Original Article

The effect of capital ownership on the relationship between the regulatory process and companies' abnormal return

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ABSTRACT

The aim of this article was to examine the effect of tariff changes, moderated by capital ownership, on the abnormal return of Brazilian public utility companies. Based on the capture perspective, regulation can be captured by the regulated party, and capital ownership can shape the pressure from companies on the regulator for regulatory decisions that are favorable to their interests. This issue has not yet been investigated. In the regulatory process, the regulator's decisions generally involve increasing the administered price. As a result, the legitimacy of the regulator is questioned, suggesting that its decisions are biased towards the interests of companies. This study sheds light on this issue. The evidence shows how the private identity of the controlling owner can lead the company to earn a return above the cost of capital through the regulatory process. The sample consisted of regulated companies (from the water and sanitation, piped natural gas and electricity sectors) from 2007 to 2019. The variables used were: abnormal return (dependent); tariff change and capital ownership (independent); and leverage, economic growth, size and sector. The data were estimated using a random effects model, generalized least squares and robustness using a dynamic panel with GMM-SYS (all observations). The results show that the private identity of the owner of the capital can lead to regulatory decisions that are more aligned with the interests of maximizing the profitability of the regulated companies. The results are consistent with the perspective of the economic rationality of private investors to maximize returns and the perspective that public investors prioritize other outcomes rather than abnormal returns.

Keywords: abnormal return, tariff change, capital ownership.

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Efeito da propriedade do capital sobre a relação entre processo regulatório e retorno anormal de empresas

RESUMO

O objetivo deste artigo consistiu em verificar o efeito da mudança tarifária, moderado pela propriedade do capital, no retorno anormal de empresas brasileiras do setor de utilidade pública. Com base na perspectiva da captura, a regulação pode ser capturada pelo regulado, e a propriedade do capital pode modelar a pressão das empresas sobre o regulador por decisões regulatórias favoráveis a seus interesses. Tal indagação ainda não foi investigada. No processo regulatório, as decisões do regulador geralmente envolvem o aumento do preço administrado. Como consequência, a legitimidade do regulador é questionada, sugerindo que suas decisões têm sido tendenciosas aos interesses das empresas. Este estudo coloca luz sobre o tema. As evidências fornecem informação sobre como a identidade privada do proprietário controlador pode levar a empresa a obter retorno superior ao custo do capital por meio do processo regulatório. A amostra foi composta por empresas reguladas (setores de água e saneamento, gás natural canalizado e energia elétrica), no período de 2007 a 2019. As variáveis utilizadas foram: retorno anormal (dependente); mudança tarifária e propriedade do capital (independentes); e alavancagem, crescimento econômico, tamanho e setor. Os dados foram estimados por meio de um modelo de efeitos aleatórios, método dos mínimos quadrados generalizados; e robustez usando painel dinâmico com GMM-SYS (todas as observações). Os resultados apontam que a identidade privada do proprietário do capital pode conduzir a decisões regulatórias mais alinhadas aos interesses de maximização da rentabilidade das empresas reguladas. Os resultados se alinham à perspectiva da racionalidade econômica dos investidores privados à maximização dos retornos e à perspectiva de que os investidores públicos priorizam outros resultados, em vez de retornos anormais.

Palavras-chave: *retorno anormal, mudança tarifária, propriedade do capital.*

1. INTRODUCTION

The exercise of regulating is a broad action that has different types, such as social, process and economic regulation (Guasch & Hahn, 1999). In this study, however, the focus is on economic regulation. Regulation is understood as a deliberate action to define criteria and conditions for the operation of economic and social activities in order to align private interests with public interests (Cunha, 2016). Economic regulation consists of government intervention in the market (Posner, 1974), regarding aspects such as price restrictions, quantity and quality of service provision, entry and exit conditions for specific sectors, among others. In public utility sectors, these aspects are determined by sectoral regulators.

Appropriate regulation, the normative view, is defined by clear, stable and predictable rules, with a purely professional and technical interpretation of standards and contracts, and must have the capacity to withstand influences and pressures from stakeholders, such as government and companies; and be committed to establishing a predictable and appropriate allocation of resources (Sirtaine et al., 2005). As part of the regulatory process, utilities must receive a fair return on invested capital and must also charge consumers fair tariffs and provide quality services (Andrade & Martins, 2017). However, what is the fair return that the investor should receive on the capital invested and that still provides tariff modicity? The expected answer is that the allowed price should be designed to provide investors with returns in line with the risks of the activity they are financing, and not use the characteristics of the sector to exploit consumers.

For the consumer, a fair tariff is one that is not abusive or disproportionate to the costs and the return to investors, without having a low quality of service, i.e., socially desirable standards of service quality at a fair price (Andrade & Martins, 2017). Therefore, the term "fair value" corresponds to the value that includes the payment of costs, the recovery of invested capital, and the return on invested capital, as well as affordable tariffs for consumers (Andrade & Martins, 2017). To achieve fair value, the needs of companies and consumers must be met.

In the regulatory system, processes can involve the reallocation of returns from shareholders to consumers (Antoniou & Pescetto, 1997) or vice versa. This scenario is fertile ground for conflicts of interest because the decisions made within the regulatory process imply a transfer of wealth between the agents providing the services and the consumers. For example, when the regulator decides to increase the administered price, either to recover costs or to increase the regulated parties' returns, the counterpart is the transfer of wealth from the consumer to the producer (regulated company).

Based on the idea of economic rationality, the managers of regulated companies are maximizers of

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company profitability and, with this function, will seek ways to increase returns; abnormal returns depend on administered prices and the revisions and readjustments of these prices; and in the regulatory process, regulators have the power to set, revise and readjust administered prices. The combination of these characteristics is a likely motivation for regulated companies to seek ways to co-opt the regulatory process through administered pricing (tariff changes).

According to the public interest, the regulator should set the regulated price that balances consumers' demand for the minimum necessary tariff (tariff modicity) with the regulated companies' need to recover costs and earn a reasonable return on investment (Blacconiere et al., 2000). In this scenario, both regulated companies and consumers have incentives to pressure regulators for policies and outcomes that are consistent with their interests (Correa et al., 2019), such that the group that can exert the most pressure on the regulator will have its interests met in the regulatory process (Becker, 1983; Peltzman, 1976).

The relationship between the regulator, regulated companies, and consumers presupposes the existence of conflicts over the outcomes of regulation that maximize the individual interests of the parties. Consumers will tend to put pressure on the regulator for lower tariffs and higher quality services, while companies will seek higher tariffs from the regulator to absorb costs and increase their returns. Some characteristics, such as capital ownership, may have a potential impact by strengthening or weakening the relationship between the outcome of the regulatory process (tariff changes) and the profitability (abnormal return) of the regulated companies.

