RAUSP Management Journal
ISSN: 2531-0488
rausp@usp.br
Universidade de São Paulo
Brasil

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RAUSP Management Journal, vol. 51, núm. 1, 2016, -Marzo, pp. 5-19
Universidade de São Paulo
São Paulo, Brasil

DOI: https://doi.org/10.5700/rausp1220

ISSN 1984-6142

Power and selection of contract terms: The case from the Brazilian orange juice sector

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RESUMO

Poder e seleção de termos contratuais: o caso do setor de suco de laranja brasileiro

O objetivo é propor um modelo para explicar como os termos contratuais são selecionados na presença de poder: poder de contrato. O setor de suco de laranja ilustra a análise, indicando os efeitos do poder de contrato na organização econômica do setor. Poder de contrato é definido como a capacidade de explorar lacunas ou falhas contratuais, que são deixadas incompletas estrategicamente. Evidências empíricas a partir da análise de conteúdo de documentos de defesa da concorrência suportam a lógica do poder de contrato de três formas: evitando a mudança no método de pagamento de peso para conteúdo de sólido (qualidade); utilizando informações assimétricas para manipular índices na fórmula de cálculo do preço da laranja; e atrasando deliberadamente a colheita da laranja e, consequentemente, reduzindo seu peso e preço. O artigo contribui para o entendimento da seleção dos termos do contrato, bem como as formas de atuação de escritórios de defesa da concorrência sobre este tópico.

Palavras-chave: contrato, poder, custos de mensuração, *agribusiness*.

Recebido em 17/dezembro/2014
Aprovado em 15/julho/2015

Sistema de Avaliação: *Double Blind Review*
Editor Científico: Nicolau Reinhard
DOI: 10.5700/rausp1220

1. INTRODUCTION

During the 1990s, citrus growers accused juice processor industries of using contract terms as a vehicle for economic power in order to raise profits, which started litigation in the Brazilian antitrust office. In reality, markets and contracts are imperfect. Frequently, economists assume that contract terms are competitively selected in order to maximize the expected value of cooperation, neglecting issues of bargaining or surplus division (Barzel, 1997, Allen & Lueck, 2002). In this competitive perspective, agents are only some kind of contract term "takers" because they cannot influence the process of terms selection. In this paper, we address situations in which competition is not a

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sufficient mechanism to coordinate the process of contract terms selection. When competition fails, contract failures take place and economic power can influence the choice of terms. The research question is: how does power affect the selection of contract provisions in the orange juice sector?

Under traditional analysis (Williamson, 1979, Grossman & Hart, 1986, Hart & Moore, 1990, Barzel, 1997), contractual problems arise because of some kind of incompleteness due to bounded rationality, measurement difficulties, information asymmetries and the presence of opportunism. Although recognizing contractual incompleteness, this study investigates the influence of power in the selection process of contract terms. In other words, contracts present both incompleteness and failures. Contractual failures, as with market failures, enable agents to influence term selection through contract power. We define contract power as the ability to exploit contractual gaps or failures of contractual provisions, which are strategically left incomplete.

The theoretical model exploits the ability of an economic agent to impose measurement costs over a commodity's attributes, grounded in the Economic Analysis of Property Rights (Barzel, 1997). Following Barzel (2002: 18), power is the ability to impose costs. If higher measurement costs unveil fewer attributes of a commodity, as imposition of measurement costs become higher, fewer attributes will be specified in the transaction. In a contractual perspective, selection of contract terms that impose higher measurement costs leaves deliberate contractual gaps or unspecified attributes. These unspecified attributes could be consumed with no marginal payment, because no legal rights are assigned. Thus, contract power does not minimize transaction costs, nor does it maximize net surplus of cooperation or redistribute value.

The Brazilian orange juice sector illustrates power in contracts. During 1990s, citrus growers accused juice processors of concerted action, using contract terms in order to deliberately raise profits. Transactions of oranges between citrus growers and juice processing firms were performed using standard contracts for the whole sector from 1986 to 1995. The Administrative Council of Economic Defense (CADE), the Brazilian antitrust office, accepted those accusations, showing the evidence of power exertion on these contracts. More recently, between 2011 and 2014, the creation of a Council for Orange Producers and Orange Juice Industries (Consecitrus) was negotiated between citrus growers and juice processors. The economic power of juice processors influenced Consecitrus' negotiation process, because the definition of a price formation mechanisms was debated. The CADE is playing a key role in Consecitrus' creation, because it arbitrates negotiations between citrus growers and juice processing firms.

This paper is organized in five sections including this introduction. The second section presents theoretical background based on economic analysis of property rights (Barzel, 1997) as well as a theoretical model of contract power. Third section presents data and methods. Section four presents evidence of contract power in the orange juice sector at two different times: between 1986 and 1995; and between 2011 and 2014. Finally, in section five, concluding remarks are made.

2. THEORETICAL BACKGROUND AND MODEL

The analysis of an institutional structure of production rests on the classical work of Ronald H. Coase (1937), which reveals the nature of the firm as a more efficient arrangement that saves costs by using price mechanisms, called transaction costs. Moreover, in a world of positive transaction costs, the structure of property rights influences the final allocation of resources (Coase, 1960) and externalities come into existence in the market, as firms cannot internalize all market transactions. Thus, in a world of positive transaction costs, institutions − formal and informal rules that limit human interactions (North, 1990) − shape governance structures (Williamson, 1991, 1985). This institutional structure of production (Coase, 1992), therefore, is directly related to how property rights are allocated (Zylbersztajn, 2010).

Barzel (1997) presents the two main definitions of property rights: one is the ability of an agent to use the property; and the other is the right that the State grants to a person. When faced with these two definitions, Barzel (1997, p. 3, italics in original) defines the first as economic property rights (hereinafter economic rights), i.e., "*the individual ability, in expected terms, to consume the good (or the services of the asset)*". The second one, according to Barzel (1997, p. 4, italics in original), refers to legal property rights (hereinafter legal rights), which is defined as "*the rights recognized and enforced, in part, by the government*". These two categories are not mutually exclusive types of rights", because according to Barzel (1997: 3) "economic rights are the end (that is, what people ultimately seek), whereas legal rights are the means to achieve the end". Thus, economic rights are the end of all transactions, which can or cannot be done through legal rights (means).

In this perspective, a commodity is a bundle of attributes (Barzel, 1982, Barzel, 1997) and transactions are the transference of property rights over attributes. These attributes carry inherent quality variability and, given bounded rationality and imperfect information (Simon, 1961), there are costs to assess quality. It is necessary to specify attributes and evaluate quality in order to transfer ownership. These measurement costs are also called transaction costs. For Barzel (1997), transaction costs are therefore costs associated with the transference, capture and protection of property rights.

