the other three analyze HEIs that provide only the courses of Business Administration, Economics, and Law, respectively. Table 3 summarizes these resuls:

Table 3: Summary of National Relevant Markets

Market	Geographic	Product	n	Private	Public	CR4	CR8	HHI
6. National	Brazil	IGC = 5	29	2,6%	97,4%	49,1%	78,4%	916
7. Business	Brazil	IGC = 5, Business Courses	17	34,3%	65,7%	53,7%	80,2%	1002
8. Economics	Brazil	IGC = 5, Economics Courses	15	17,3%	82,7%	50,4%	78,4%	936
9. Law	Brazil	IGC = 5, Law Courses	10	97,7%	2,3%	73,6%	94,0%	1870

Source: elaboration by the author based on data by INEP (2018).

Upholding the first criteria (**Market 6**) are 29 institutions from three regions and nine states in the country. Notably, there is no institution in this category from the North and Midwest regions, and there is only one from the Northeast.

Here we have a fuller understanding of the high-quality higher education industry. The CR_4 equals 49,1%, which could characterize a concentrated market depending on the benchmark chosen, which is between 40 and 60%. The CR_8 equals 78,43%, higher than Bain's 70%. However, player size is much more balanced,

as shown by an HHI of 916 points, making the national scope a non-concentrated market. This means that there are many players with similar market shares, especially between the seven biggest players (7% to 15%).

Another interesting fact is that the private sector holds only 2,6% of the market. The biggest private provider has 3.149 students, while the average public institutions has around 23.000 students. Thus, public institutions tend to provide greater quality and are able to provide a greater number of courses and maintain an elevated quality standard, while private institutions with an IGC rating of five tend to be specialized in certain areas of knowledge or in certain courses. Albeit this is more common for private institutions, there are very small players, with less than 0,1% market share, in both public and private domains. Since this is a consequence of these institution providing only a few courses, usually in the same general area of knowledge, this can be interpreted as a tendency to differentiate, or to specialize, into specific niches. This will be further explored in section 3.4, according to the discussion on players' conduct.

Regarding the market **Business Administration courses (Market 7)**, it is clear that this specification of the national market constitutes a much more concentrated one than when accounting for students enrolled in all courses within each institution (Market 6). Despite a relatively low HHI presenting 1002 points, with a CR_4 at 53,66%, and a CR_8 at 80,17%, this could be considered a concentrated market. The high CRs and a low HHI indicate that the market is also quite symmetrical. Additionally, the difference between the public and private sectors shares are much small, with 65,7% and 34,3%, respectively. Another interesting result is that UFRGS shows a quite relevant share of the market, with 15,49%, being the biggest public school in the Business Administration product market. FGV SP and INSPER dominate the market alongside other big public HEIs, while smaller private schools complete it.

