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What Accounts for Plural Forms of Governance Structure in the Same Industry or Firm – The Case of the Brazilian Electricity Industry

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Abstract

Governance structures are described as a spectrum with the market and vertical integration as its poles. During the past decades, the theoretical and empirical work aligned with New Institutional Economics sought to understand the factors that determine which transactions will run through the market and which will run within the firms. However, the existence of plural forms of institutional arrangements in the same productive chain defies logic theories that study the vertical borders of the firms. Thus, the goal of this article is to investigate these plural forms in the Free Contracting Environment of the Brazilian Electricity Industry. We used a qualitative approach and resorted to a case study strategy in order to understand the adoption of distinct governance structures within a single transaction. Our analysis suggests five propositions that can be tested. These propositions are related to manager's background, market price volatility, legal delays, type of ownership and institutional environment, and effects of innovation on the governance structure.

Key words: plural forms; governance structure; vertical boundaries; transaction cost economics; measurement cost theory.

Introduction

Governance structures are described as a spectrum with the market and vertical integration as its poles. During the past decades, the theoretical and empirical work aligned with New Institutional Economics (NIE) sought to understand the factors that determine such decisions (Joskow, 2008). The NIE considers that the minimization of transaction costs is the main factor that influences the choice of one of the forms of governance structure at the expense of the other (Williamson, 1996). However, the coexistence of governance structures for the same type of transaction in the same sector or even within the same firm is still a major puzzle in governance structures agenda and has not been studied enough.

Recently, Leite and Castro (2010) conducted research on the Brazilian electricity industry's governance structure. Their results show a remarkable plurality of governance structures in the sector. Some companies were reported as totally vertically integrated and others were operating in only one of the chain segments - generation, transmission, distribution, and commercialization - and resorting to contracts to run their operations. This surprising evidence makes us question what could be the explanations for this plurality of governance structures in this sector.

The electricity industry remained under Brazilian government ownership until the privatization process of utility companies in the 1990s. This market liberalization process was a consequence of constraints faced by public finances and the skepticism about the State's ability to operate efficiently (Correia, Melo, Costa, & Silva, 2006). However, despite private actors' participation, State regulation continued to have a central role in the industry. Through the concessions policy in the distribution segment - which established monopolies for the supply of energy in each region of the country - the State denied the possibility of freely negotiated contracts.

In 1998, the Free Contracting Environment (FCE) was designed to introduce free competition in the energy industry (Lock, 2005). However, it was only in 2004 that the electricity sellers and large consumers were allowed decide whether to freely negotiate the exchange of energy or stay in the Regulated Contracting Environment (RCE) tied to the concessionaire supply. These reforms have caused major changes in the energy sector, and encouraged inquiries about the benefits of companies' migration to FCE and the impact of the new rules on the industry organization, investments, and transactions between firms (Leite, Castro, & Timponi, 2013).

As previously stated, despite the proposition that the best governance structure is frequently diffused, there is stability of plural forms in certain transactions. This evidence can also be seen in the Brazilian Electricity Industry (BEI). The Free Contracting Environment (FCE) of electricity is the market segment in which the purchase and sale of energy are carried out through bilateral freely negotiated contracts. Similarly to other markets, the energy trading in the FCE has adopted sophisticated plural forms of governance structures which call for an investigation about their determinants. Thus, the aim of this paper is to examine the coexistence of plural forms of governance structures in the Free Contracting Environment (FCE) of the Brazilian Electricity Industry.

Our analysis suggests five propositions that can be tested. These propositions are related to the manager's background, market price volatility, legal delays, type of ownership and institutional environment, and effects of innovation on the governance structure. Therefore, we organized the article as follows: after this introduction we present the theoretical background about governance structures followed by a brief exposure to transaction cost economics and measurement cost theory; the next section explains the methodological procedures; then, we present the descriptive results followed by discussion of each of the five propositions; finally, we make our conclusions.

Theoretical Background

The governance structures

The study of vertical boundaries of organizations was founded in Ronald Coase's article *The Nature of the Firm*. Coase (1937) explains that outside a firm, the movement of prices directs the production through a series of transactions. However, inside a firm these market transactions are eliminated and, instead of this complex structure of exchanges, it is the entrepreneur who plays the role of production coordinator. The central issue of vertical limits of firm studies is to comprehend when it is most interesting to produce under the direction of a hierarchy and when it is most interesting to let the market, through the price mechanism, coordinate production.

The literature on the vertical boundaries of firms generally presents a dichotomy between the decision to make – internally – or buy in the market. However, it is possible to identify a variety of governance structures. At one end of the spectrum is the arrangement through the market, where ordinary operations – such as commodity transactions – are conducted anonymously (P. G. Klein, 2000). This mechanism is the main structure for transactions that do not require specific investments or systemic coordination (Langlois, 1992). Within the market, prices provide incentives for the discovery of profit opportunities and then entrepreneurs are quick to adapt to changes in relative prices of these transactions (Kirzner, 1978). Thus, competition between firms protects the transaction parties from opportunistic behavior of their peers.