The concentration of capital ownership should determine most of the relevant decisions about the company's strategy and its expectations regarding results. In this sense, it is possible that the identity of the owner of the capital is a mitigating or aggravating characteristic of the relationship between the regulatory process and companies' abnormal return, since, due to the circumstances, publicly-owned companies would be motivated to achieve social outcomes rather than prioritizing profits (Holzhacker et al., 2015). Also, in this context, Loch et al. (2018) and Guerrini et al. (2011) argue that companies in which the government is the controlling shareholder tend to have lower returns.

The abnormal return of price-regulated companies partly reflects the performance of the regulator's decisions, which, according to Becker (1983) and Stigler (1971), may be biased toward the interests of the regulated companies, based on the perspective of the theory of regulatory capture and interest groups. When the price

of the tariff is overestimated, the result of a price change represents an advantage for the regulated companies (Tapia, 2012) and signals regulatory capture, in which the regulated companies exploit the dynamics of the regulatory process to obtain higher abnormal returns. Overestimation implies higher tariff changes, which will be absorbed by consumers and will represent a departure from the regulator's commitment to tariff moderation.

In Brazil, there are no studies that have analyzed the process of regulatory co-optation from the perspective of economic rationality based on the relationship between tariff changes and returns in public utility companies; and how this relationship can be moderated by shareholder identity. Furthermore, in the Brazilian context, public and private capital ownership is found in public utility companies. Against this backdrop, the aim of this article is to examine the effect of tariff changes, moderated by capital ownership, on the abnormal return of Brazilian public utility companies.

Sectoral economic regulatory agencies were originally created to correct market failures and serve the public interest. However, the legitimacy of the agencies' decisions can be questioned, suggesting that regulators have made decisions biased toward corporate interests. For example, in 2016, the Goiana Regulatory Agency (AGR) approved tariff increases that cumulatively amounted to 32.03% for Saneago. Due to consumer dissatisfaction, the Goiás Public Prosecutor's Office was called in and determined that the revised tariff had no accounting or financial support, making it abusive and illegal. In the end, the index remained at 16.07% and the remaining percentage of 16.06% would be applied at a later date (Abreu, 2016). Given the lack of scientific evidence, this argument does not appear in the literature, considering the relationship between tariff changes and abnormal return moderated by capital ownership.

In Brazil, there is a gap about the effect of the regulatory process of regulatory agencies through tariff changes. The understanding and relationship between the variables (return, tariff change and ownership) involved in the process of management, control and inspection policies should enable the regulatory agency to select the best alternative to meet society's needs, without compromising the economic and financial balance of the regulated company. In addition, the approval of the legal framework in the basic sanitation sector in 2020 and in the piped natural gas sector in 2021, aimed at universalizing the provision of services and attracting private investment in these sectors, could accelerate the transfer of public control to private control of the companies, similar to what happened in the electricity sector.

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2. THEORETICAL FRAMEWORK

2.1 Theory of Regulation

The theory of regulation discusses regulation using a number of approaches (Becker, 1983; Peltzman, 1976; Posner, 1974; Stigler, 1971), such as public interest theory, capture theory, and interest group theory. Public interest theory emphasizes the role of government in correcting market imperfections such as monopoly pricing and environmental externalities (Laffont & Tirole, 1991). Capture theory emphasizes that the main beneficiary of regulation is not the public interest but the regulated agents (Peltzman et al., 1989; Stigler, 1971). Interest group theory emphasizes that regulation is designed to meet the needs of the interest group that exerts the greatest relative pressure on the regulator (Becker, 1983; Posner, 1974).

Public interest theory postulates how government intervention in the economy through regulation should work. The agents involved in the regulatory process (politicians/regulators) should act to promote the vision of the public interest or need (Laffont & Tirole, 1991; Levine & Forrence, 1990). Regulatory capture is modeled as a dynamic process in which political leaders, interest groups, and regulatory agencies interact repeatedly (Martimort, 1999). Capture occurs when a regulatory agency uses its power for the benefit of the regulated sector, rather than in the public interest (Potter et al., 2014).

Regulated companies have incentives to capture regulation because they know that the decisions made by the regulator can have a significant impact on the sector and, consequently, on company results. Regulated parties will seek to control the regulator with the intention of ensuring that the regulations subsequently promulgated are beneficial to companies in the sector. According to Mitnick (1980, cited by Walker 1987), there are at least five ways in which a regulated entity or industry can capture a regulator. Capture is said to occur a) when the interest of the regulated party controls the regulation and the regulatory agency; b) when the regulated party manages to coordinate the activities of the regulatory agency with its activities, so that its private interests are satisfied; c) when the regulated party manages to neutralize or guarantee the non-performance (or mediocre performance) of the regulatory agency; d) when, in a subtle process of interaction with the regulator, the regulated party manages (perhaps not even deliberately) to co-opt the regulator to see situations from its perspective and thus to give it the regulation it wants; or e) when, quite independently of

the formal or conscientious wishes of the regulator or the regulated party, the basic structure of the reward system does not lead to a regulator who is inept in serving the interests of the regulated party.

Interest group theory posits that groups will form to protect specific economic interests (Becker, 1983; Deegan & Unerman, 2011; Peltzman, 1976). According to this theory (Becker, 1983), in the model based on competition between different interest groups, the regulator responds to the amount of pressure exerted by the interest groups, i.e., the group seeks answers about the viability of exerting pressure on the regulator. When regulation is aligned with the interests of the most influential group, privately-owned companies, which are more concerned with profitability, can exert greater pressure for regulation that is favorable to their interests.

In summary, regulatory theory approaches seek to explain the relationship between the regulator and the regulated agents, which is why they were used as a theoretical platform to achieve the objective of investigating whether the regulatory process is captured by regulated companies, according to the capture perspective; this considering the condition of ownership as a moderator of group or individual pressure on the regulatory process.

2.2 Previous Studies

Several studies have addressed the influence of interest groups on the regulatory process, by investigating the determinants of influence (Macher & Mayo, 2012), the relationship between the regulatory information environment and tariff changes (Fremeth & Holburn, 2012), the determinants of the balance between consumer and business interests promoted by regulators (Klein & Sweeney, 1999), and the extent to which public or private interests prevail in the regulatory process (Mizutani & Nakamura, 2017). In general, the findings (Fremeth & Holburn, 2012; Klein & Sweeney, 1999; Macher & Mayo, 2012) have pointed to alignment with the interests of companies (interest group and capture perspective).

The profitability (abnormal return) of a company is a highly complex concept because it depends on exogenous constraints (economic regulation, level of competition, economic growth) (Reynaud & Thomas, 2013). The size of the company, the economic environment, and the characteristics of regulation are essential for understanding and explaining company profitability (Reynaud & Thomas,

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2013). Evidence on the impact of the regulatory process on company performance (abnormal return) is limited. There may be stability in the abnormal return, but it may change over time (Maziotis et al., 2015).