For instance, the orange (fruit) can be broken down into several attributes, such as acidity, color, concentration of soluble solids, absence of pesticides that affect health, maturity level at harvest, harvesting and transportation responsibility, among others. It is possible to assign marginal payments for attribute variation, i.e., it is possible to price those attributes.

For instance, solids content or weight, as a payment unit, can define prices in contracts for purchasing oranges. For solids content (the first case), it is necessary to measure the soluble solid concentration attribute, which varies from fruit to fruit. Technical tests and accurate monitoring of measurement procedures are required to coordinate this transaction. In the second case, boxes of 40.8 kg (weight) define prices in contracts. The measurement is simpler and easier to monitor, and evaluating the weight is more direct than evaluating solids content.

More complex measurement mechanisms frequently unveil more attributes, but also raise measurement cost; this logic will be important in the following pages. It is evident that transaction costs can arise from different contract terms, and the choice of these contractual terms are based on tradeoffs between costs and benefits of performing the measurement.

Recognizing the commodity as a bundle of attributes, and teking into account attributes quality variability, figure 1 represents the transaction, adapted from Zylbersztajn (2006). The commodity is separated into *n* attributes, and it is possible to find different types of safeguards for each attribute, depending on the costs of measurement. Thus, in the same commodity, more than one safeguard mechanism guarantees property rights. Note that attributes guaranteed by formal institutions, the judiciary and hierarchies have legal rights assigned to them, while private mechanisms have assigned economic rights. There are also attributes whose costs are prohibitively high, since benefits are less than the costs of measuring. Attributes with prohibitive measurement costs – where costs are greater than benefits – are allocated in the public domain, and subsequently value dissipation occurs.

Property rights are guaranteed in different ways, just like the governance mechanisms proposed by Williamson (1991). Guarantees are chosen in order to minimize measurement costs. For the case of low measurement costs, i.e., low variability, it is not necessary to establish contracts or vertical integration, because courts are able to assure property rights; this is a typical market transaction. As measurement costs increase, difficulties in adjudication arise within courts and new guarantees emerge through private mechanisms, contracts or vertical integration. When measurement costs become higher, more types of organization can be found. On the one hand, contracts are one of these types and they depend on courts, because contract terms are the reference for adjudication. However, on the other hand, there are private mechanisms with no court intervention or hierarchical coordination, such as economic sanctions imposed by one party; for example, sanctions imposed by retailers on suppliers, described by Arruñada (2000), or diamond sales per sights imposed by De Beers (Kenney and Klein, 1983). Finally, vertical integration is hierarchical coordination executed within an organization.

As the definition of property rights depends on measuring a commodity's attributes, each attribute must be allocated into three different dimensions: legal rights, economic rights and the public domain (Barzel, 1997). Zylbersztajn (2010) proposes an index to analyze property rights definition, called the Property

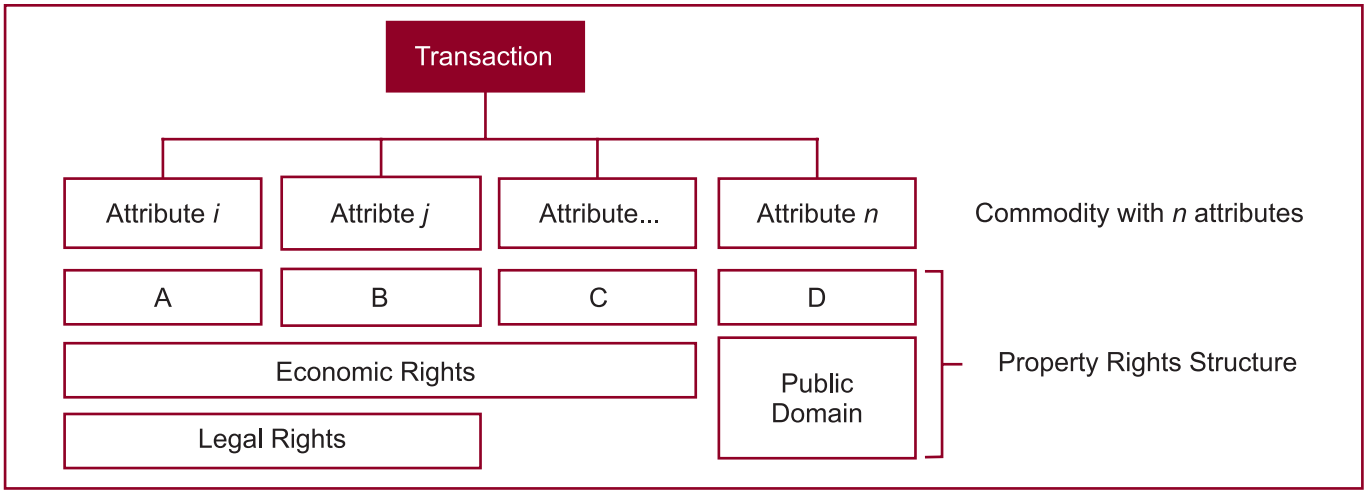

Figure 1: Property Rights Structure and Types of Guarantees

Source: adapted from Zylbersztajn (2006).

Figure 2: Property Rights Index

Source: adapted from Zylbersztajn (2010)

Rights Index (PRi) (Zylbersztajn, 2010). Allocation of property rights depends on transaction costs, and the index ranges from 0 to 1 between two poles: (1) the first pole is the absence of transaction costs and the attribute is fully guaranteed by legal right; and (2) in the opposite pole, transaction costs are at maximum and property rights are in the public domain. Figure 2 represents PRi and, in the real world, a commodity frequently presents attributes guaranteed by all property right dimensions.

In effect, a transaction cannot be seen as a simple transference of property rights, but as a relationship that builds a framework for property rights allocation. The property rights structure is granted by different means, and the contract is only one of these means. This paper focuses on the contract, because it defines which attributes are relevant in the transaction and how the parties distribute economic rents derived from each attribute. Contract terms are essential to understand property rights structure.

However, the process of contract terms selection has received little attention in literature, because economist frequently assume that terms are competitively chosen in order to maximize value creation. Barzel (1997, p.40) states the following: "I assume that contract terms are determined by competition and, therefore, that those contracts that maximize the value of each transaction means the net of all the associated costs will prevail". Allen and Lueck (2002: 5) also made the same kind of statement: "we assume that all parties [...] choose contracts and organizational forms because they *maximize the expected value of the relationship*". Thus, a theoretical model that explores the underlying process of contract terms selection in the presence of positive transaction costs is needed in order to understand two mechanisms in this process: competition and power (the latter being the situation when there is insufficient competition).

2.1. The theoretical model

The model analyzes contract terms selection in the presence of positive measurement costs as well as contractual failures. More specifically, with contracts being central, the model analyzes the delimitation of legal rights. As stated by Barzel (1997), economic rights are the ends, i.e., the economic benefits of consuming services. Legal rights are the means of guaranteeing the consumption of these attributes. Specifying a contractual provision, one party who has economic rights assigned by legal rights over an attribute will be able to appropriate economic rents from this attribute. Thus, in general, the model has the limitation of targeting only legal rights but, specifically, it fulfills the purpose of serving as an analytical tool for contracts.