The case is not much different when considering the **courses of Economics (Market 8)**, which is once again a market with higher concentration than the full national market. The market's concentration ratios show a highly concentrated market, with the HHI being lower than the threshold of 1.500 points indicating that it is also highly symmetrical. Here, UFRJ is the biggest player with 15,7% market share, followed by UFPR, UFSC, and UFRGS, all in the 11% range. The biggest private player is INSPER, with 10,44%. Interestingly, the public sector has a much higher share and dominates the market of economics courses, with 82,7%.
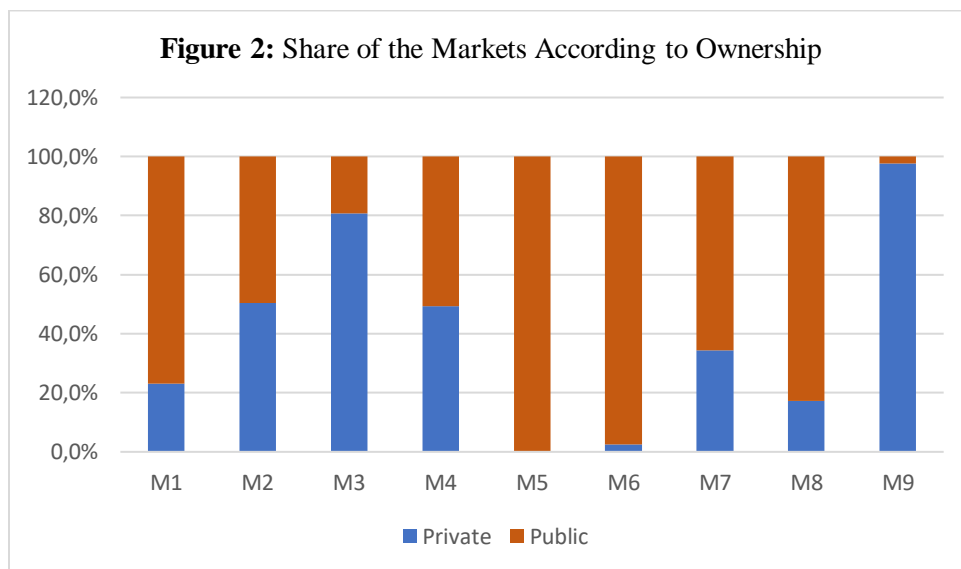
The trend of higher concentration continues for **Law courses (Market 9)**. In fact, this is the most concentrated of the three product markets, with 73,6% CR_4 and 94% CR_8, and a 1870 points HHI, indicating to a highly concentrated market. In addition to that, the share of the market the public sector holds is 90,2%, with UFRJ taking 31,8% of the market, and UFMG with 23,5%. The fact that the economics and law markets are more concentrated than administration and, specifically, that the public sector's share is higher, could be explained by the fact that these are disciplines that do not tend to generate a higher return to universities. Therefore, the private sector would not have a great incentive in providing them. Nonetheless, that is hard to measure.
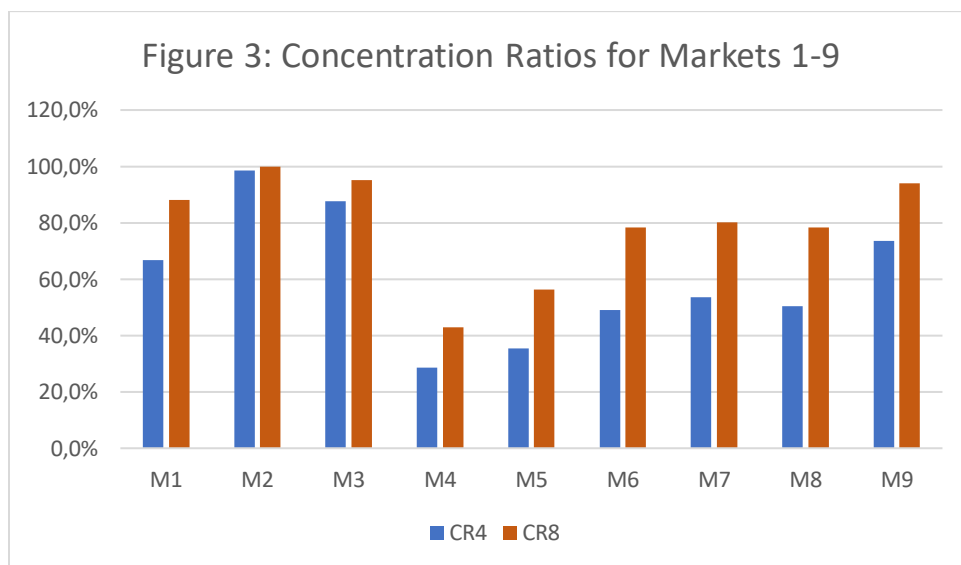
3.3.4 Comparing Markets

It is quite interesting to see how these markets compare amongst each other regarding their indicators and composition. First, Figure 2 shows how the share of public institutions is quite varied between markets.

The notable exception is Market 6, the one with the highest quality and national scope, where the public sector holds 97,4% of the market (of course, excluding Market 5, which by definition accounts only for public institutions). This fact highlights the prestige and commitment to quality of the public sector in Brazilian higher education. Market 7 (national Business courses) and Market 8 (national Economics courses) are also quite public-led, once again highlighting the importance of public sector supply for certain courses. These markets (Markets 6, 7, and 8), in addition to Market 4 (southeastern region) and Market 5 (southeastern region public schools) also tend to show the lowest concentration rates of all markets, as

translated by Figure 3.

Figure 2: Share of the Markets According to Ownership

Source: elaboration by the author based on data by INEP (2018).

Figure 3: Concentration Ratios for Markets 1-9

Source: elaboration by the author based on data from INEP (2018).

That is in contrast with markets led by private institutions, which tend to be more concentrated. That trend becomes even clearer when assessing the HHI of each market, as provided by Figure 4. The only exception here is Market 4, which is quite balanced between the public and private sectors. Therefore, there is basis to conclude that markets that have a stronger presence of the public sector are usually less concentrated.