Hybrid governance structures (*e.g.*, franchises, joint ventures, and take-or-pay contracts) are mechanisms placed between market and hierarchy, which can protect firms from opportunistic behavior. Firms choose a hybrid arrangement in order to achieve some hierarchical coordination and protection for specific investments, maintaining the incentives of market relations (P. G. Klein, 2008).

Finally, vertical integration has the advantage of sequential adaptations without the need for renegotiation (Williamson, 1985). However, Joskow (2008) points out that vertical integration should not be taken as costless. Notwithstanding, the NIE considers that the minimization of transaction costs is the main factor that influences the choice of one of the forms of governance structure at the expense of the other (Williamson, 1996).

As stated before, there is empirical evidence that a single governance structure is not always found within the same industry – even the same firm – for the same transaction. The existence of plural forms of governance structure has been treated by authors as a contractual mix, where the decision of the contractual design goes from make or buy to make and buy (Raynaud, 2008). One of the pioneering studies (Bradach & Eccles, 1989) used franchised and owned retails as examples of plural forms. More recently, when looking into franchised and owned hotel chains, Botti, Briec and Cliquet (2009) found no statistical evidence that the governance structures of the chains differ in efficiency.

The first explanation for the coexistence of plural forms may be the difference between institutional environmental incentives offered by each region. When these institutional distinctions are not observed, the adoption of multiple arrangements may be justified as a transitional situation in which firms implement different governance structures and over time migrate to the more efficient of them. The time between the adoption of plural forms and the convergence into a single efficient governance structure is treated as the rate of diffusion of the arrangement. However, longitudinal studies indicate stability in the evidence of plural forms in certain transactions (Zylbersztajn & Nogueira, 2002).

Ménard (2013) provides a list of existing explanations for the coexistence of plural forms that include technological diversity, innovation-oriented solutions, lack of financial provisions, informational benchmarking – also supported by Heide (2003) –, credibility of termination to put pressure on partners likely to be opportunistic, and lastly, knowledge-gathering reasons. By integrating these explanations with the transaction cost approach, Ménard (2013) suggests a framework of three

determinants to explain plural forms: ambiguity about the best fit of organization mode; complexity of a transaction; and strategic behavior.

In order to comprehend the role of transaction costs in the choices of governance structures is necessary to highlight that there is no single definition of transaction costs (Eggertsson, 1990). The most ordinary definition is that transaction costs are the costs of resorting to the market (Coase, 1937), and that they can be compared to friction in physics (North, 1992). Since the choice of governance structure is a comparative decision (Masten, 1996), the costs of resorting to a specific structure cannot be directly observable. Thus, the empirical evidence relies on the researcher's decision about how to measure these costs.

More accurate studies have proposed ways to operationalize the research on transaction costs. The most notable approach is Oliver Williamson's Transaction Cost Economics (TCE). However, Yoram Barzel's (1982, 1997) contributions - known as Measurement Cost Theory (MCT) - will also be addressed in this inquiry. Therefore, Transaction Cost Economics and Measurement Cost Theory are considered two complementary theoretical frameworks that are useful for understanding the decisions on firms' vertical boundaries (Kim & Mahoney, 2005). They are also helpful for suggesting some possible explanations for the persistence of plural forms of governance structures.

The transaction cost economics

The Transaction Cost Economics (TCE) addresses the governance structure that organizes production as a result of the transactions characteristics. The focus of TCE is to identify which governance structure will reduce transaction costs and maximize firm's performance. Assuming that agents have bounded rationality (*i.e.*, it is not possible to write complete contracts) and behave opportunistically in those grey areas, Williamson (1985) considers key attributes for transactions to be: (a) asset specificity; (b) frequency; (c) uncertainty.

An asset specific investment occurs when a firm decides to make an investment with a view to transact with another firm, and the value of this investment in another transaction option is considerably lower or even null compared to the original. The existence of a specific asset in a transaction creates a Quasi-rent, *i.e.* the difference between the amount generated in the specific activity and its best alternative use (B. Klein, Crawford, & Alchian, 1978). The situation in which a mutually beneficial transaction is not carried out due to the asset specificity is called a hold-up problem and it is a key issue in strategic corporate management (Holmström & Roberts, 1998).

The frequency of transactions has two implications: some transactions are conducted in a single period in time, while others are recurrent. Whereas occasional transactions tend to be carried out through the spot market, building a complex governance mechanism in the most recurring transactions can be economically viable to justify the reduction of transaction costs (Farina, Saes, & Azevedo, 1997). An additional option is the trilateral structure governance in cases where a transaction is recurrent but has an intermediate level of specific assets. It refers to a third agent assisting in measuring the performance of a contract (Williamson, 1985).

The analysis of transaction uncertainties is not a simple task, since the term is full of meanings and addressed in different ways by NIE scholars. In effortless transactions (*e.g.*, a product that is already in inventory), the uncertainty would be relatively unimportant and acquisition through the market would be satisfactory. However, for more complex transactions (*e.g.*, the installation of specialized equipment), a sophisticated contract would be necessary in order to reduce uncertainty of future behavior (P. G. Klein, 2000). Therefore, the type of governance structure adopted by firms is able to reduce uncertainty related to the supply chain and, consequently, reduce transaction costs.