Initially, we analyze a situation where contract terms are competitively chosen to ensure economic rights through legal rights (contract) and, then, we analyze the situation where competition is insufficient and contract power imposes additional costs in order to change the final allocation of property rights. The construction of a contract involves costs and benefits of including or excluding contract terms. Therefore, our first task is to understand these costs and benefits, as well as how competition among contract terms can indicate those that will be selected by economic agents.

First, assume that commodity attributes carry not only an internal variability, but also differ in their nature in terms of transparency and complicacy. In other words, some attributes have direct measurement, while others attributes have indirect measurement (Sykuta & Parcell, 2003). Thus, when a commodity is taken, we can assume that some attributes are initially easy to measure, because there are attributes of direct measurement. After exhausting attributes of simple measurement, additional measurements become more difficult, because they require more complex techniques, given indirect measurement attributes. Thus, we assume that it is possible to sort attributes by complicacy of measurement, from easy (direct) to difficult (indirect) measurement. Economic agents initially decide to include in contracts those attributes with direct (easy) measures and, then, they start to gradually include those attributes with indirect (difficult) measures.

In this sense, as more attributes are measured, measurement procedures become more complex, with indirect measurement attributes depending on more refined techniques and monitoring systems. We can assume, therefore, that as the level of complexity of measurement increases, more attributes

are specified and included in the contract, which becomes more expensive due to measurement costs. Under perfect competition, no measurement costs are needed and all attributes and prices are defined in legal rights. Conditions for perfect competition, however, are not found in the real world and contractual incompleteness arises from the impossibility of "presentiation"[1] (Macneil, 1978, Williamson, 1979). Thus, it is assumed that the contract is intended to specify most of the commodity attributes, i.e., the contract is as complete as possible.

Another assumption states that as more attributes are revealed, higher economic benefits can be obtained, because more economic rights over the attributes are delimited and the contract becomes more complete. However, when the number of disclosed attributes is too large, the marginal benefit of revealing one more attribute is minor compared to the marginal benefit achieved when two attributes are revealed instead of just one. In other words, the economic benefits depend on the attributes revealed in the contract, but the marginal benefit of revealing attributes decreases. Given A as a level of complexity in a measurement system and benefits being represented by B, wherein $B(A)$ and $B'(A) < 0$.

Regarding measurement costs, as the complexity of a measurement system becomes greater, evaluating an additional attribute is even more difficult compared to evaluating the next attribute of the commodity. Thus, the measurement system becomes more expensive. In other words, when complexity is low, the cost of measuring an additional attribute is relatively small, compared to the situation in which complexity is high and the measurement cost of an additional attribute is relatively high as well. Thus, we assume that measurement costs, given by M, behave differently, because marginal measuring costs are increasing, $M(A)$ and $M'(A) > 0$.

A choice of contractual terms that maximizes surplus generated by cooperation, therefore, occurs when the marginal benefit of measurement is equal to the marginal cost of measurement, $B'(A) = M'(A)$. In a situation where contract terms are selected competitively and transaction costs are positive, parties will negotiate until the maximization is obtained, represented by Figure 3, where A^c is the level of complexity of the measurement system (quantity of attributes revealed or included in the contract) and G^c is the governance cost of the contract. Level G^c is the minimum measurement cost obtained by using contracts. A^c, in turn, represents the level of contractual incompleteness, because it determines which attributes are viable to measure and which have prohibitive measurement costs.

Analyzing Figure 3, we observe that attributes on the left of A^c contain attributes specified in the contract. These attributes have quality standards, measurement methods, and monitoring procedures. Attributes on the right of A^c are attribute that remain unspecified in the contract. This model explains the formation of legal rights, which are the attributes

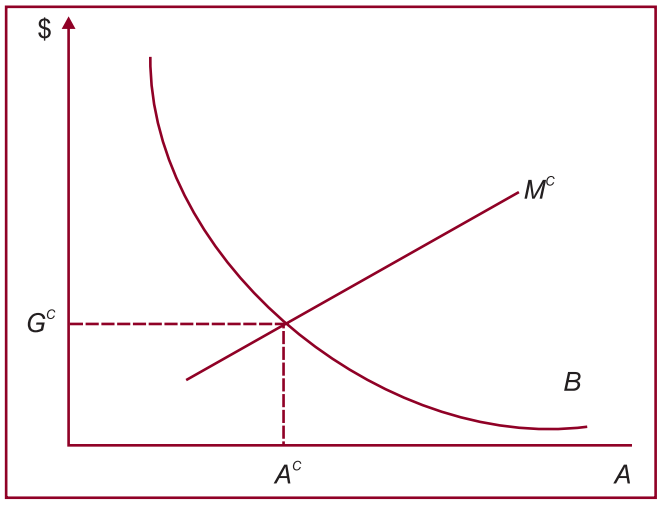

Figure 3: Competitive Contract Choice

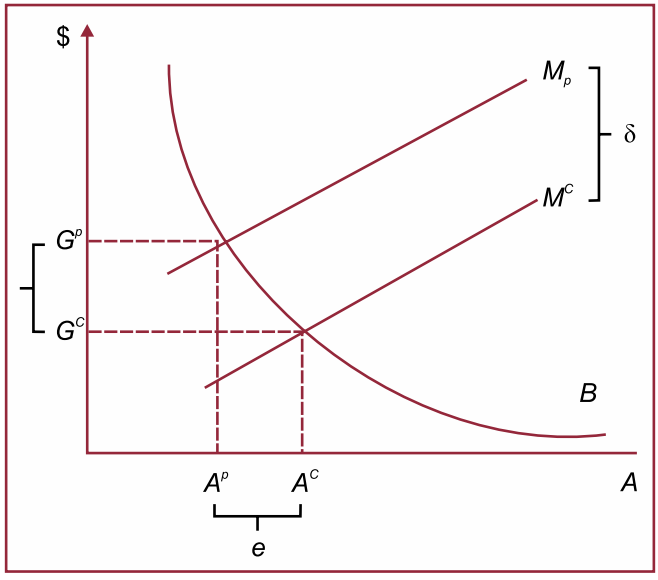

Figure 4: Contract Power

on the left of A^c. This feature of the model does not mean that unspecified (to the right of A^c) attributes were placed into the public domain. Unspecified attributes can be consumed through economic rights, but contracts do not define marginal payment for those attributes. Barzel (1997: 40) emphasizes in this idea that unspecified attributes can be consumed despite no legal rights being assigned: "among the unspecified attributes, some are subject to control by the buyer and some by the seller. By 'control' I mean one's freedom to manipulate the particular unspecified attribute without making any marginal payment to others".