The studies that have addressed the relationship between ownership (public or private) and profitability have examined aspects such as comparing public or private ownership with profitability and leverage (Dewenter & Malatesta, 2001) and whether company performance is related to variables such as ownership, size, and diversification (Guerrini et al., 2011; Romano & Guerrini, 2014). The results of these studies suggest that privately-owned companies may be more profitable.

Regarding the relationship between capital ownership (public or private) and the regulatory process, more specifically the tariff price, studies have addressed regulator decisions in a more privatized environment (Cambini & Spiegel, 2016), whether service prices are lower after privatization in Western Europe (Fiorio & Florio, 2013), and the relationship between the ownership of the company providing the service and the tariff price in countries such as France (Porcher, 2017), Spain (García-Valiñas et al., 2013), the United States (Wait & Petrie, 2017) and Brazil (Barbosa & Brusse, 2015). In general, the results of these studies show that privately-owned companies have higher tariff prices.

2.3 Research Hypothesis

Company ownership can be established based on the identity of the majority shareholder, which consists of the category that holds the controlling stake in the company – family, government, or institutional investor (Campos, 2006; Thomsen & Pedersen, 2000; Wang & Shailer, 2018). It is expected that each type of shareholder will have a different interest in the company and that the company's strategy will need to be aligned with the objectives of the dominant owner (Thomsen & Pedersen, 2000), i.e., the formalization of the controlling shareholder's preferences for specific outcomes, for example, in terms of economic, social or political outcomes.

The literature on economic outcomes, such as that of Hart et al. (1997), suggests that governments tend to pay special attention to political and social objectives, such as low production prices, employment, or external effects on profitability. Therefore, government ownership, through aspects inherent to the owner's identity, can represent different desires from those of private ownership (Willner & Parker, 2007) in terms of the order of priority of the company's objectives. In the case of a company with both public and private capital, the concentration of ownership

is expected to explain the direction of decision-making, which determines most of the relevant decisions about the company's performance.

Dewenter and Malatesta (2001), without distinguishing between regulated and unregulated firms, found that state-owned companies are significantly less profitable than private ones. In principle, this is because state-owned companies forgo maximum profit in pursuit of social (Dewenter & Malatesta, 2001; Romano & Guerrini, 2014) and political objectives. Also, in this context, Loch et al. (2018) and Guerrini et al. (2011) argue that firms in which the government is the controlling shareholder tend to have lower returns.

Economic regulation has different effects on public and private firms because government firms seek to maximize other objectives (such as quantity) rather than profits (Holzhacker et al., 2015; Romano & Guerrini, 2014) and suffer less from regulatory pressures. Government firms are less responsive to changing regulations than private, for-profit firms, which are under more pressure to demonstrate their ability to make a profit (Holzhacker et al., 2015).

The economic results of price-regulated companies are directly affected by the regulatory process. If the regulator decides to change the tariff to be charged to the consumer, this will affect the operating profits of the regulated company. In this sense, price-regulated firms with a concentration of private ownership will have greater incentives to co-opt the regulatory process to their advantage (through higher prices), due to the economic rationality of managers to maximize profits. In this regard, the literature has found that, in comparable scenarios, the prices charged by private firms are higher than those set by public management in France (Porcher, 2017), Spain (García-Valiñas et al., 2013), the United States (Wait & Petrie, 2017), Brazil (Barbosa & Brusca, 2015) and Western Europe (Fiorio & Florio, 2013).

Regulated agents do not behave passively within the regulatory process, but seek ways to co-opt it to satisfy their interests. Since the interest of privately-owned firms is to obtain higher tariffs and, hence, higher returns, the capture process can be driven by the identity of the owner.

Tariff changes can be seen as the most direct representation of the provision of consumer resources to companies; consequently, an increase in revenues resulting from tariff changes can imply an increase in returns. Since the regulator assumes the role of determining the appropriate tariff level, the company's return depends on the regulator's decisions. The interest of the managers of privately-owned companies in maximizing returns should be reflected in greater demand on the regulator for

higher tariffs and, consequently, in greater pressure from the regulated company on the regulator. Therefore, if a privately-owned regulated company succeeds in obtaining higher tariff changes than a publicly-owned company, it may be co-opting the regulatory process, motivated by profit, leading the regulator to make decisions more in line with its interests.

Given the economic rationality of managers, private firms are motivated to seek greater positive tariff changes than publicly-owned firms because private investors are more interested in abnormal returns. This leads to the research hypothesis:

H_1: Capital ownership moderates the relationship between tariff changes and abnormal returns in regulated companies.

3. METHODOLOGY

3.1 Sample and Variables

The sample consisted of public utility sectors regulated by administered prices: water and sanitation, piped natural gas, and electricity. The interval from 2007 to 2019 was chosen taking into account the availability of annual data, since going back in time increases the unavailability of data. With regard to data collection, companies with negative equity were excluded as this considerably distorts the calculation of the weighted average cost of capital (WACC).

The unbalanced sample consisted of 110 companies, of which 21 were piped natural gas companies, 27 were water and sanitation companies and 62 were electricity firms. The sample was also divided into two groups: companies with a return equal to or less than the WACC (i.e. *Ret* variable less than or equal to 1, according to Table 1); and companies with a return greater than the WACC (*Ret* variable greater than 1, according to Table 1).

Table 1

Sample by sector and year, from 2007 to 2019

Regulator	State		Aneel	Total
Sector	Natural gas	Sanitation	Electricity	3
Number of companies	21	27	62	110
All observations	273	340	806	1,419
(–) Companies/year without data	(63)	(50)	(180)	(293)
(=) Companies/year with data	210	290	626	1,126
(–) Companies/year with negative equity	0	(20)	(63)	(83)
(=) Companies/year with positive equity	210	270	563	1,043
(–) Observations with incomplete information	(2)	(14)	(13)	(29)
(=) Observations with complete data	208	256	550	1,014
Observation with return less than or equal to the weighted average cost of capital (ROIC ≤ WACC)	75	209	222	506
Observation with a return higher than the weighted average cost of capital (ROIC > WACC)	133	47	328	508

Note: *Aneel = Agência Nacional de Energia Elétrica (National Electricity Agency); ROIC = return on invested capital; WACC = weighted average cost of capital.*
Source: *Prepared by the authors.*

As most of the companies are privately held, no structured database was used to collect all the data. Annual financial and operating data were collected from the company's or regulator's website; data were also requested under the Access to Information Act (AIA) or from government agency websites between August 2020 and March 2021. Market data, the beta of the sector, were

collected from the Economatica® consultancy database. Economic growth data, gross domestic product (GDP) growth, were collected from the Brazilian Institute of Geography and Statistics (IBGE).