Furthermore, learning also plays an important role in reducing uncertainty. Although there is no guarantee that past experiences will provide agents the correct solution to new problems, North (2008) points out that

[t]he cumulative learning of a society embodied in language, beliefs, myths, ways of doing things ... not only determines societal performance at a moment of time but through the way in which it constrains the choices of the players contributes to the nature of the process through time (p. 24).

Finally, the uncertainty of human action along with bounded rationality increase the inability to enumerate all possible contingencies and stipulates the appropriate adjustments for each. Thus, the fact that all contracts are unavoidably incomplete (Williamson, 2000) opens room for the debate about the property rights that are traded in transactions.

Measurement cost theory

Measurement Costs Theory (MCT) is part of the Property Rights approach to Economics. In Economics, Property Rights covers a much broader scope than that studied by the Law. It concerns not only the Legal Rights - the ones subscribed by laws - but also the Economic Property Rights, *i.e.*, the rights “an individual has over a commodity (or an asset) to be the individual’s ability, in expected terms, to consume the good (or the services of the asset) directly or to consume it indirectly through exchange” (Barzel, 1997, p. 3).

Private ownership of resources involves at least four categories of rights. Firstly, the rights to use the assets - namely, user rights - which define the potential uses of goods which are of legitimate employment by their owner. This right includes the autonomy to decide to physically transform or destroy an asset. Secondly, the right to receive income from a good through the use of the asset or the rent of it. Thirdly, the right to permanently transfer the right over the asset to another agent, *i.e.* sell the asset (Eggertsson, 1990). Finally, the right to exclude the access of non-owners to the good and the flow of its rents is also a fundamental characteristic of private property (Mahoney, 2004).

In their turn, institutions shape property rights by limiting the extent of control of each resource. These institutions encompass a variety of forms, including but not limited to formal agreements, constitutional provisions, statutes, court decisions, informal conventions and customs in the uses of the property. These institutions directly affect decisions regarding the use of resources and, consequently, indirectly shape economic performance (Mahoney, 2004). Foss and Foss (2015) distinguish two main schools of thought: the Old Property Rights Approach (OPRA) and the New Property Rights Approach (NPRA). The OPRA (Alchian & Demsetz, 1973; Barzel, 1982, 1997) invests great attention in the institutional context which defines and alters property rights and, consequently, economic incentives, while the NPRA (Grossman & Hart, 1986), through advanced mathematical models, seeks to determine the best ownership structure.

The Measurement Cost Theory is associated with the OPRA. The primary issue it addresses is the concept of goods as a bundle of attributes, where each attribute can be separately exchanged. This rejects the naive idea of one-dimensional property rights, increasing the complexity of the measurement and enforcement of rights (Fiani, 2011). Therefore, the transaction involves the exchange of rights to these attributes and not the exchange of the good *per se*.

The multidimensionality of the attributes of a good carries substantial consequences for economic organization. The employee measurement mechanism allows the owner of a right over an asset, at the time of sale, to get hold of the flow of current and future income caused by the subsequent appreciation or depreciation of its assets (Fiani, 2003). These measurements - which may require assessment of the physical dimensions of the object attributes (*e.g.* color, size, weight, quantity) and dimensions of property rights included in the exchange (*e.g.* rights that define the uses, potential income and alienation) - have high costs that may be unforeseeable in some cases. Consequently, these rights end up being scaled imperfectly and incompletely depending on the technology that agents have (North, 1992).

Therefore, Barzel (1997, p. 4) states that

[w]hen transaction costs are positive, rights to assets will not be perfectly delineated. The reason is that, relative to their value, some of the attributes of the assets are costly to measure. Therefore

the attributes of such assets are not fully known to prospective owners and are often not known to the current owner either. The transfer of assets entails costs resulting from both parties' attempts to determine what the valued attributes of these assets are and from the attempt by each to capture those attributes that, because of the prohibitive costs, remain poorly delineated. Exchanges that otherwise would be attractive may be forsaken because of such exchange costs.

The effort to ensure these rights is also important. Monteiro and Zylberstajn (2012) argue that strategic considerations can be incorporated through the assessment of the activities of capture and protection of property rights. Thus, transaction costs are also increased when individuals must consider the cost of third-party exclusion. Ultimately, coercion may be needed to ensure these rights (Eggertsson, 1990).

Finally, the contract becomes a transaction cost milestone. Costs related to the time before contract signature are called *ex ante* and costs related to the enforcement of the initial contract terms are *ex post*. These costs are interchangeable (Farina *et al.*, 1997), which means that the *ex ante* incentive alignment will affect the *ex post* costs (Williamson, 1985). Thus, contracts are difficult to specify when acquiring information is costly or enforcement is uncertain (Shirley, 2008).

Comparing transaction cost economics and measurement cost theory

In sum, TCE and MCT can be seen as complementary because while the MCT analyzes the problems of property rights settings, TCE emphasizes the issue of the implementation of these rights. Both agree that the property matters and emphasize, respectively, *ex ante* and *ex post* transaction costs (Fiani, 2003). However, the interdependence of these costs – forcing its *pari passu* analysis – makes the convergence of these theories a complex effort. Table 1 shows a comparison between the two theories used in this study.