3.4 Conduct

This section has two objectives: first, to explore other traits of competitiveness in the industry, closely related to market structure but that are not explicitly laid out in the SCP paradigm, nonetheless having a significant impact on players' conducts; and second, to explicitly analyze conducts and players' actions and the competitive dynamics of the sector.

Figure 4: HHI Index for Marktes 1-9
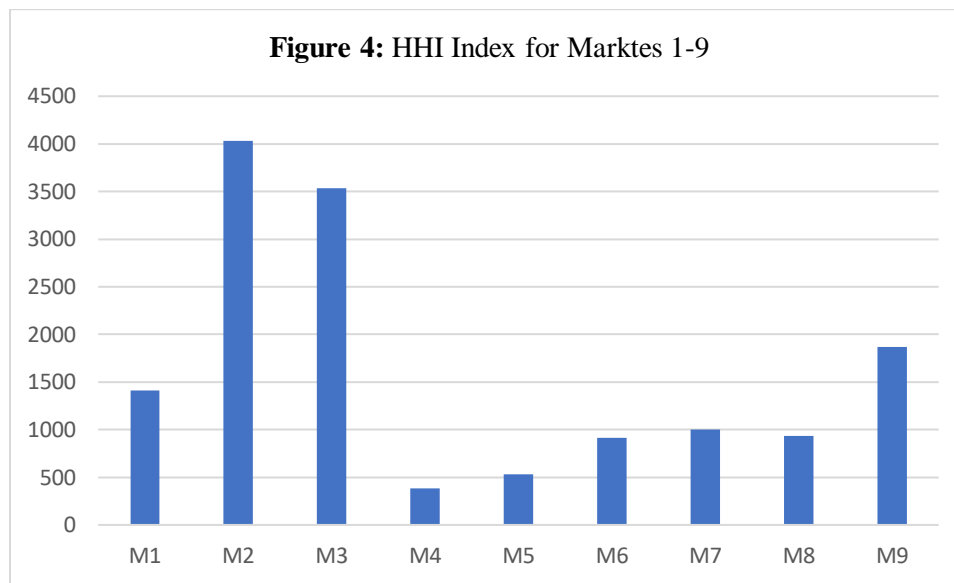
Source: elaboration by the author based on data from INEP (2018).

Public institutions receiving subsidies can be considered stiffer in terms of their responses to market demands and financial for-profit incentives, since they are governed by a sense of building social value, not by market or shareholder values. Especially in the case of Brazil, as public institutions charge no tuition. This makes analyzing the sector with the two-good framework a bit tricky, but nonetheless still enlightening.

The first setback is that tuition is not the **main source of revenue for public institutions** in Brazil. Clearly, government funds constitute their first source of revenue. If the pricing policy of institutions is a proxy of their incentives, the weight that the public sector puts on providing free high-quality higher education is a testament to its mission of wide access and equity.

It is interesting to note that public institutions' elevated degree of quality is common sense in the industry, which translates to high prestige. This is especially true if one considers the number of courses offered and the consistency with which public players provide a myriad of top-quality courses. There are 16 public institutions with a rating of 5 in the IGC, and the average number of courses supplied by them is of 56. On the other hand, although there are 22 private institutions with an IGC rating of 5, none of them provide more than seven courses. Once again, it is stressed that top-quality private institutions are specialized.

However, perhaps the defining aspect of competition dynamics in the industry is the peer effects characteristic underlying the sector, so that the product is a service that requires considerable effort from the buying part to fulfill its objective, and that the final quality depends on the traits of consumers. This directly impacts the incentives of HEIs to capture the most able students, since the greater the student's ability, the more successful the institution will be in its mission. In fact, these incentives have a clear effect on how schools act, which will be explored in this next section.

In terms of conduct, it is important to see how the environment affects players' incentives in the market. In that regard, peer effects are even more relevant for high-quality schools. For the private sector in general, there is a greater divide in terms of price, which reflects quality levels as well. Top private institutions usually charge much higher tuition than institutions with the lowest perceived quality, or mass institutions. Nonetheless, it has been established that high-quality institutions, mainly public and nonprofits, tend to compete for the best student in order to improve their own prestige and, consequently, attract better students.[6]

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[6] It is not clear whether this happens for low-quality for-profit mass institutions. It might be that their incentives are merely those of profit, therefore aiming at enrolling the highest possible number of students in their classes.