Given that most of the companies in this study do not have shares traded on the stock exchange, it was decided to use the comparable beta methodology (Sanvicente, 2012)

to calculate the cost of equity (*Ke*). This methodology was operationalized with the average annual unlevered beta of the sector, and then re-levered with the annual financial data of the sample companies. In this case, the comparable beta was the average annual periodic beta of the sector.

Data from the water and sanitation sector were collected from the companies' websites, in environments such as accountability, financial reports, annual reports, financial statements or investor relations. Data from companies in the electricity sector were collected from the website of the National Electricity Agency (Aneel), in the Economic and Financial Inspection environment. In this environment, the companies' financial and operational data were collected from financial reports prepared in accordance with the Brazilian Accounting Standards in force and from annual reports. Data on companies in the piped natural gas sector were initially collected from the companies' websites; if any data were not available, they were requested through the AIA.

Data on tariff changes (revisions or readjustments) were collected from sources such as the company's website and/or the regulator's website, and the company's annual reports. Some companies did not have all the data necessary to research tariff changes; in these cases, the data were requested through AIA.

The three main variables in the research are tariff change (independent), abnormal return (dependent) and capital ownership (moderator). The tariff change can be seen as the most direct representation of the consumer's transfer of resources to the regulated firm as a result of a regulatory decision. The regulator assumes the role of arbitrator to balance the relationship between the consumer and the regulated company, and should essentially seek an appropriate tariff level to guarantee the economic and financial balance of the companies and, at the same time, tariff modicity (definition of the minimum necessary tariff). Therefore, the periodic tariff review (PTR) or the annual tariff readjustment (ATR) are the products of regulation and moderating mechanisms in the relationship between consumers and utility companies.

The indicator of regulatory capture was modeled by the proxy periodic tariff review of company i at time t (PTR_{it}) or annual tariff adjustment of company i at time t (ATR_{it}), controlled by the price of the average periodic tariff review of sector s at time t (PTR_{st}) or the price of the average annual tariff adjustment of sector s at time t (ATR_{st}). The revision or readjustment of the company and the sector converge to the abbreviations Tar_{it} and Tar_{st}, respectively. The result of this moderation was called $Tariff_{it}$, which is the tariff change of company i at time t, adjusted by the average tariff change of sector s at time t, as shown in Table 2; it was also called $Tariff$ for the estimation of the econometric models.

Another characteristic identified in the three sectors was the tariff change period, which occurs in different months of the year, but the financial, market, and operational data follow the calendar year. To correct this mismatch, the tariff change was controlled by the number of days in the year before and after the change. For example, on July 9, 2018, Companhia de Saneamento Básico do Estado de São Paulo (Sabesp) increased its tariff by 3.51%, and on May 11, 2019, it adjusted its tariff by 4.72%. The tariff change for company i (in this case, i is Sabesp) assigned to the 2019 period was obtained as follows: the tariff change in t-1 divided by 365 days, multiplied by the number of days in t (in this case, t is the year 2019) before the tariff change [(3.51% ÷ 365) × 130], called $TARIF_{it-1}$; plus the tariff change in t divided by 365 days, multiplied by the number of days in t after the tariff change [(4.72% ÷ 365) × 235], called $TARIF_{it}$. Therefore, the adjusted price of the tariff change in Sabesp assigned to the 2019 period was 4.29%, called Tar_{it}, as shown in Table 2.

According to Sirtaine et al. (2005), an appropriate regulatory practice should align the firm's rate of return with its cost of capital over the medium term. An excessive rate of return punishes consumers, while a low rate of return discourages investment. According to Santos (2006), in order to measure how much value has been added to equity, it is necessary to establish a direct relationship between the invested capital and the spread (ROIC and WACC). As a rule, investments will create value for their owners if they generate a ROIC that is higher than the WACC. Otherwise, they will destroy value and reduce the owners' wealth, since the return generated is insufficient to meet investors' expectations in relation to similar risks (Santos, 2006).

In this study, abnormal return *(Ret)* corresponds to the distance between the rate of return on invested capital (ROIC) and the weighted average cost of capital (WACC). The companies' return consisted of the ROIC. The return was controlled by the WACC. The WACC was used as a threshold for the ROIC to be higher or lower than the WACC, as the WACC represents the return expected by investors.

Capital ownership was measured by the percentage of the firm's voting capital owned by private investors. It consists of a dummy that assigns a value of 1 (one) to a privately-owned company and 0 (zero) otherwise. If private

investors held more than 50% of the voting shares, the company was classified as privately-owned (otherwise, the company was classified as publicly-owned), as shown in Table 2. In the case of publicly-owned companies, control was measured by taking into account direct government control and indirect control through public entities.

Table 2
Model variables and variable metrics

Variable		Calculation/metric	Reference
Abnormal return (*Ret*)	ROIC	$$ROIC = \dfrac{EBIT\,(1 - tax\,rate)}{Loan,\,financing,\,debentures \\ + Equity}$$	Santos (2006); Sirtaine et al. (2005)
	WACC	$$WACC = \left[Ke.\dfrac{E}{E + D} \right] + \left[Kd\ .(1 - Tax).\dfrac{D}{E + D} \right]$$	
		$$Ret = \dfrac{ROIC}{WACC}$$	
Tariff change (*Tariff*)		$$Tar_{it} = TARIF_{it-1} + TARIF_{it}$$ $$Tariff_{it} = \dfrac{Tar_{it}}{Tar_{st}}$$	
Ownership (*Own*)		Consists of a dummy that assigns a value of 1 (one) to a privately-owned company and 0 (zero) otherwise. If private investors held more than 50% of the voting shares, the characteristic of a privately-owned company was assigned.	Dewenter & Malatesta (2001); Romano & Guerrini, (2014)
Leverage (*Lev*)		$$Lev = \dfrac{Onerous\ Liabilities}{Total\ Assets}$$ Onerous liabilities (loans, financing and debentures, in the short and long term) over total assets	Machado et al. (2010); Forti et al. (2011); Barros et al. (2014)
Economic growth (*GDP*)		Gross domestic product, measured by the annual percentage growth of the country's GDP	Reynaud & Thomas (2013); Macher & Mayo (2012)
Size (*Size*)		Natural logarithm of operating investments (fixed assets and intangibles)	Guerrini et al. (2011); Pamplona et al. (2019)
Sector of activity (*Sector*)		Economic sector in which the company operates, measured by a dummy	Macher & Mayo (2012)

EBIT = earnings before interest and taxes; D = total volume of third-party capital at book value; E = total own capital at book value; E + D = total volume of capital; Ke = cost of own capital in the sector (annual percentage); Kd = cost of third-party capital (annual percentage); and Tax = corporate income tax rate of 34%; the revision or readjustment of the company and the sector converge to the abbreviations Tar_{it} and Tar_{st}, respectively; TARIF refers to the annual tariff readjustment or revision, weighted by the number of days the tariff was in force during the period; continuous variables with outliers were treated using the winsorization technique; the sector division was carried out according to the Bovespa (B3).
Source: *Prepared by the authors.*

To control for the effect of tariff changes on firms' abnormal returns, the level of leverage *(Lev)*, firm size *(Size)*, economic growth *(GDP)* and the economic sector in which the firm operates *(Sector)* were used, as shown in Table 2.