Table 1

Comparison between Measurement Cost Theory and Transaction Cost Economics

	Measurement cost theory	Transaction cost economics
Unit of analysis	Institution	Transaction
Focal dimension	Property rights	Various types of asset specificity
Focal cost concern	Externalities	Maladaptation
	Rent-seeking	Holdup problems
Contractual focus	<i>Ex ante</i> property rights allocation	Choice of <i>ex post</i> governance mechanism
Theoretical orientation	Comparative assessment	Comparative assessment
Sources of Market frictions	Externalities, unclearly defined and difficult to enforce property rights, vested interests	Bounded rationality, uncertainty, information asymmetry, opportunism, and asset specificity

Note. Source: based on Kim, J., & Mahoney, J. T. (2005). Property rights theory, transaction costs theory, and agency theory: an organizational economics approach to strategic management (p. 231). *Managerial and Decision Economics*, 26(4), 223-242. <http://dx.doi.org/10.1002/mde.1218>

Method and Data

This paper is based on an empirical research characterized as a descriptive inquiry, through a qualitative approach, and resorts to the case study strategy of the Free Contracting Environment of the

Brazilian Electricity Industry. Four companies were selected for this research. The choice of these organizations was made based on the diversity of operation in the energy industry. Firms 1, 2 and 3 operate in the generation and commercialization of electricity. Firm 4 only operates in commercialization. Moreover, these organizations have different profiles, since Firm 1 and 2 are public companies, Firm 3 emerged from the privatizations made in the 1990s and Firm 4 has been a privately held company since its conception.

This section presents the criteria used and the actions that were conducted in order to ensure the validation of this study, and also the limits of its inquiry. According to Pozzebon (2004), interpretative studies can be validated based on four criteria: authenticity, plausibility, criticality, and reflexivity. Authenticity is the proof that there has been sufficient interaction between the researcher and the participants of the study, and also enough access to relevant documents. Plausibility consists on the generalization of the results. It has been argued that the validity of the inferences of a interpretative case research does not depend on the case representativeness in a statistical sense, but on its plausibility and the consistency of the logical reasoning used in describing the case results. Criticality implies a new improved comprehension of the studied subject that will influence readers to reconsider their opinions about it. Finally, reflexivity involves understanding that the research results are shaped by how it is conducted. This implies the researcher's responsibility in positioning themselves in relation to their assumptions.

Table 2 shows - based on these four criteria - how to conduct an inquiry, as well as the actions that we performed in order to ensure the validity of the study.

Table 2

How to Ensure the Validity of the Research

Criteria	How to ensure	What was done
Authenticity	set strategies and procedures for the smooth progress of the research project	case study strategy
	carefully plan the data collection	semi-structured interview based on Ménard, Saes, Silva and Raynaud (2014)
	consider the environmental context	analysis of the institutional environment; <i>i.e.</i> , formal rules, norms, and sanctions
Plausibility	choose representative cases for your universe	three large vertically-integrated groups and the largest Brazilian independent trader
Criticality	theoretical triangulation	interpreting the data based on two theories (TCE and MCT)
	use of interdisciplinary approaches	choice of an interdisciplinary theoretical framework (business, economics and law)
Reflexivity	consider the subjective nature of the firms' criteria for choosing its governance structure	conducting an empirical study with qualitative data analysis

Note. Adapted from Pozzebon, M. (2004). Conducting and evaluating critical interpretive research: examining criteria as a key component in building a research tradition. In B. Kaplan, D. P. Truex, D. Wastell, A. T. Wood-Harper, & J. DeGross (Eds.), *Information systems research* (pp. 275-292). Boston: Springer US.

First, we gathered secondary data from books, newspaper, and industry and government reports in order to comprehend the context we aimed to study. This provided us a better understanding of the complex mechanism of electricity commercialization and the institutional environmental it faces. Afterwards, we conducted semi-structured interviews with one director of each firm. All interviews were based on the script provided by Ménard *et al.* (2014) and were audio-recorded and transcribed. The foundational question for the entire interview was **why is this your choice of governance**

structure? In addition, respondents were asked how they perceive issues such as the rules of the institutional environment, new technologies and their history as a company.

Data analysis was conducted for each case in order to summarize the view of each interviewee about our research topics; hereafter, we started to bring together what could be counterintuitive in their argument. We assume that the studies about the boundaries of the firms may suffer from the limitation of the presumption of efficiency of the governance structure. The inability of observing all possible arrangements prevents the researcher from deducing which type would be appropriate for each situation (P. G. Klein, 2008). Nevertheless, we believe that the case study approach is also useful since it allows the examination of behavioral paths and the role of beliefs and judgments in decision making (Alston, 2008).

Finally, as we decided to analyze the collected data considering the subjective nature of the firms' criteria for choosing their governance structures, our results are limited by not being enabled to set generalizations through the presented cases. The research design aimed to interpret the cases and extract new insights and discoveries (Locke, 2011) that allow testable propositions.

Results

An important institutional change in the Brazilian electricity industry occurred in 2004, when two environments of energy procurement were introduced. The Regulated Contracting Environment (RCE) follows the same model prior to the reform, in which the purchase of energy is performed - preceded by bidding - by the distribution companies that operate a monopoly in their established region. Meanwhile, the Free Contracting Environment (FCE) of electricity is the market segment in which operations are carried out for the purchase and sale of energy through bilateral contracts freely negotiated.