Once the reference of competitive contract choice is established, it is possible to analyze the effects of power on this process. Contract power, as defined in this paper, is the ability to impose costs. This imposition strategically leaves gaps in contracts in order to influence property rights allocation. In other words, contract power is the exploitation of contractual gaps, or the failure of contractual provisions, which are strategically left incomplete. Thus, contract power is treated in the model as the parameter δ, which shifts the measurement cost curve – imposing additional costs. Measurement costs are now given by $M(A, \delta)$, and when $\delta > 0$ contract power takes place. Figure 4 shows the effect of economic power over contractual terms selection, where the distance between M^c and M^p curve is given by the parameter δ. M^c is the marginal measurement cost under competition and M^p is the marginal measurement cost under contract power.

Values A^p and G^p are, respectively, the complexity level of the measurement system and governance costs of the contract in the presence of contract power. Parameter δ shifts the marginal measurement cost curve up and, therefore, increased the total measurement cost, represented by c ($= G^p - G^c$). Thus, when contract power takes place, there is no measurement cost minimization, which decreases the total net surplus of cooperation. This occurs by imposing terms that hurdle measurement procedures and it increases renegotiations, conflicts and disputes that are hard to adjudicate by courts or to arbitrate through specialized organizations.

Contract power also fails to allocate property rights of a subset of attributes, represented by e ($= A^c - A^p$). Thus, contract power increases contractual incompleteness, because no contract terms are set to specify those e attributes, which are allocated in the economic rights of one party or both parties. Unspecified e attributes have no assigned legal rights and consumption occurs with no marginal payment. Notwithstanding, e attributes remain unspecified not because of high measurement costs, but because of the choice of one party to impose additional costs. Contract power changes the structure of property rights and the result is low-net value from cooperation and large benefits to one party that consumes attributes without marginal payments.

Attributes that would be allocated in legal rights under a competitive selection process are, in fact, allocated in economic rights for those who have contract power. In figure 4, there is no analytical insight into which economic agent (buyer or seller) has contract power or is the beneficiary of contract power. Of course, the party who has the power to influence the measurement costs should be the party who controls the attributes left unspecified, otherwise there is no economic incentive to exercise power. Identification of the party with contract power must be made case by case. In the citrus industry located in São Paulo, contract power is exercised by juice processing firms – the buyer.

3. DATA AND METHODS

This is a case study that uses qualitative techniques to analyze the content of written documents from the Brazilian antitrust office, the CADE. Although the main feature of case study is the direct observation of phenomena, this study focuses on events in the past. Thus, taking into account historical context is critical to the analysis, since "institutions are historically specific, and for this reason it is necessary to be sensitive to historical context" (Alston, 1996: 25). Thus, those events and factors that influenced contracts during standard contracts, from 1986 to 1995, and during the negotiation of Consecitrus, 2011-2014, are emphasized.

This qualitative research assessed a wide range of different data sources, such as reports, interviews, field visits and, in particular, documents of the Brazilian antitrust office. Evidence

Table 1

Analyzed Documents

References	Description
SDE (1994)	Preliminary Investigation, December 27th, 1994, Administrative Process nr 08000-012720/94-74, Economic Defense Secretariat
SDE (1995)	Final Report, July 12th, 1995, Administrative Process nr 08000-012720/94-74, Economic Defense Secretariat
CADE (1995a)	Specialist Opinion nr 23/95, September 20th, 1995, Administrative Process nr 08000.012720/94-74, Administrative Council of Economic Defense
CADE (1995b)	Vote, Counselor Neide Teresinha Malard, Administrative Process nr 08000.012720/94-74, Administrative Council of Economic Defense
CADE (1995c)	Term of Conduct Cessation, October 31th, 1995, Administrative Council of Economic Defense
Maia (1996)	Standard Contract Copy, crop season 1990/91
None	Contract of Coinbra-Frutesp (a juice processing firm), crop season 1994/95

of contract power was extracted from content analysis of several documents listed in table 1. Other data sources were secondary in this paper, since they only offered an overview of the historical context of the case.

The selected documents were systematically interpreted using content analysis. Content analysis is a technique to extract meaning from messages or communication (Bardin, 1995). In general, four categories were defined: (1) contract terms; (2) power; (3) commodity attributes; and (4) The CADE's opinion. Categories were designed according to the theoretical background and the theoretical model of contract power. During the analysis, some propositions are made about contract power and, then, the content of documents are used to support these propositions (Vergara, 2009). In some cases, data on prices, production, industrial yields, among others are also used to support our propositions.

4. CONTRACT POWER IN ORANGE JUICE SECTOR: EVIDENCE

The Citrus industry in São Paulo state is dedicated to the production and exportation of high quality orange juice. The genesis of the orange juice sector in Brazil is related to weather conditions in Florida and an excess of oranges being controlled by large groups of fruit exporters. After an intense frost in Florida in the crop season of 1962/1963, the first orange juice processor plant was installed in São Paulo state in 1963. Initially complementary, juice production in Brazil presented fast growth during the 1970s and 1980s. Exportation of orange juice increased from 531 tons in 1963 to more than 33 thousand tons in 1970 and, then, to more than 401 thousand tons in 1980. The sector became more specialized over time, with 2% of orange production in São Paulo being used to produce juice in 1970, which changed to 81% in 1980.

Until the 1970s, transactions between citrus growers and juice processors were a typical market transaction (Azevedo, 1996, Hasse, 1987). Nevertheless, specific investments deepened over time as the sector expansion, with 81% of all oranges being used to produce juice by 1980. Another important factor is the technological features of production processes. As juice production is a large operation and requires economies of scale, citrus growers could easily face diseconomies of scale. The industrial structure of juice processors is naturally more concentrated than agricultural production. In this context, the presence of specific investments and power asymmetries derived from industrial structures led to the creation of citrus growers association in the beginning of the 1970s, called *Associação Paulista de Citricultores* (Associtrus). At the same time, juice processors followed growers' initiatives, creating their association named *Associação Brasileira das Indústrias de Sucos Cítricos* (Abrassucos).

Market transactions faced increasing governance costs. In response to these characteristics, collective negotiations started between the associations, Associtrus and Abrassucos, in order to deal with several conflicts among the parties. These collective negotiations led to the creation of Citrus Committees at a federal and state government level at the beginning of the 1970s. During the 1970s and 1980s, the presence of the government in economic activity was frequent in agro-industrial relations; for instance, sugarcane, coffee and milk were regulated sectors in the Brazilian economy.