This makes the competition for the best students very fierce, and there are three main ways that institutions act to secure the best students for themselves: **through the selection process, through product differentiation, and through price discrimination.**

Regarding the selection process, despite the use of the ENEM (*Exame Nacional do Ensino Médio*) as the only admissions exam by many public institutions (47,3%), half (50%) of the schools analyzed here carry out independent exams.[7] On the other hand, 18,4% of schools use only independent exams – in other words, do not use ENEM in their selection process. Additionally, 28,9% of schools use both independent exams and ENEM as separate selection processes, while 7,9% of schools use ENEM and independent exams together in their process. These exams vary in their model, and their objective is to exert dominance over the institution's region, as they apply these tests only locally and attempt to capture the region's best students.

An interesting figure is that of institutions that apply only independent exams, accounting for 18,4% of the total. This conduct is justified by HEIs with an argument defending that ENEM's exam level is not suited to judge students' quality at the highest level. However, this limits the school's ability to capture students from outside of their region, since these tests are mostly localized. Therefore, applying only independent admissions exams would incur a trade-off between exerting local geographic dominance and capturing better students from distant regions. However, there appears to be no clear relation between the market share of a school and either the share of students admitted via independent processes, nor the share of students admitted via ENEM. The specificities of each process are not the case here – the focus is on the fact that universities that apply this type of exams might develop a close relationship with the best schools in the region, advertising their exam and encouraging students to take part. This is a clear way that universities attempt to capture the best students and exert geographic dominance.

However, this could be seen as shady, or even as an anticompetitive conduct. Public universities were pressured to adopt the ENEM as their only admissions program in order to unify selection across the country. Institutions that have pushed against it and kept independent admission exams now have an upper hand at selecting the most qualified students.

It seems hard to fit Brazilian public institutions in a narrow concept of players seeking a geographic monopoly or oligopoly because there is an issue with their incentive. When a public HEI is commissioned to a city or region where there was previously no HEI of similar quality, this institution does not seek to explore a geographic location for profit; its mission is to provide quality higher education to a region where there previously were no institutions of such caliber. However, some public institutions potentially enjoy 'geographic market dominance', or at least some 'market dominance' resulting from their geographic location, especially in smaller cities and regions. They enhance this market power through independent selection exams. If these institutions do not actively exert market power, at least one can say that they face little geographic pressure – which is not ideal.

The second strategy is to **differentiate**, in the meaning of specializing in a specific niche in terms of product market (Weisbrod *et al.,* 2008). This type of strategy is easier to observe in some of the elite private institutions, such as FGV and Ibmec, for example, that focus on economics and business, or ESPM, focusing on publicity and marketing. These are very prestigious institutions in the market – and arguably, this prestige comes from the fact that there is a specific focus and direction in their programs towards excelling in their respective areas.

This is also true for public institutions. ITA (*Instituto Tecnológico de Aeronáutica)* and IME (*Instituto Militar de Engenharia*) are perhaps the most representative of this trend. These are renowned institutions, offering only courses in the field of engineering, ITA being even more stratified towards the aeronautics

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[7] All data regarding admissions processes are from the CENSUP (INEP, 2018).

subject. Of course, one could argue that these institutions did not specialize as the result of a market strategy to be more competitive. However, the incentives behind that choice might differ, the end result seems to be the same: they are specialized in a certain area and the quality of their courses (and prestige of the institution) benefits greatly from that.

What seems more aligned to a "market" strategy for public institutions, in that sense, is when specific courses present a certain specialty. This specialization is commonly more intense on the graduate level, but it happens on undergraduate as well. This can be easily seen in the field of economics. Schools usually tend to be specialized in orthodox (mainstream, market-oriented approach) or heterodox economics (approaches outside the mainstream, usually based on Keynesian or Marxist economics). For example, while USP and FGV are highly regarded as prestigious orthodox schools, Unicamp and UFRJ are seen as prestigious heterodox schools.

The bottom line is that, at a certain point, a choice was made within these institutions to focus on a certain line of thought, or area of expertise, and therefore a quality differential was built in that subject for that university (of course, considering successful cases). That creates a differentiated product, which constitutes a classic way of attempting to attract more consumers.