According to the annual report of the Brazilian Association of Energy Traders (*Associação Brasileira dos Comercializadores de Energia* [ABRACEEL]), about 27% of Brazilian electricity consumption was transacted through the FCE in 2013. A total of 1,815 consumers resorted to the FCE to get an average of 16,052 MW per month (ABRACEEL, 2014). These data indicate that few consumers are responsible for a significant amount of energy consumption. Commercial relations in the FCE allow free negotiation of deadlines, volumes and prices among generation firms, traders, and free consumers. Figure 1 illustrates the electricity production chain in the FCE when it is completely unbundled. The generation firms trade (T1) energy to commercialization firms who trade (T2) to free consumers⁽¹⁾.

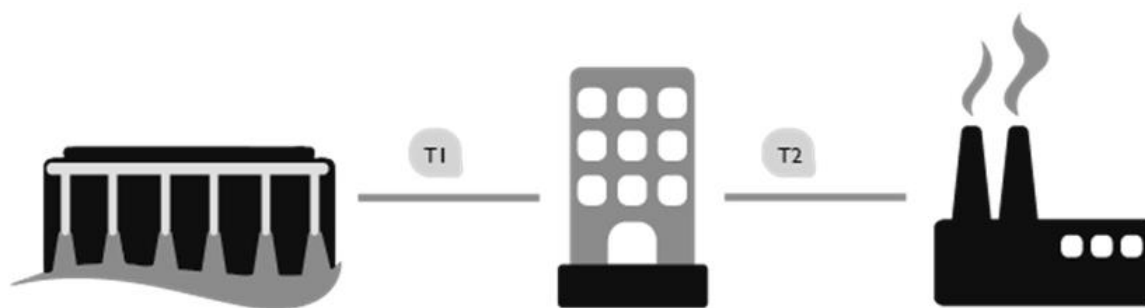


Figure 1. Completely Unbundled Electricity Industry in the FCE

However, researches show the trend of the creation of companies' holdings comprising the generation and commercialization firms in the electricity industry (Leite & Castro, 2010). Figure 2 illustrates the process of piggybacking the commercialization of energy by generating companies. In

this case, the transaction between generation and commercialization (T1) is vertically integrated and only the transaction to free consumers (T2) is performed through the market mechanism.

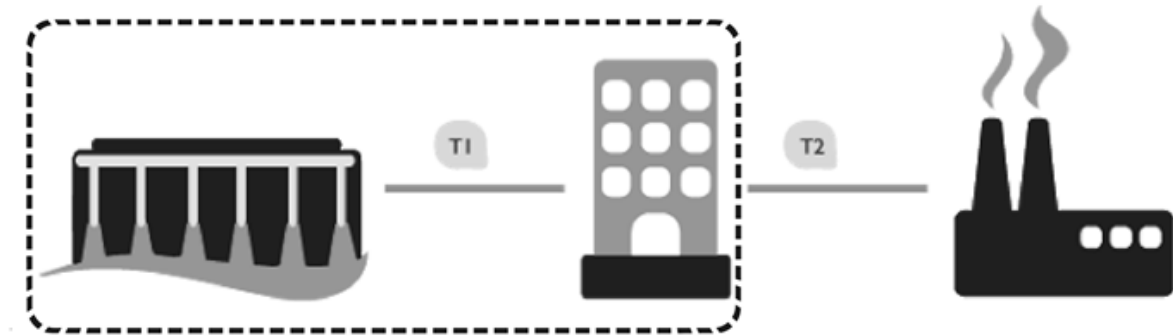


Figure 2. The Process of Piggybacking the Commercialization of Energy by Generating Companies

The results of our study suggest that the studied firms have a slightly different strategy of operation, although acting in the same segment. Firms 1 and 2 only acquire power from their own generation plants. Their goals include the preservation and security of their property, discarding speculation and prioritizing long-term agreements. On the other hand, almost 90% of Firm 3's energy is auto-supplied and 10% is acquired through other companies. Firm 4 buys all its energy supply through other companies on the market, including Firm 3. These companies trade long and short-term contracts, in which profits are provided by a speculative process, allowing the maintenance of the sector's liquidity⁽²⁾.

Table 3 shows the description of the studied firms and the respondents' answers to each investigated aspect. The studied companies did not report high investments in specific assets. Nevertheless, they have highlighted the complexity of the institutional environment's rules, as well as the need for financial backing as characteristics of this industry stage. Also, it was apparent that the adoption of new technologies in order to simplify the negotiation and contracting of energy is reducing contract costs.