The Citrus Committee worked well as a coordination mechanism until the beginning of the 1980s. Nevertheless, frosts in Florida increased juice prices and Brazilian juice processors could achieve higher profits. Citrus growers, however, were not able to take any advantage of international market's conditions. The Citrus Committee failed to provide agreement on this new market condition and, in the 1986/87 crop season, a standard contract was created as a private solution, excluding government participation. Creation of the standard contract was intermediated by Abrassucos and Associtrus. The new contract design linked juice prices in the New York Board of Trade (NYBOT) to orange prices in the Brazilian domestic market, though its adoption was voluntary. Citrus growers widely adopted this contract and its initial results were beneficial. Beyond the change in prices, the Brazilian institutional environment was in transformation due to the end of the military government in the 1980s and economic openness and stabilization in the 1990s. Government regulation in economic activity decreased in the 1990s and private solutions to transactions emerged as the government withdrew. These events occurred in several agricultural sectors and standard contracts were the solution adopted by the citrus sector at that time.

Beneficial results from the adoption of standard contracts were, however, only transitory for citrus growers. Juice prices in the NYBOT were an important determinant of orange prices in Brazil and these prices became highly volatile. When citrus growers accepted standard contracts, they were both accepting benefits from increases in juice prices and accepting risk from decreases in those prices. Then, at the beginning of 1990s, citrus growers faced deficits as orange prices fell below production costs. Citrus growers were also dissatisfied with some terms of the standard contracts, which were not modified in private negotiations. First, citrus growers claimed that juice processors were deliberately delaying orange harvest, causing dehydration of the fruit that lowers weight and prices. Second, citrus growers requested a change of payment method from weight (box of 40,8 kg) to solids content, since the amount of juice inside the orange correlates with its solids content rather than its weight. There was no agreement on these topics.

Disagreements about standard contracts motivated Associtrus and other representative associations to initiate a litigation process in the Administrative Council of Economic Defense (CADE), the Brazilian antitrust office. Citrus growers accused juice processors of concerted action, using contract

terms in order to deliberately raise profits. The CADE accepted the accusations and initiated the legal process, but citrus growers and juice processors achieved an agreement, called the "commitment term" in order to conduct cessation. In this agreement, the CADE suspended the use of standard contracts and collective negotiation of juice processors was forbidden. In practice, the CADE extinguished the standard contract and the sector started to pursuit new forms of organization.

4.1. Contract power in standard contracts

The standard contract was at the center of citrus growers' accusations against juice processing firm. It is worth noting that some of the contract terms were a critical component in the contractual relationship between citrus growers and juice processor industries:

> the use of the standard contract imposed by the processing industry on producers [citrus growers] is a clear offense against the law, since the "oranges came to be purchased within the terms imposed by a cartel of buyers, formed by concerted actions of all orange juice processors that were submitted to all the productive sector (SDE, 1994, p 1647)

The main feature of the standard contract is the formula for calculating the orange box price:

$$\text{OBP} = \frac{\text{(Orange Juice Price NYBOT)} - \text{(Total Expenditures + Return on Capital)}}{\text{Average Industrial Yield of Fruits}}$$

Where, OBP is the orange box[2].

At the center of some of the allegations made by the growers is the unit of payment. The price unit is a box of 40.8 kg − the fruit weight. Citrus growers suggested a change from weight to soluble solids, or solids content (Brix). Orange juice produced in Brazil and exported to Europe and the United States has a high level of homogeneity in terms of concentration of solids (degrees Brix). Thus, juice processors are concerned about solids content within oranges at the moment of purchase, because solids content are responsible for the industrial yield (productivity) of the fruit instead of its weight. Then, when juice processors purchase oranges, they are actually buying solids within the fruit instead of a quantity of liquid. Because of this, juice processors could avoid the change in payment method.

4.1.1. Avoidance of the change in the payment method

The lack of soluble solids-content measures in standard contracts was at the center of citrus growers' accusations in this litigation:

> - The quality of commercial oranges is measured by the amount of "soluble solids" that it presents, and "the greater the presence of soluble solids in the fruit, the higher its yield of juice, and not, as might be supposed, by the presence of liquid in the oranges";
> - Although this scientific truth should remove the weight of the fruit for defining the purchase price of the product, juice processor firms, impose such criteria to producers, which, according to representatives [citrus growers], constitute violations of the economic order (SDE , 1994: 1644-1645, translated from Portuguese).

According to the aforementioned transcription, citrus growers pointed out that juice processors avoid the adoption of the solids content to calculate orange prices. The adoption of solids content as a price unit is not a novelty; the orange juice industry in Florida, USA, uses this price standard (Fernandes, 2003), and juice prices in the NYBOT are defined in dollars per solids weight (which is the solids content). Similarly, in Brazil, the sugarcane sector employs a payment system based on sugar content in sugarcane (the same principle as solids content), named total recoverable sugars. In fact, sugarcane is an important benchmark when discussing organizational changes in the orange juice sector (Belik, Paulillo and Vian, 2012). Alternative contract types are available, but price unit remains unchanged.

Adoption of the formula for calculating orange box prices in standard contracts brings, indirectly, the variability of solids content to price formation. The denominator in the formula is the average industrial yield of the fruit, given by the number of orange boxes needed to produce 1 ton of juice. More productive fruits generate lower rates of industrial yields and higher orange prices, and vice-versa. It is assumed, therefore, that the standard contract has improved the accuracy of solid contents evaluation, if compared to the previous contracts (**proposition 1**), i.e., before 1986.

Nevertheless, juice processors avoided the US measurement system (dollars per weight of solids). Therefore, it is assumed that the US measurement system was more accurate than the Brazilian measurement system in standard contracts (**proposition 2**). Propositions 1 and 2 are in fact based on the logic that the adoption of standard contracts improves the evaluation (measurement) of solids content of oranges − as citrus growers requested at the time, but a more most accurate measurement system like the US's was not chosen. In other words, the capacity to impose the formula in standard contracts and the avoidance of price unit using solids content is the ability to impose measurement costs. This is the manifestation of juice processors' contract power, because solids content remains partially unspecified and juice processors can consume it without marginal payment.

In order to confirm the propositions, we collected data of orange box prices in the USA (Source: USDA) and Brazil (source: Maia 1996 and IEA[3]). In addition, data was collected on orange juice prices in the New York Board of Trade (NYBOT) (source: Trombin and Neves, 2011) and the orange juice prices free on board at the port of Santos (FOB Santos) (source: Ministry of Development, Industry and Foreign Trade, Brazil). Thus, the correlation between orange prices and juice prices were computed. Table 2 shows the correlation results.

Results in table 2 support propositions 1 and 2, since correlations between orange price and juice prices during standard contracts are higher than the previous period. Correlations between orange prices and juice prices are higher in US than Brazil, which means that the US measurement system is more accurate than the Brazilian one. These results suggest that avoidance of solids content as a price unit enables juice processors to internalize quality variability of oranges. Furthermore, avoidance of solids content as a price unit has two additional implications: (1) overestimation of the average industrial yield used to calculate the price of an orange box; and (2) deliberate delay of harvest executed by juice processors. The following subsections explain these implications.