Another important point that affects the competitive dynamics of the sector are scholarships given by private institutions, which can be considered **price discrimination.** This has gained importance especially in recent years when government funded programs have been slowing down. In such scenario, private universities are investing more in their own funding programs, in order to keep providing scholarships and attracting the best students. Only the biggest HEIs can keep offering scholarships at the same rate as before. Hence, they get a competitive edge.[8]

In addition to analyzing the share of students that receive funding from their HEI, it is important to look at the total number of students enrolled, as it might be related to the HEI's capacity to provide special funding. It also indicates that such schools are more fit to compete with public institutions, since they provide a greater range of courses, presenting higher substitutability with public HEIs. Good examples of this are: the PUCs – PUC Minas with 50.472 students and 30,4% funding rate, PUC-Rio with 16.444 students and 29,2% funding rate, and PUCSP with 15.218 students and 12,6% funding rate; Mackenzie SP with 33.354 students and 24,1% funding rate; and ESPM with 5.073 and 18,8% funding rate.

On the other hand, smaller private schools with the highest IGC rating with a relatively high HEI-specific funding rating (say, close to or greater than 20%) could also be considered close competitors to public HEIs, since they usually specialize in a certain area or certain courses. This is the case of the courses provided by FGV, as the campus in Rio provides funding to 23,6% of its 982 students and the campus in São Paulo provides funding to 21,4% of its 3.149 students. Surprisingly, no other private school with an IGC rating of 5 has funding program initiatives. However, it is worth noting that these private institutions also enjoy government funding programs, and the only ones that offer absolutely no funding aid in the National IGC = 5 market are FCC, FCRN, and SOCIESC.

Therefore, despite the apparent lack of incentives, public institutions carry out competitive action to attract the best students and differentiate their product. In addition to doing that, private institutions also discriminate in price with the same goals. Now, what is left is to check whether these conducts influence HEIs' performance.

4. Conclusions

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[8] *Anexo ao Parecer Técnico nº 1/2017/CGAA2/SGA1/SG/CADE **KROTON/ESTÁCIO, AC nº 08700.006185/2016-56.***

The main goal of this paper was to gauge competition in the Brazilian higher education industry, with focus on the high-quality public sector's structure and conduct. This industry differs from traditional markets because of its many peculiarities, which were all recognized and mostly dealt with to provide an analysis that is the closest to reality. For that, many contributions of the Industrial Organization field have been exposed as the basis to understanding this sector.

In general, markets were found to be moderately concentrated and occasionally highly concentrated. In total, nine market definitions were analyzed, comprising both geographic and product specifications. There was also a slight tendency of lower concentration on markets dominated by public institutions. However, it is hard to connect public players' high market shares with the existence of market power, since their incentives are not aimed at maximizing profits, but to maximize social surplus. Nevertheless, it is clear that these players compete amongst each other, especially for able students. Therefore, we could think of using the term "market dominance"[9] in this case.

In fact, higher education institutions' incentives to capture the best students make them act in certain ways. Firstly, they attempt to reach the most students by carrying out independent admissions exams together with the national test (ENEM). Second, product differentiation or specialization is a strategy seen most commonly amongst private players, that have incentives to specialize in sectors with higher financial returns. For the public sector, it is more common to differentiate their courses and attempt to attract more students. Price discrimination, here seen as the provision of scholarships or funding aid to students, is the final trend of conduct identified. In fact, almost half of students in private schools in Market 4 (southeastern region) receive some sort of funding or grant. This can be considered a strong argument in favor of the high substitutability of high-quality private HEIs with high quality public institutions, since it reduces or eliminates the price differential between them.

There are many possible avenues for further exploration on the subject. For example, one can assess different market specifications, such as including or studying only online courses, or focusing on the private education sector and its specificities. Another option would be to analyze graduate programs across the country and see if there are considerable differences to these results. Finally, measuring performance in these markets can also be fruitful as future research.

5. References

Alm, J., & Winters, J. V. (2009). Distance and intrastate college student migration. *Economics of Education Review*, *28*(6), 728-738.

Bain, J. (1959). S. Industrial organization. *New York and London*.

Baker, J. B. (2007b). Market definition: An analytical overview. *Antitrust Law Journal*, *74*(1), 129-173.

Becker, W. E., & Round, D. (2009). The Market for Higher Education: Does It Really Exist? *Institute for the Study of Labor (IZA),* Discussion Paper No. 4092.

Brazil (1996). Lei das Diretrizes e Bases da Educação Nacional. Lei 9.394/96. *Casa Civil, Subchefia Para Assuntos Jurídicos.* Accessed 11 November 2020, http://www.planalto.gov.br/ccivil_03/leis/l9394.htm

Brazil (2011). Lei da Defesa da Concorrência. Lei 12.529/11. *Casa Civil, Subchefia Para Assuntos Jurídicos.* Accessed 24 September 2020, https://www.planalto.gov.br/ccivil_03/_ato2011-2014/2011/lei/l12529.htm

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[9] Not in the sense employed by the European Commission's antitruste analyses, but attempting to run away from the price 'value' that the term market power carries.