Table 3

Summary of Answers

	Firm 1	Firm 2	Firm 3	Firm 4
Ownership	public	public	privatized	private
Operation	generation and commercialization	generation and commercialization	generation and commercialization	commercialization
Energy buying	100% vertical	100% vertical	90% vertical and 10% contracts	100% contracts
Buying process	null	null	free trading	free trading
Energy selling	100% final consumers	100% final consumers	90% final consumer 10% others traders	final consumers and others commercialization
Selling process	public auctions	public auctions	free trading	free trading
Reason for I.A.	heritage security	board of directors conservatism	risk and return trade-off	risk and return trade-off and market complexity

Continues

Table 3 (continued)

	Firm 1	Firm 2	Firm 3	Firm 4
Asset specificity	low	low	low	low
Enforcement of contracts	yes	yes	yes	yes
Competition process	price and customers service	price and brand trust	price and risk	price and brand trust
Institutional environment	unstable and interventionist	few incentives	unstable and insecure	unstable, complex and political

Manager's background

The main TCE's attributes that determine transaction costs are: (a) asset specificity; (b) frequency; and (c) uncertainty (Williamson, 1985). According to the managers of firms 1 and 3, the main investment for a trading company is financial backing. This is done in order to provide the capital reserve to ensure the liquidity of the company forward to the fluctuations on purchasing and selling operations. The availability of financial support is an asset with null specificity, because the company may decide at any time to reduce their operations and invest this capital in other activities.

Respondents 2 and 3 pointed out the similar physical structure of both trader companies and regular service providers that operate from an office and invest in furniture and communications equipment. Besides this, respondent 4 argues that human resources are an important variable. His assertion relies on the shortage of skilled professionals, which require the company's investment in training their staff. In this regard he clarifies that

“human resources is the most valuable [asset] and it is the greatest investment. [People] need to be trained. I come from another market—from engineering—and did not know anything about the FCE and it took me a long time to understand [the market]. Today, there are no colleges that prepare you for this and even if there were, when you get out of college things have already changed. The rules have changed the regulatory system. The person would have to study again. It is a constant process. When you get into a company, it takes a while until you can get the hang of it” (Respondent 4).

Respondent 4's emphasis on the investment in training employees may be justified by the fact that his company also provides consultancy services for buyers and sellers of energy. Another characteristic of his company is that the main collaborators are a group of managers with a financial market background, where they acquired experience in management, strategy and negotiation of various commodities. In this case, it is seen as necessary to hire highly skilled employees in order to provide specialized consulting services and this constant training can be a human asset specificity investment.

Thus, according to the TCE, in relation to asset specificity and frequency of transactions, the governance structure between generating companies and energy traders should be carried through market governance. However, it can be seen that there is a diversity of governance structures and that investments in human resources and team characteristics appear to have an important role in this relation.

Proposition #1 – Managers that have more experience in private companies are more likely to choose plural forms than to choose a single governance structure.

Market prices volatility

Measurement Cost Theory rejects the one-dimensional notion of an asset property (Fiani, 2011). It implies that the energy commercialization - although commonly characterized as a commodity transaction - should not be characterized as such. Energy trading contracts as a bundle of attributes (Barzel, 1997) represents more than the exchange of electricity flows. The energy multidimensionality

is evident in the contractual clauses dealing with the flexibility and seasonality in supply, the deadlines, delivery, and credit guarantees, among other attributes that can vary according to the firms' transaction negotiation.

These complex attributes require a rigorous description of the rights granted in the agreement and its price adaptation to unforeseen situations. It increases the cost of establishing a transaction. About the procedure for setting a contract, Respondent 1 points out that "when a company signs up to participate in our energy sale auctions, it must present a series of documents proving their suitability, thus avoiding future problems during the contract period". Respondent 2 believes that *ex ante* actions are concerned about the assessment of transaction risk. The general questions for this evaluation are:

"What is the risk I am willing to take? If I make a purchasing energy contract with a generation firm, I need to know whether its energy is not delivered on time, what guarantees it will give me, and how it will give me these guarantees. It is likewise with my client. Is this client a good payer? What is his financial condition?" (Respondent 2).

The Respondent 4 believes that barriers to new contracts are reduced after the first round. Thus, this suggests that transaction costs related to the knowledge shortages are reduced during the course of time which allows agents throughout the market process find governance structures closer to the maximization. This argument is consistent with the observation made by Respondent 3, that it does not matter how good the relationship with a customer is; the competitive price is a determinant factor in the renegotiation of a new contract.

Bounded rationality also matters in the inability of companies to predict future energy demand perfectly, which inevitably results in incomplete contracts. It implies some degree of exposure to the spot market price fluctuation. This exposure can be faced by the final consumer or by the commercialization firm. As mentioned by Fiani (2003), the measurement mechanism of the property rights related to an asset is what will allow the owner to take advantage at the time of sale of the current and future income flow caused by subsequent appreciation or depreciation of its assets. As the results of these evaluations are necessarily uncertain, firms can use plural governance structures as a way to create a portfolio that allows them to manage the risk and return relation, similarly to financial portfolios.

Proposition #2 – Market prices volatility is more likely to foster plural forms than to foster a single governance structure.

Legal delays

The literature on property rights also argues that the private property of resources involves three categories of rights: the use rights of the asset; the right to receive income from an asset; and the right to alienate or sell the asset (Eggertsson, 1990). Thus, the enforcement for the fulfillment of contracts is a determinant factor for the potentiality of property right transactions. Respondent 4 believes the Electric Energy Trading Chamber (EETC) plays an important role in enforcing the fulfillment of contracts and hence property rights. According to him, "the EETC sets a lot of rules precisely to mitigate the risk of the market. Every event that generates losses in the market is divided among the agents of the EETC. It has a lot of rules exactly for this reason" (Respondent 4).