3.2 Econometric Models and Hypothesis Analysis

According to the hypothesis, capital ownership moderates the relationship between tariff changes and abnormal returns in regulated companies. This relationship is analyzed using the equation:

$$Ret_{it} = \alpha + \beta_1 Tariff_{it} + \beta_2 Own_{it} + \beta_3 Tariff_{it} * Own_{it} + \sum_{c=1}^{3} \phi Controls + \sum_{i=2}^{3} \Upsilon Sector + \varepsilon_{it}$$

where: Ret_{it} = abnormal return of company *i* at time *t*; $Tariff_{it}$ = tariff change of company *i* at time *t*; Own_{it} = ownership of company *i at* time *t*; $Tariff_{it} * Own_{it}$ = interaction between the variable $Tariff_{it}$ and the variable Own_{it} of company *i* at time *t*; Controls (Lev_{it} = leverage of company *i* at time *t*; GDP_t = growth in the country's gross domestic product (in %) at time *t*; $Size_{it}$ = investments in the operating assets of company *i* at time *t*); *Sector* = economic sector of company *i*; ε_{it} = error term of company *i* at time *t*.

The coefficient of the *Tariff* variable (β_1) indicates the effect of the tariff change on the abnormal return of companies that are publicly owned; the coefficient of the *Own* variable (β_2) indicates whether there is a significant difference in the abnormal return of public utilities depending on capital ownership, whether public or private; while the coefficient of *Own* × *Tariff* (β_3) indicates whether the relationship between tariff change and abnormal return has no difference between public and private companies or whether there is a significant difference.

The models were estimated in unbalanced panels; the Chow, Hausman and Breusch-Pagan tests indicated that the generalized least squares (GLS) method was the most appropriate. In addition, new robustness estimates, such as sensitivity to endogeneity, were made using the dynamic panel data model with the systemic generalized method of moments (GMM-SYS) estimator of Arellano and Bover (1995) and Blundell and Bond (1998); and

the chi-square and Hansen adjustment tests. The use of the dynamic panel with GMM-SYS helps to mitigate the problem of endogeneity, gives robustness to the estimates, and allows us to demonstrate that the results of this research are independent of the econometric approach adopted and corroborate the initial estimates.

The models using the GMM-SYS estimator are composed of endogenous and exogenous variables. The exogenous variables were used as controls and to instrument the equation at the level; and the endogenous variables were instrumented by their lags. The variables *Tariff*, *Own*, *GDP* and *Sector* were treated as exogenous, while the variables *Lev* and *Size* were treated as endogenous. The variable *Own* measures the identity of the owner of the capital, and the entity (company) represents the particular agent that received the capital, which is why *Own* was treated as exogenous in the model.

4. RESULTS

4.1 Descriptive Statistics of the Data

Table 3 shows the descriptive statistics (the mean, median, standard deviation, maximum and minimum value of each variable, and the number of observations) of the variables (from 2007 to 2019) that make up the

econometric model. Of the 1,043 observations described in Table 1, 29 were invalid due to the weighting of the *Tariff* variable or incomplete data in the *Lev* and *Inv* variables. In addition, the presentation of the descriptive statistics was divided into two groups: ROIC > WACC and ROIC ≤ WACC.

Table 3

Descriptive statistics of the variables, period from 2007 to 2019

Continuous variables	Observations	Mean	Median	Standard deviation	Minimum	Maximum
All observations						
Ret	1,014	1.1103	1.004	1.6515	-6.02	8.56
Tariff	1,014	0.9498	0.9714	2.4816	-9.49	9.65
Lev	1,014	0.2143	0.1860	0.1819	0	0.82
GDP	1,014	1.5357	1.1400	3.0847	-3.55	7.53
Inv (Size)	1,014	8.4789	8.8045	1.1291	1.72	10.53
ROIC > WACC						
Ret	508	2.0998	1.6278	1.4241	1.00	8.56
Tariff	508	0.8880	0.9675	2.8539	-9.49	9.66
Lev	508	0.2436	0.2571	0.1784	0	0.82
GDP	508	1.9473	1.1400	2.9783	-3.55	7.53
Inv (Size)	508	8.3969	8.5130	0.9842	5.37	10.53
ROIC ≤ WACC						
Ret	506	0.1169	0.4165	1.2090	-6.02	0.99
Tariff	506	1.0118	0.9728	2.0441	-9.49	9.65
Lev	506	0.1849	0.1338	0.1807	0	0.82
GDP	506	1.1225	1.1200	3.1370	-3.55	7.53
Inv (Size)	506	8.5612	8.9700	1.2536	1.72	10.46
Binary variable	All observations		ROIC > WACC		ROIC ≤ WACC	

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Table 3
Cont.

Continuous variables	Observations	Mean	Median	Standard deviation	Minimum	Maximum
Own (private ownership)	53.25%		68.90%		37.55%	
Own (public ownership)	46.75%		31.10%		62.45%	

Note: *Ret = abnormal return; Tariff = tariff change; Lev = leverage; Own = ownership; GDP = economic growth; Inv = investment size.*
Source: *Prepared by the authors.*

Considering the dependent variable *Ret*, it is expected that the higher the ROIC in relation to the WACC, the higher the abnormal return; and when the *Ret* variable is equal to 1, it means that the ROIC is equal to the WACC. In Table 3 (all observations), *Ret* has a mean of 1.1103 and a median of 1.004, indicating that, on average, the companies earn a return higher than the cost of capital. The standard deviation of 1.6515 and the range of -6.02 to 8.56 show that some companies have a negative return, while others can have a return eight times higher than the WACC.

In the ROIC > WACC group, the abnormal return values have a mean of 2.0998, which means that, on average, the return on capital is 109.98% higher than its cost; the median value of 1.6278 suggests that the return value dividing the sample is 62.78% higher than the cost of capital; and the abnormal return values vary on a scale from 1.00 to 8.56. The observed dispersion (standard deviation of 1.4241) was treated by the winsorization technique at 0.78% at each extreme. In the ROIC ≤ WACC group, the *Ret* values have a mean of 0.1169 and a median of 0.4165, which means that on average, ROIC is 88.31% lower than WACC; and half of the observations have *Ret* values lower than 0.41, due to the dispersion of -6.02 to 0.99. The negative minimum *Ret* value and the distance of the mean value from the median indicate the existence of a small group of companies with negative ROIC.