4.1.2. Overestimation of fruit industrial yield

Orange prices in standard contracts were calculated by a formula with three main components: juice prices at NYBOT; expenditures and return on capital; and industrial yield. Citrus growers could estimate juice prices, expenditures and return on capital with greater transparency, but the industrial yield is more difficult to assess, even by courts. The industrial yield is defined by the quantity of oranges needed to produce 1 ton of orange juice. The industrial yield varies across crop seasons and regions. However, this productivity rate is an important factor in price formation for orange boxes during the standard contract period. As the denominator of the formula, the rate serves as a weight for the other values in the numerator. The rate of industrial yield depends on the average past industrial yield, which is informed by juice processors. Given information asymmetry, juice processors can overestimate the rate in order to obtain lower orange prices. In fact, citrus growers included the manipulation of productivity rates in their accusations at the CADE:

> - Beyond the benefits of weight criterion, another contractual condition is imposed by the acquiring industry, namely, the "rate of industrial yield of the fruit". Such criterion would be entirely arbitrary, because "it is impossible that all the juice processing firms have the same level of productivity; i.e., firstly they all equally require 280 boxes to produce the same amount of juice, and when they decided to reduce this index as they did, they all require 260 boxes, as we have now";
> - The relationship between producer [citrus grower] and industry [juice processor] results in a paradox, because, according to the representatives [citrus growers], the better the fruit, the higher the productivity, the lower the gain, since there is no link between investments and remuneration, as the industry puts all citrus growers under equal conditions (SDE, 1994: 1644-1645, translated from Portuguese).

Moreover, citrus growers' associations made successful efforts to modify these rates, mitigating the problem, as described by Maia (1996, p 92.):

> [Citrus growers'] representative associations have intensified their efforts to improve the contract and, thus, in 1988/89, several terms were modified in favor of growers, namely: the rate of the fruit's industrial yield, expressed in boxes of 40.8 kg per ton of juice, changed from 280 to 272, because, according to the associations, the weighted average

Table 2

Correlation Between Orange Prices and Juice Prices, Periods 1971/72 and 1994/95

Period	País	Correlation between...	Index (r)
Before Standard Contract (1971/72 - 1985/86)	USA	Orange x NYBOT	0,99
	Brazil	Orange x NYBOT	0,48
	Brazil	Orange x FOB Santos	0,75
Standard Contract (1986/87 - 1994/95)	USA	Orange x NYBOT	0,92
	Brazil	Orange x NYBOT	0,71
	Brazil	Orange x FOB Santos	0,51

> yields of five crops processed by Frutesp, calculated from reports published by the company had been approximately 252 boxes per ton of juice [...]
> The growers, however, were still questioning the rate of industrial yield and, then, in 1989/90 and 1990/91, it was set at 270 boxes and, finally, in 1991/92, 260 boxes per ton of juice was established.

Frutesp, a juice processor firm controlled by a cooperative of citrus growers, played an important role in reducing information asymmetry when negotiating rates of industrial yield (Maia, 1996; Azevedo, 1996). Nevertheless, rates in contracts were still above 252 boxes, which was the industrial yield of Frutesp at time. Thus, information from Frutesp was not sufficient to eliminate contract power. Defining a formula with a component that is difficult to assess, juice-processing firms could impose higher rates for industrial yields, increasing orange prices and consuming higher amounts of solids content without any marginal payment. It is assumed that rates of industrial yield are overestimated in standard contracts, underpricing the orange to the benefit of juice processors (**proposition 3**).

Using data about the quantity of orange juice production and quantity of orange processed (source: CitrusBR), we estimated the industrial yield actually achieved between 1988/89 and 1990/91 (real industrial yield). From the standard contract formula, we calculated the orange price using the rate of industrial yield defined in contracts at the time and the rate of industrial yield actually achieved. Table 3 presents the results. There is no data available about prices in standard contracts for 1986/87, 1987/88, and between 1990/91 and 1993/94.

Results in table 3 support proposition 3 as orange prices between 1988/89 and 1990/91 using rates of industrial yield in contracts were lower than prices calculated using the industrial yield actually achieved. The amount of redistribution in favor of the juice processor is U$ 28.7 million, US$ 38.18 million, and U$ 25.93 million, respectively, for the crop seasons of 1988/89, 1989/90, and 1990/91.

In the standard contract period, taking into account the period between 1988/89 and 1994/95, the lowest industrial yield is 233.3 in 1994/95, while the higher industrial yield is 260.7 in 1988/89. The average industrial yield rate for the available data is 246.5 and the standard deviation is 11.9. These numbers mean that considering optimist and pessimist scenarios, juice processors could estimate a range of industrial yields from 234.6 to 258.5. It is worth noting that the highest rate in the pessimist scenario is 258.5, which is close to the 260 defined in the contract between 1991/92 and 1993/94. Proposition 3 is also supported by this data.

4.1.3. Deliberate delay of harvest

Finally, one can explore another way to allocate economic rights on the variability of solids content within oranges that is not specified in contracts. This action is related to the time of harvesting, as shown by the transcription of citrus growers' complaint:

> - Juice processors slowed, intentionally and in a concerted manner, the pace of harvest, to benefit from the highest yield of the late-harvested oranges and lower the cost of obtaining it, which would result in increased profits, according to representatives [citrus growers];
> - The purpose of delaying the harvest is to obtain an even more dehydrated fruit, which, therefore, contains higher concentrations of soluble solids, the raw material of juice. Furthermore, maintaining a fixed weight per orange box would mean that smaller

Table 3

Influence of Contract Power Over Industrial Yield Rate

Crop Season	Industrial Yield In Standard Contract	Price In Standard Contract (US$)	Real Industrial Yield	Simulated Price Using Real Industrial Yield (US$)	Under-Pricing (US$)
1986/87	280	-	-	-	-
1987/88	280	-	-	-	-
1988/89	272	3.73	261	3.89	0,16
1989/90	270	3.54	259	3.69	0,15
1990/91	270	1.11	242	1.24	0,13
1991/92	260	-	236	-	-
1992/93	260	-	257	-	-
1993/94	260	-	237	-	-

> and lighter fruits would be necessary to complete one box. Because of this, juice processors obtain a greater number of units of orange fruits from the same quantity of orange boxes and, consequently, a larger amount of juice.
> - Considering that citrus growers receive money based on the quantity of fruit instead of by its productivity, delays in harvest imply less fruit to harvest, which means greater benefits to juice processors with obvious detriment to citrus growers (SDE, 1994: 1658, translated from Portuguese).

Juice processors purchase fruit in advance, in the trees and before maturity, and control the exact moment of harvesting. In this case, it is assumed that juice processors will wait as long as possible to harvest fruits with maximum solids content and minimum weight (**proposition 4**). However, this action means losses through over-mature oranges and oranges that are passed the optimum harvest period suggested by technical requirements. It is not possible to point to empirical evidence for this practice and proposition 4 cannot be verified.