In his turn, despite the absence of contractual breaches, Respondent 3 highlights contractual renegotiations:

"we have already discussed the contract conditions. Sometimes the client's market falls and then he wants to discuss the price, etc. We are always open to discussion. [For] many of them we end up renegotiating something, accepting something the client wants but also adding something for us.... we always discuss that from a win-win point of view" (Respondent 3).

Beyond the EETC and the bilateral trade agreements, the Energy Reallocation Mechanism (ERM) plays an important role and was also cited by Respondent 4 as a conflict-reducing component. According to the National Electric Energy Agency, "the Energy Reallocation Mechanism (ERM) has been designed

to share among its members the financial risks associated with the sale of electricity by hydro plants dispatched centrally and optimized by the National Operator System (NOS)” (Agência Nacional de Energia Elétrica [ANEEL], 2015, p. 3). Therefore, the ERM is an agreement - *i.e.* an institution - among some generators that allows the reduction of transaction costs in order to mitigate their exposure to financial risk. The ERM

assures that, during the process of accounting in the EETC, all participating plants will receive their levels of physical guarantee, independently of the actual production of energy, provided that the ERM's total generation is not below the physical guarantee of the National Interconnected System. In other words, the ERM relocates the energy among the “mechanism's” participants, transferring the surplus of those that generated more than their physical guarantees to the others that generated less (ANEEL, 2015, p. 3, our translation).

Moreover, Mahoney (2004) points out that excluding non-owners' access to the good or to its income flows is a key element of property rights. In this regard, Respondent 3 complains about the slowness of the EETC in a transaction's shutdown process. According to the respondent,

“this is alarming because - even though I do not have problematic situations with a client and break a contract very often - if this happens, I want the contract to leave the EETC's list as soon as possible. I want this discontinuation process to be fast and safe. Besides, if I break this contract bilaterally, this contract's record on EETC must be cleared quickly. And this is a problem. If that happens, I spend time to do that and this results in costs because what counts is the contract that is there. I may have broken with the client but he continues to receive energy because the contract's record is on EETC. And then I'm selling energy without getting any money. This is my risk. Today, this process on EETC is neither fast nor safe in my opinion” (Respondent 3).

According to the MCT's perspective, this failure on the definition and enforcement of rights increases transaction costs and reduces investments in the sector. Time is a dimension of this enforcement. When a court delays the decision and enforcement of a judgment it may mean a loss in the right to receive income from a good through the use of the asset or the rent of it.

Proposition #3 – Higher legal delays are more likely to foster plural forms than to foster a single governance structure.

Type of ownership and institutional environment

The institutional environment - which should be conducive to enforcement of property rights - is regarded with suspicion by the interviewees. Respondents 1, 3, and 4 complained about constant changes in trading rules, which go against the argument of Spiller and Tommasi (2008) about regulatory policy being stable, coherent and consistent in all areas, ensuring inherent predictability in the rule of law.

Respondent 4 considers the Brazilian energy market's institutional environment

“very unstable, with lots of rules and a strong political bias. When that happens, there are some decisions that are taken from a political point of view, and not from the market. That weakens the environment. We could mention several events such as the MP579, which have changed the SPD's maximum and minimum value. Also, the generation concession's renewal is only for the RCE. For us, several decisions have political nature instead of being actually based on the market”.

Respondent 1 and 3 recall recent government interventions in the FCE and its destabilization of the market price signals. Moreover, Respondent 3 highlights the need of stability in the rules for the proper running of transactions:

“When it comes to the institutional environment, in our point of view, we had a major worsening. Since 2012, there were many changes that only harmed the market as a whole. From our perspective nobody was benefited, neither the consumer nor the generator nor us. The consumer wants to feel assured in regard to the energy price. His business is to produce goods. This institutional mess had a major impact on the market

and the price.... He wants to keep manufacturing, so he wants to be sure of the costs, and he doesn't want to take risks. That is very unfavorable for the FCE”.

Respondent 4 believes that government interventions end up shifting the FCE's focus. He points out that the free market should have rules allowing a State-free environment; however, that does not happen. Compared to countries like Norway and Germany, where free competition is truly free, the Brazilian government remains, in his words, laying its “heavy hand” on the energy market.

Respondent 2 ponders that the advantage that RCE has over the FCE is that it provides a more stable institutional environment for consumers. When operating in the RCE, the owner of a factory can only consider energy as a variable cost with a fixed price. However, when choosing to migrate to the FCE, a company must be aware of all energy industry variables in addition to manufacturing products.

Proposition #4 – Privately-owned companies are more likely, in comparison with public companies, to choose plural forms of governance structure in unstable institutional environments.

Innovation

Respondent 2 also affirms that the institutional environment could be more encouraging. In particular, the respondent mentions the legal entry barriers. For Respondent 3, the removal of entry requirements in the FCE - what Ostrom (2008) calls the boundary rule - could entail a huge change in the technology's status. About the industry's future, Respondent 3 speculates that

“what may happen depends heavily on the possibility of opening the market more, as well as on different entry criteria in the FCE. Maybe if residential consumers were free, a big change would happen when it comes to technology, because the number of clients would be a lot bigger and it would be almost like the telephone market.... Then you would need more technology. You would need an evolution, a selling platform, internet products where a person can hire energy online. I think that would bring a new dynamic for the sector” (Respondent 3).