The independent variable analyzed, the tariff change, was obtained by weighting the company's tariff change by the average annual tariff change in the sector, considering that the higher its value, the greater the change in the company's tariff in relation to that of the sector. Considering all the observations, the values of the *Tariff* variable have a mean of 0.9498 and a median of 0.9714, indicating that, on average, the companies have tariff changes that are lower than the average value of the change in the sector; and half of the companies have tariff changes that are lower than the average value in the sector. The dispersion found ranges from -9.49 to 9.65, with a standard deviation of 2.4816, and was treated using the winsorization technique of 1.5% at each end.

In the ROIC ≤ WACC group, the tariff change values have a mean of 1.0118 and a median of 0.9728, indicating that the tariff changes are on average 1.88% higher than the annual average in the sector; and that the median value is close to that of the ROIC > WACC group. These findings show that companies with ROIC > WACC have, on average, lower tariffs (in relation to the market average) than companies with ROIC ≤ WACC, but both are below the average tariff in the sector. In the ROIC > WACC group, the tariff change values have a mean of 0.8880 and a median of 0.9675, indicating that the companies' tariff changes are, on average, 11.20% lower than the average annual tariff change in the sector; and half of the companies have tariff changes lower than the sector average.

Capital ownership is also used as an interacted variable. This variable indicates that 53.25% of the companies in the study are privately owned, according to Table 3 (all observations). For the ROIC > WACC and ROIC ≤ WACC groups of companies, 68.90% and 37.55% of the companies are privately owned, respectively. This shows that a return on capital that is higher than the cost of capital is more frequent in privately-owned companies.

4.2 Relationship between Abnormal Return and Ownership-Related Tariff Change

The analysis of this relationship is based on the assumption that privately-owned regulated firms earn higher abnormal returns explained by tariff changes. This relates to the influence of the identity of the company's owner on the decisions made within the regulatory process. Therefore, the analysis of the data presented in Table 4 focuses mainly on the β_3 coefficient, which is the result of the interaction resulting from the multiplication between capital ownership and tariff change.

The model was estimated using an unbalanced random effects panel, with and without *Sector* control. The estimation of the random effects model, using the GLS method, indicates that at least one of the explanatory variables has a significant impact on the explained variable, using the Wald chi-square. The random effects panel was estimated with the independent variables *Tariff*, *Own* and *Tariff*Own* and the dependent variable *Ret* and

three control variables (*Lev*, *GDP* and *Size*), as well as controlling for the economic sector (*Sector*). It should be noted that the *Tariff* variable was standardized in z-score before being multiplied, as suggested by Dawson (2014) when dealing with non-binary variables.

In Model II (Table 4), the analysis of the estimates with the control variables shows the statistical significance of the *Tariff* and *Tariff*Own* variables, with and without *Sector* control, at the 1% or 5% level. The positive sign of the

Tariff*Own interaction and the negative sign of the *Tariff* indicate that the identity of the owner, as a moderating effect, can influence the relationship between tariff change and abnormal return in opposite directions. However, in Model II, with *Sector* control, the non-significance of the *Own* variable at the 10% level suggests that this effect may be greater for firms with larger tariff changes, so the insignificant β_2 coefficient indicates that no effect of ownership on abnormal return was identified.

Table 4
Panel estimates with random effect, period from 2007 to 2019

Variables	Model I			Model II				Model III			
	Ret (ROIC > WACC)			Ret (ROIC > WACC)				Ret (ROIC ≤ WACC)			
	Coef.	z stat. (p-value)	Coef.	z stat. (p-value)	Coef.	z stat. (p-value)	Coef.	z stat. (p-value)	Coef.	z stat. (p-value)		
Tariff	−0.1873	−2.13 (0.033)	−0.1927	−2.31 (0.021)	−0.1945	−2.34 (0.019)	0.0737	1.08 (0.280)	0.0745	1.09 (0.274)	
Own	−0.5738	−2.01 (0.044)	−0.5454	−1.74 (0.082)	−0.4299	−1.38 (0.167)	0.8111	4.29 (0.000)	0.7932	3.47 (0.001)	
Tariff*Own	0.2144	2.20 (0.028)	0.2221	2.40 (0.016)	0.2246	2.43 (0.015)	−0.0345	−0.46 (0.649)	−0.0352	−0.46 (0.642)	
Lev			−0.7081	−1.30 (0.194)	−0.4954	−0.89 (0.375)	−0.5328	−1.53 (0.127)	−0.5370	−1.50 (0.135)	
GDP			0.0497	3.32 (0.001)	0.0529	3.56 (0.000)	0.0084	0.75 (0.455)	0.0084	0.77 (0.444)	
Size			−0.1549	−1.34 (0.180)	−0.1212	−1.09 (0.277)	0.4013	3.28 (0.001)	0.40020	3.50 (0.000)	
Sector	Yes		No		Yes		No		Yes			
Intercept	3.0313	6.74 (0.000)	3.7711	3.28 (0.001)	3.9412	3.15 (0.002)	−3.5265	−3.12 (0.002)	−3.5407	−3.05 (0.002)	
R2	Within 0.0046	Between 0.2016	Within 0.0448	Between 0.1367	Within 0.0475	Between 0.1928	Within 0.0392	Between 0.3230	Within 0.0293	Between 0.3215	
	Overall 0.1723		Overall 0.1294		Overall 0.1955		Overall 0.3247		Overall 0.3270			
Mean VIF	3.16		3.02		2.61		1.86		2.31			
Obs.	509		508		508		506		506			
Tests	Coef.	p-value	Coef.	p-value	Coef.	p-value	Coef.	p-value	Coef.	p-value	
Chow	8.88	0.0000	8.77	0.0000	8.83	0.0000	6.66	0.0000	6.66	0.0000	
LM BP	337.89	0.0000	420.46	0.0000	341.73	0.0000	277.16	0.0000	256.57	0.0000	
Hausman	2.53	0.4702	18.28	0.0056	15.38	0.0175	8.10	0.2312	7.95	0.2421	
Wooldridge	18.159	0.0001	21.781	0.0000	1.643	0.0000	0.872	0.3548	0.872	0.3548	
Wald	28.34	0.0000	30.19	0.0000	43.50	0.0000	22.67	0.0000	29.76	0.0002	
White	61.42	0.0000	131.50	0.0000	152.17	0.0000	92.32	0.0000	93.73	0.0000	