Brazil (2014). Plano Nacional da Educação – PNE. Lei 13.005/2014. *Casa Civil, Subchefia Para Assuntos Jurídicos.* Accessed 19 September 2020, http://www.planalto.gov.br/ccivil_03/_ato2011-2014/2014/lei/l13005.htm

Conselho Administrativo de Defesa Econômica (Cade). (2016). Guia para análise de atos de concentração horizontal.

Donsimoni, M. P., Geroski, P., & Jacquemin, A. (1984). Concentration indices and market power: two views. *The Journal of Industrial Economics*, 419-434.

Elizalde, J. (2012). A theoretical approach to market definition analysis. *European journal of law and economics*, *34*(3), 449-475.

Elzinga, K. G., & Howell, V. M. (2018). Geographic Market Definition in the Merger Guidelines: A Retrospective Analysis. *Review of Industrial Organization*, *53*(3), 453-475.

Gideon, A. (2017). *Higher education institutions in the EU: between competition and public service*. TMC Asser Press.

Hansmann, H. (2012). The evolving economic structure of higher education. *The University of Chicago Law Review*, *79*(1), 159-183.

Hasenclever, L., and Torres, R. (2012). O Modelo Estrutura, Conduta e Desempenho e seus Desdobramentos. In Kupfer, D., Hasenclever, L. (ed.) *Economia industrial: fundamentos teóricos e práticas no Brasil.* Elsevier Brasil, pp. 41-51.

Hoxby, C. M. (1997). *How the changing market structure of US higher education explains college tuition* (No. w6323). National Bureau of Economic Research.

Leppel, K. (1993). Logit estimation of a gravity model of the college enrollment decision. *Research in Higher Education*, *34*(3), 387-398.

Losekann, L., Gutierrez, M. (2012). In Kupfer, D., Hasenclever, L. (ed.) Economia industrial: fundamentos teóricos e práticas no Brasil. *Elsevier Brasil*, pp. 67-77.

Massey, P. (2000). Market definition and market power in competition analysis: some practical issues. *Economic and Social Review*, 31(4), 309-328.

Massy, W. F. (2004). Markets in higher education: Do they promote internal efficiency?. *In Markets in Higher Education* (pp. 13-35). Springer, Dordrecht.

McMahon, W. W., & Walter, W. (2009). *Higher learning, greater good: The private and social benefits of higher education*. JHU Press.

McMillen, D. P., Singell Jr, L. D., & Waddell, G. R. (2007). Spatial competition and the price of college. *Economic Inquiry*, *45*(4), 817-833.

Motta, M., & Salgado, L. (2015). Política de concorrência: teoria e prática e sua aplicação no Brasil. *Elsevier Brasil*.

Resende, M. (1994). Medidas de concentração industrial: uma resenha. *Análise econômica*, *12*(21 and 22).

Rothschild, M., & White, L. J. (1995). The analytics of the pricing of higher education and other services in which the customers are inputs. *Journal of political Economy*, *103*(3), 573-586.

Salerno, C. (2004). Rapid expansion and extensive deregulation: the development of markets for higher education in the Netherlands. In *Markets in Higer Education* (pp. 271-290). Springer, Dordrecht.

Scherer, F. M. (1970) Industrial Market Structure and Economic Performance, Chicago: *Rand McNally & Company.* 2nd Edition.

Shy, O. (1995). *Industrial organization: theory and applications*. MIT press.

Teodorovicz, T., Leandro, T., & Esteves, L. A. (2016). The evolution of a methodology for relevant market definitiion: an analysis of CADE's jurisprudence on private higher educational markets. *Economic Analysis of Law Review*, *6*(2), 246-268.

Tirole, J. (1988). *The theory of industrial organization.* MIT press.

Tremblay, V. J., & Tremblay, C. H. (2012). *New perspectives on industrial organization: With contributions from behavioral economics and game theory*. Springer Science & Business Media.

Weisbrod, B. A., Ballou, J. P., & Asch, E. D. (2008). Mission and money: Understanding the university. Cambridge University Press.

Winston, G. C., & McPherson, M. S. (1991). The Economics of Cost, Price and Quality in US Higher Education. *Williams Project of Higher Education.*