Consequently, according to Respondent 3, new sales channels would be possible, since the retail dynamic is different from that in wholesale. He supports that the small number of customers in the market - currently, about 2,000 - allows straightforward negotiation and relational wholesale contracts. For respondents 1 and 2, the relationship between traders and consumers was also strongly affected by the adoption of electronic auction platforms. It is possible to provide a free and transparent sales process through remote operation.

Moreover, respondent 4 mentions the contractual nature of the energy market as a key variable instead of the technological changes. According to him, technological changes such as the Smart Grid⁽³⁾ and others IT tools stay in the background, since the sale of energy relies more on the relationship and closeness between the consumer and the provider than the technology employed. Finally, respondent 3 highlights the importance of long-term relationships in the energy market:

“the scenario has a extremely high price. The price is higher than the RCE price in some cases. We joke that we are earning money now as a generator, but certainly it is not going well for us, because we have a long-term business. I want to have long-term clients and that is harming the clients' perception regarding the FCE, because they are realizing that there are risks in the FCE, and that it could be worse than the RCE. It is difficult to persuade them” (Respondent 3).

However, we believe that new technologies have the potential to reduce transaction costs, in particular, measurement costs (Barzel, 1982). These new technologies allow agents to have better sources of information to determine comprehensive contractual clauses on transaction values.

Proposition #5 – Higher innovation markets are more likely to foster plural forms than to foster a single governance structure.

Conclusions

The aim of this paper was to examine the coexistence of plural forms of governance structures in the Free Contracting Environment (FCE) of the Brazilian Electricity Industry. Firstly, we identified the governance structure of the four firms that were selected for this study. Considering the transmission and distribution as given, the supply chain in the FCE comprises three stages: the energy generation, the energy trade; and the final energy consumption. Then, our effort was to comprehend the managers' perception about the firm's operations.

We used the qualitative approach in order to understand the adoption of distinct governance structures within a single transaction. The results suggest that the firms that were studied, although acting in the same segment, have a slightly different focus of action. Firms 1 and 2 only acquire power from their own generation plants. On the other hand, Firm 3, and more prominently Firm 4, buy their energy supply through other companies on the market. These companies trade both long and short-term. Firm 3 also self-produces a major part of its supply. Thus, this confirms the coexistence of governance structures for the same type of transaction in the same sector and within the same firm.

When confronted with specificity criteria and frequency of transactions intended by the ECT (Williamson, 1985), the governance structures that were identified suggest that only these two variables may not be sufficient to justify their adoption. According to the respondents, the necessary investments when starting a trading company are not specific. When it comes to trading services, financial backing was cited as the most important asset for operating a transaction. Since money cannot be considered a specific asset, the presence of plural forms of governance structure led us to a deeper investigation about the motives for the adoption of these forms.

Concerning these plural forms of governance structures among firms, we argue that this evidence can neither be justified by the variation of the institutional incentives for each region, nor as a transitory situation in which the firms migrate to the most efficient arrangement after some time. Firstly, the institutional environment is the same for the entire Brazilian territory. All traders are allowed to operate in the whole country, and there are no different laws or rules for each agent. Moreover, all firms except Firm 4 - which is planning to have a part of its energy outsourced - have operated since the beginning of the new institutional regulation without changing their governance structures.

The decisions regarding the governance structure are, in part, influenced by the perception of existing risks in the operations and in building strategies for dealing with these risks. The results indicate that the *ex ante* measurement of asset prices is the greatest obstacle to the conclusion of contracts. The measurement technologies (Eggertsson, 1990) do not provide the apparatus that is necessary for the correct projection of the values of the assets in the future and the unstable institutional environment increases the presence of transaction costs related to the measurement of property rights. Furthermore, firms, despite considering the fulfillment of contracts as satisfactory, consider that the regulatory policy is not stable, coherent and consistent (Spiller & Tommasi, 2008).

Based on these findings we suggest five propositions that can be tested. These propositions support that the manager's background in private companies, market prices volatility, legal delays, type of ownership moderated by institutional environment, and innovation may be explanations for the presence of plural forms of structure governance in the same industry or firm.

Notes

¹ FCE agents have free access to transmission and distribution lines through the payment of the transmission system use fare and the distribution system use fare.

² Part of the complex environment of electricity commercialization of energy, the Settlement Price for the Differences (SPD) is a mechanism for the settlement of the difference of the contracting, generation and consumption of electricity. In short, the contracting and actual generation or consumption of energy always present variations. This fluctuation is adjusted based on a spot price. Therefore, all companies resort to the market governance structure on some level. The Respondent 4 clarifies that rules are established for the settlement of differences during the contract negotiation. The rules are carried out according to the company's strategy in the face of the spot price fluctuation and through demand forecasts with three different scenarios. Since the SPD is settled *ex post* the consumption, its detailed analysis was not part of the scope of this research. Nevertheless, we believe that the decision about SPD exposure is an important part of the firms strategy in the FCE.

³ The term *smart grid* refers to the transmission and distribution lines that employ information technology as a communicational tool and the energy transmission automation.

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