Note: *In Model II, the estimation was carried out with a random effect for comparison purposes and because the results persisted in the fixed effects estimation. The White and Wooldrigde tests indicate heteroskedasticity of the errors and autocorrelation of the residuals, respectively, but the GLS estimation was done with robust standard errors. The Chow test indicates that the fixed effects model is a better fit than the pooled model, and the Hausman test indicates that the random effects model is a better fit than the fixed effects model in models I and III.*
*Tariff$_{it}$ = tariff of company i at time t, controlled by the average annual tariff of sector s at time t; Own$_{it}$ = ownership of company i at time t; Tariff$_{it}$ * Own$_{it}$ = interaction between the variables Tariff$_{it}$ and Own$_{it}$; Lev$_{it}$ = level of leverage of company i at time t; Size$_{it}$ = natural logarithm of investments of company i at time t; GDP$_t$ = country's economic growth at time t; and Sector$_s$ = dummy for economic sector.*
Source: *Prepared by the authors.*

The hypothesis is answered by the results shown by the coefficients of the variables *Tariff*, *Own* and *Tariff*Own*. In Model II, with *Sector* control, the negative β_1 coefficient (-0.1945) indicates that the greater the tariff change, the greater the decrease in abnormal return. The

non-significant β_2 coefficient at the 5% level indicates that there is no difference in abnormal return depending on capital ownership. The β_3 coefficient (0.2246) shows that the interaction between *Tariff* and *Own* has a statistically significant effect at the 1% level, indicating that the

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relationship between tariff change and abnormal return differs between public and private companies, and that the moderating effect is positive in privately-owned companies. Therefore, based on these results, it is not possible to reject the hypothesis that capital ownership moderates the relationship between tariff changes and abnormal returns in regulated companies.

Also according to Table 4, in the group of companies with ROIC ≤ WACC, the coefficients of the β_1 and β_3 variables are not significant at the 10% level, and the coefficient (0.7932) of the β_2 variable indicates positive significance at the 1% level with the *Ret* variable. This indicates that there is a significant difference in the abnormal return of public utilities depending on the capital ownership; in the case of privately-owned companies, the effect is positive. Furthermore, comparing the results between models II and III, the effect of the tariff change on the abnormal return in privately-owned companies differs from the effect on publicly-owned companies between companies with ROIC > WACC and ROIC ≤ WACC. In this regard, Reynaud and Thomas (2013) point out that profitability can vary greatly depending on the metric, the size of the firm, the economic environment and regulatory characteristics.

Table 4 shows that the country's economic growth helps to positively explain the abnormal return in the group of companies with ROIC > WACC; while in the group of firms with ROIC ≤ WACC, only operating investments positively explain the abnormal return. These results provide evidence that the company's abnormal return is related to the country's economic situation; and that the relationship between company size and return is stronger for firms with ROIC ≤ WACC.

The model with all observations was estimated with sensitivity to endogeneity. To control for suspected endogeneity problems (omitted variable problems or simultaneity), the model with all observations was estimated with a GMM-SYS dynamic panel. The panel helps to reduce or eliminate the omitted variable problem (Barros et al., 2020), which can be a source of endogeneity.

The dynamic panel estimation with GMM-SYS explored the dynamic relationships between the response and predictor variables. The regression models were estimated with GMM-SYS using the response variable *Ret*, the predictor variables *Tariff*, *Own* and *Tariff*Own* and three control variables (*Lev*, *GDP* and *Size*).

Table 5
Estimation of the dynamic panel with GMM-SYS with all observations, from 2007 to 2019

Variables	Model IV		Model V		Model VI	
	Ret (all observations)		*Ret* (all observations)		*Ret* (all observations)	
	Coef.	Z stat. (p-value)	Coef.	Z stat. (p-value)	Coef.	Z stat. (p-value)
Ret_{t-1}	0.4667	3.24 (0.001)	0.6078	6.13 (0.000)	0.6277	6.30 (0.000)
Tariff	-0.5129	-1.84(0.066)	-0.4056	-1.97 (0.049)	-0.4184	-2.11 (0.035)
Own	0.4346	2.97 (0.003)	0.4586	3.38 (0.001)	0.4947	3.07 (0.002)
Tariff*Own	0.6303	1.83 (0.068)	0.5265	2.12 (0.034)	0.5382	2.30 (0.021)
Lev			-1.2248	-3.24 (0.001)	-1.0474	-2.51 (0.012)
GDP			0.0221	1.88 (0.061)	0.0236	2.21 (0.027)
Size			0.1569	2.46 (0.014)	0.1534	2.19 (0.028)
Sector	Yes		No		Yes	
Intercept	0.7764	1.59 (0.111)	-0.9048	-1.56 (0.119)	-0.5698	-0.78 (0.438)
No. observations	921		920		920	
No. instruments	63		125		127	
Lag	(3 4)		(3 4) (1 2)Size		(3 4) (1 2)Size	
Wald test (p-value)	992.28 (0.000)		1,023.51 (0.000)		1,513.12 (0.000)	
Arellano/Bond AR1/AR2 test	0.001/0.299		0.000/0.331		0.000/0.336	
Hansen/dif-Hansen test	0.225/0.164		0.953/0.218		0.984/0.229	

Note: *The chi-square test indicates rejection of the null hypothesis, i.e. there is an association between the variables used in the model. The Hansen test indicates that the null hypothesis cannot be rejected, i.e. it is assumed that there is no over-identification of the instruments. In the Arellano and Bond (1991) test, the null hypothesis for first-order serial autocorrelation is rejected, but the second cannot be rejected, i.e., the model has first-order serial correlation, indicating that the GMM-SYS dynamic model is the most appropriate for the study. Two-step estimation with robust standard errors (Windmeijer, 2005). The Wald test indicated that the model estimated by GMM-SYS was well specified.*
Source: *Prepared by the authors.*

The analysis described in Table 5 focuses on the β_3 coefficient, which is expected to be positive, suggesting a higher abnormal return due to tariff changes when companies are privately owned. In Model VI, with *Sector* control, the positive and significant β_3 coefficient (0.5382) at the 5% level indicates that the relationship between tariff changes and abnormal returns shows a significant difference between public and private firms. This result indicates that the hypothesis is not rejected when analyzing the entire sample (all observations). Therefore, it indicates the existence of the moderating effect of the *Own* variable.

In addition, the negative and significant coefficient (-0.4184) at the 5% level for the *Tariff* variable indicates that tariff changes have a negative on the companies' abnormal returns. The positive and significant coefficient (0.4947) at the 1% level for the *Own* variable suggests that there is a significant difference in the abnormal return of public utilities depending on whether they are publicly or privately owned, and for privately-owned companies the effect is positive.

Model VI, with *Sector* control, was estimated with three control variables: *Lev*, *GDP* and *Size*. The negative and significant coefficient, at the 1% level, of the *Lev* variable suggests that more leveraged companies earn lower abnormal returns. The level of leverage is a determinant of companies' financial performance, and the negative effect of leverage may be due to the fact that the company's net income decreases as financial expenses increase (Ramos & Murillo, 2021). The coefficients of the *GDP* and *Size* variables show positive significance at the 5% level with *Ret*, which implies that the country's economic growth and the amount of investments in operating assets seem to explain the increase in abnormal return, in line with expectations.