4.1.4. Alternative explanations offered by juice processors

The aforementioned content analysis of Brazilian antitrust office documents that supported our propositions are, in fact, part of the accusations formulated by citrus growers. This means that these actions were not necessarily recognized as anticompetitive actions by antitrust authorities. Thus, taking into account the content of arguments formulated by juice processors in their defense is a critical step, in order to look for alternative and efficiency driven explanations.

The arguments presented by juice processors can be summarized as follow: (1) there are other contractual options available such as selling the fruits for fresh consumption; (2) there are uniform conducts in contracts of juice processors due to technological features of the juice production process; (3) the economic problems from standard contracts are, in fact, the consequence of the low price level of juice in the international market; and (4) this contractual problem is a private and commercial matter between the parties and, therefore, outside the authority of the CADE. Antitrust authorities considered the arguments presented by juice processors to be fragile, and also indicated that juice processors were trying to delay the decision, as the transcription shows:

> None of the indicted [juice processors] deny the use of standard contracts or their anticompetitive content. On the contrary, they justify both the use and effects of standard contracts as a matter of a commercial nature.
> [...] in front of the impossibility of defense from the acts that constitute anticompetitive practices, the only answer of the juice processors is to defer the course of the litigation, in order to insure delays and try to make the antitrust office's analysis unfeasible (SDE, 1995: 5544, translated from portuguess).

Brazilian antitrust authorities did not present a conclusion about which terms in the standard contracts had anticompetitive effects. However, they did not recognize any efficiency driven effects from standard contracts when juice processors' arguments were presented. As arguments from accusations are the main evidence supporting contract power propositions, prudence is necessary in conclusions − even if alternative explanations are fragile.

4.2. Contract power during consecitrus' negotiations

The end of standard contracts had an immediate and positive effect for citrus growers, since they acquired better price levels for oranges. Nevertheless, the CADE intervention had transitory effects (Marino and Azevedo, 2003), partly because power asymmetries between citrus growers and juice processor were reestablished by the prohibition of the collectively negotiated contract. The sector found new forms of organization for orange transactions and backward partial vertical integration of juice processors increased during the 1990s and 2000s.

In 2011, two large juice processors started a merger and acquisition (M&A) process, which was regulated by antitrust authorities. As industrial concentrations became even higher, the CADE decided to impose a condition to the approval of the M&A, which was the creation of a transparent price formation system for oranges. The CADE decided that it was imperative to mitigate the effects of economic power of juice processors through this price formation mechanism. In order to build this price mechanism, citrus growers and juice processors underwent negotiations for the creation of the Council of Orange Producers and Orange Juice Industries, or Consecitrus. This negotiation existed since 2000, but had been paralyzed. When negotiations restarted, juice processors moved quickly to create a model by which orange prices could be calculated. We assume that juice processors would take advantage of their economic power to propose a price formation mechanism with difficult to adjudicate features, raising measurement costs, etc. in order to consume attributes without marginal payments (**proposition 5**).

Consecitrus' model was effectively launched in October 2012, a few months after the signing of its statute (Consecitrus, 2012a). Citrus growers had no participation in the creation of Consecitrus or the construction of the Consecitrus model (Consecitrus, 2012b). Actually, citrus growers' associations did not agree with several topics of the model since it used inaccurate technical criteria of the production process, as shown in the following transcript:

> Associtrus and FAESP on November 6th, 2012 − manifested by the reformulation of the parameters for prices calculated by the model − claim that the study is incomplete and contains errors. These are: (i) stating that Brazilian agricultural production is not high-tech and does have high levels of efficiency; (ii) overestimating average production in the agricultural sector and underestimating it in juice processing; (iii) underestimating the costs of agricultural production and disregarding investments in facilities and land; (iv) underestimating historic orange prices; and (v) biases with technological coefficients and input prices; favoring industry [juices processors] and reducing the participation of growers in economies of scale (CADE, 2014: 66-67, translated from Portuguese).

Dissatisfaction of citrus growers can be illustrated by two examples. The basic rural unit used to determine the rates was from a farm with the capacity to produce 20 million boxes of oranges per season. This is not the size of a typical citrus-growing farm, which puts in doubt the technological assumptions and economies of scale presented by the model. Moreover, the criterion for profit sharing between processors and growers was calculated by the capital invested by each party. However, land value was not included as part of the capital invested of citrus growers. Proposition 5 is supported, because juice processors tried to take advantage of the formation of a new contract design, proposing a model to their own benefit.

The CADE did not accept the proposed model and, in December 2012, antitrust authorities suspended Consecitrus' activities. The expected voluntary and negotiated agreement between citrus growers and juice processors was not achieved and the CADE decided to interfere directly in the process. In 2013, the CADE played an active role in the formation of Consecitrus, but the antitrust agency did not impose a contract design. The solution was to propose and enforce a governance structure for Consecitrus. The aim of this governance structure was to equalize voting between citrus growers and juice processors and, then, these parties can figure out their new contract design or their new contracts designs.

4.3. Antitrust remedies to contract power

Although antitrust litigations in the orange juice sector occurred in two distinct periods and are different in nature, the core of the problem in both cases was economic power in contract terms selection. The failure of a competitive process to choose contract terms, nevertheless, was approached through different methods. It is fruitful to analyze two different means by which the CADE intervened in the orange juice sector.

First of all, in 1994/95, the CADE decided to end standard contracts, i.e., the main instrument that coordinates transactions and simply prohibits contract power. However, contractual problems were still present, with failures in standard contracts being due to insufficient competition in the selection process. The CADE did not address any action on the central cause of the problem. However, the learning process in antitrust offices allowed for more effective action in the future, which was the case almost 20 years later.

Thus, from 2011 to 2013, contractual problems and potential contractual failures emerged in Consecitrus negotiations. Instead of the simple prohibition of a new type of contract, the CADE had a more pro-active voice in the negotiation process, as the antitrust office directly imposed itself on Consecitrus. In this case, the CADE recognized that power asymmetries might prevail in the relationship between citrus growers and juice processors. Competition was not an efficient means to organize contracts in the sector. If prohibition was not effective, the CADE must find new ways to deal with problems of this nature.

Counselor Ricardo Machado Ruiz, in his vote in the administrative litigation (CADE, 2014: 79-80), clearly stated this problem:

> The central purpose of Consecitrus should be the reduction of bargaining power between citrus growers (orange producers) and industries (concentrated juice producers) when pricing orange boxes, which is the main but not the only bargaining object.
> [...] the structural basis of the asymmetric power is the high market-concentration of juice processors (oligopsony) vis-à-vis the high fragmentation among citrus growers (competition). Consecitrus should be an institution that connects these two segments.

Nevertheless, the CADE was not able to simply impose a new contract type. As an antitrust office, the CADE would not take the place of the competition and write a new contract for the sector. On the contrary, the CADE was supposed to promote competition in the process of selection of contract terms, which could induce the formation of a new contract design or even new contract designs. In principle, economic agents in the orange juice sector should be able to choose many different contract types, where neither juice processors nor citrus growers could impose terms in contracts. The challenge was to delineate as an antitrust remedy that could accomplish this task.

The solution applied by the Brazilian antitrust office was based on countervailing power (Galbraith, 1952). The countervailing power concept states that horizontal coordination on the seller side of a transaction can be efficient if the sellers face buyers holding high economic power (monopsony or oligopsony). Azevedo and Almeida (2009)

argue that the principle of countervailing power could be applied in antitrust decisions under the right conditions. This application is not trivial, because horizontal coordination in antitrust cases is typically seen as an initiative that leads to cartels. Thus, first, it is important to separate those situations in which countervailing power is efficient from those which promote economic power.

In the orange juice sector, the CADE analyzed the case using the theoretical background developed by Azevedo and Almeida (2009), especially the case of a chain constituted of monopoly-monopsony-competition. Therefore, the CADE decided to apply countervailing power principles to the governance aspects of Consecitrus. It is important to note that countervailing power did not imply a change of industrial structure of both citrus growers and juice processors, which would have been very expensive. Instead, the CADE decided to impose constraints on the action of economic agents involved in Consecitrus' administration. Furthermore, the CADE was responsible for the establishment of a schedule to implement changes in the governance rules of Consecitrus as well as monitor the implementation of these actions (CADE, 2014).

The underlying rational behind the CADE's intervention was to mitigate power asymmetries between citrus growers and juice processors through the creation of Consecitrus. The CADE constrained the action using the governance rules of the Council, especially those regarding the constitution of the board of the Council and how the board makes decisions (voting rules). In this way, the CADE induced horizontal coordination on the citrus growers' side, and created an environment where farmers and juice processors are on more equal terms when negotiating a price formation mechanism for oranges. It is not possible to assess the success of this intervention, but in principle, the CADE's solution in this case is a potential antitrust remedy for contract power in the working economy.

5. CONCLUDING REMARKS

We proposed a model to explain how contract terms are selected when a type of economic power is present: contract power. The orange juice sector illustrates an analysis that demonstrates the effects of contract power on the economic organization of the sector. Empirical evidence supports the logic of contract power in three forms: (1) avoiding changes to payment methods from weight to solids content (quality) and imposing a formula to calculate orange prices; (2) using information asymmetries to manipulate the index formula that calculates orange prices; and (3) deliberately performing the late harvesting of oranges, in order to dehydrate the fruits and, consequently, reducing their weight and price. Although alternative explanations are rather fragile, prudence is necessary in these conclusions.

The main findings in this paper can contribute to the debate about the situations in which contract power takes place and the ways antitrust authorities can remedy them. In this paper, we were able to analyze two different actions of the antitrust authorities (including the demand for a new price formation mechanisms for oranges) when facing similar contractual problems in the orange juice sector. Contract power took place in both situations, but the remedy used in 1995 was not effective. Thus, the CADE decided to try another remedy through the creation of a council in the sector and applied the principle of countervailing power.

Problems of the first intervention in 1990s could be explained by a paradox in the conduct of the CADE. The paradox consists, on one hand, of the fact that competition was not sufficient to achieve an efficient contract and contract power prevailed. On the other hand, the CADE tried to avoid contract power by prohibiting the only working contract in the sector, expecting that more freedom in negotiations (competition) would create more efficient contractual types. The paradox is the attempt to solve contractual problems raised from the lack of competition through the lack of competition. The message from this first situation is: insufficient competition can create inefficient contracts and prohibition of these inefficient contract types is not a simple answer to solve the problem.

In the 2010s, the CADE faced problems related to a lack of competition in Consecitrus' negotiation process. Contract power took place once again, but the solution was not to allow freedom in the negotiation between the parties. In this case, a lack of competition was substituted by constrained competition, which avoids the paradox created in 1990s. Consecitrus worked as an institution to constrain the actions of economic agents using the principle of countervailing power. The Council promoted the horizontal coordination of citrus growers and created a forum where the parties could negotiate on more equal terms. In effect, contract types that emerged from this forum suffer less from the effects of contract power. It is still too soon to draw conclusions from the results of the CADE's solution.◆

NOTES

(1) "Presentiation" is the ability to present all factors that affect the contractual relationship. It is some kind of perfect forecast.

(2) For more information about the components of this formula, consult Maia (1996).

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ABSTRACT

Power and selection of contract terms: The case from the Brazilian orange juice sector

We propose a model to explain how contract terms are selected in the presence of a form of economic power: contract power. The orange juice sector is used to illustrate an analysis that demonstrates the effects of contract power on the economic organization of the sector. We define contract power as the ability to exploit contractual gaps or failures of contractual provisions, which are strategically left incomplete. Empirical evidence from content analysis of antitrust documents supports the logic of contract power in the orange juice sector in three forms: avoiding changes to payment methods from weight to solid contents (quality); using information asymmetries to manipulate indexes that calculate the formula of orange prices; and deliberately harvesting oranges late in order to dehydrate the fruit, which consequently reduces weight and price. The paper contributes to understanding the selection of contract terms and the debate about how antitrust offices can deal with this issue.

Keywords: contracts, power, measurement cost, agribusiness.

RESUMEN

Poder y condiciones contractuales de selección: el caso del sector de zumo de naranja brasileño

El objetivo es proponer un modelo para explicar cómo se seleccionan los términos contractuales en presencia del poder: poder de contracto. La industria de zumo de naranja ilustra el análisis, con indicación de los efectos del poder de contrato en la organización económica del sector. Poder de contrato se define como la capacidad de explotar las brechas o fallas contractuales que quedan incompletas estratégicamente. La evidencia empírica de los documentos de defensa de la competencia de análisis de contenido compatible con la lógica del poder de contracto tres maneras: evitar el cambio de la forma de pago de peso por contenido de sólidos (calidad); el uso de la información asimétrica para manipular los índices en la fórmula de cálculo del precio de la naranja; y retrasar deliberadamente la cosecha de naranja consecuentemente implicando enla reducción de su peso y precio. Esta investigación contribuye a la comprensión de la selección de los términos del contrato y las formas de acción de las oficinas de defensa de la competencia en esto tema.

***Palabras clave*:** contracto, poder, costos de medición, agronegocios.

COMO REFERENCIAR ESTE ARTIGO
(De acordo com as normas da *American Psychological Association* [APA])

Ito, N. C., & Zylbersztajn, D. (2016, janeiro/fevereiro/março). Power and selection of contract terms: The case from the Brazilian orange juice sector. *Revista de Administração* [RAUSP], *51*(1), 5-19. doi: 10.5700/rausp1220