Overall, the non-rejection of the hypothesis is consistent with the perspective of the economic rationality of private investors in maximizing abnormal returns and the perspective that public investors may prioritize other outcomes rather than abnormal returns. The fact that companies with private ownership and higher tariff changes earn higher abnormal returns suggests that privately-owned companies may be co-opting the regulatory process and earning higher abnormal returns. Therefore, the identity of the owner may be a condition with the potential to co-opt the regulatory process through greater tariff changes (greater readjustment).

Capture theory (Stigler, 1971) argues that the regulatory process can be captured by the regulated agents, and interest group theory (Becker, 1983) argues that the decisions made within the regulatory process are the result of pressure from the different groups present and that the strongest group will have its demands met. The findings of this research strengthen the perspective of regulatory capture, in which the interest group composed of privately-owned regulated companies, and therefore with greater demands for returns, obtains greater changes (greater adjustments) in tariffs, which positively explains their abnormal returns. These considerations are supported by the research of Fremeth and Holburn (2012), Klein and Sweeney (1999), Macher and Mayo (2012), Mizutani and Nakamura (2017) and Niesten and Jolink (2012), who pointed to the perspective of capture and interest groups.

The studies by Dewenter and Malatesta (2001), Guerrini et al. (2011), Romano and Guerrini (2014) found that privately-owned companies are more profitable, and Barbosa and Brusca (2015), Fiorio and Florio (2013), Porcher (2017), García-Valiñas et al. (2013) and Wait and Petrie (2017) found that privately-owned firms have higher tariff prices. Overall, the results of this article converge with the findings of the previous authors, adding that this higher profitability is related to the regulatory process.

5. CONCLUSION

The capture perspective emphasizes that the main beneficiary of regulation is not the public interest but the agents being regulated; and the interest group perspective emphasizes that regulation is designed to meet the needs of the interest group that exerts the greatest relative pressure on the regulator. This means that private investors may be more motivated to seek higher returns.

The results found validated the proposed argument regarding the conditioning factor of capital ownership. The study found evidence that companies obtain greater economic benefits explained by the regulatory process, when conditioned on aspects such as private ownership.

The results show that the process of capture and pressure from interest groups is not homogeneous across firms, as the relationship between tariff changes and abnormal returns is conditioned on aspects such as the identity of the owner of the capital.

Governments tend to pay special attention to political and social objectives such as low production prices, employment or external effects on profitability (Hart et al., 1997). On the other hand, privately-owned companies, supported by the economic rationality of private owners, will seek ways to increase their abnormal returns. They will therefore be more motivated to co-opt the regulatory

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process and pressure regulators for tariff changes that benefit them, especially economically. The results of this study support this understanding by showing the positive effect of private ownership on the relationship between tariff changes and the abnormal returns of the companies studied.

The contributions of the evidence from this study are aimed at: (i) society, as the results show how the regulators have made decisions to balance the divergent interests between consumers and the concessionaire, and that the decisions on tariff adjustments/revisions are reflected in the abnormal return of the companies; (ii) private investors, as the evidence provides information on how the private identity of the controlling owner can lead the company to earn a return higher than the cost of capital;

(iii) regulators, as the results encourage discussion on the importance of using accounting indicators to monitor the impact after the regulatory process; (iv) academics, as the evidence strengthens the regulatory capture and interest group perspective and exposes capital ownership as a driver of the regulatory co-optation process.

The limitations of this study are the lack of a consolidated database of regulators, especially in the sanitation and piped natural gas sectors, and tariff adjustments and revisions in different months of the year. Future research could explore the effects of other constraints on the capture process, and the impacts of the new regulatory framework for basic sanitation and natural gas could encourage further research on the regulatory process.

REFERENCES

Abreu, M. (2016). Saneago recebe notificação de reajuste (MP). *Ministério Público do Estado de Goiás*. https://www.mpgo.mp.br/portal/noticia/saneago-recebe-notificacao-de-reajuste-mp

Andrade, M. E. M. C., & Martins, E. (2017). Desafios na política pública de mensuração dos ativos para a formação das tarifas no setor elétrico: alguém deve ser beneficiado e alguém deve ser sacrificado? *Revista Contabilidade e Finanças*, *28*(75), 344-360. https://doi.org/10.1590/1808-057x201703160

Antoniou, A., & Pescetto, G. (1997). The effect of regulatory announcements on the cost of equity capital of British telecon *Journal of Business Finance & Accounting*, *24*(1), 1-25.

Arellano, M., & Bond, S. (1991). Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations. *The Review of Economic Studies*, *58*(2), 277.

Arellano, M., & Bover, O. (1995). Another look at the instrumental variable estimation of error components models *Journal of Econometrics*, *68*, 29-51.

Barbosa, A., & Brusca, I. (2015). Governance structures and their impact on tariff levels of Brazilian water and sanitation corporations. *Utilities Policy*, *34*, 94-105. https://doi.org/10.1016/j.jup.2015.02.002

Barros, L. A. B. C., Bergmann, D. R., Henrique Castro, F., & da Silveira, A. D. M. (2020). Endogeneity in panel data regressions: Methodological guidance for corporate finance researchers. *Revista Brasileira de Gestão de Negócios*, *22*(Special Issue), 437-461. https://doi.org/10.7819/rbgn.v22i0.4059

Becker, G. S. (1983). A theory of competition among pressure groups for political influence. *The Quarterly Journal of Economics*, *130*(August), 371-400.

Blacconiere, W. G., Johnson, M. F., & Johnson, M. S. (2000). Market valuation and deregulation of electric utilities. *Journal of Accounting and Economics*, *29*(2), 231-260. https://doi.org/10.1016/S0165-4101(00)00021-5

Blundell, R., & Bond, S. (1998). Initial conditional and moment restrictions in dynamic panel data models. *Journal of Econometrics*, *87*(1), 115-143. http://dx.doi.org/10.1016/S0304-4076(98)00009-8

Cambini, C., & Spiegel, Y. (2016). Investment and capital structure of partially private regulated firms. *Journal of Economics & Management Strategy*, *25*(2), 487-515. https://doi.org/10.1111/jems.12153

Campos, T. L. C. (2006). Estrutura da propriedade e desempenho econômico: uma avaliação empírica para as empresas de capital aberto no Brasil. *Revista de Administração*, *41*(4), 369-380. https://doi.org/10.1590/S0080-21072006000400002

Correa, P., Melo, M., Mueller, B., & Pereira, C. (2019). Political interference and regulatory resilience in Brazil. *Regulation and Governance*, *13*(4), 540-560. https://doi.org/10.1111/rego.12274

Cunha, B. Q. (2016). Antagonismo, modernismo e inércia: a política regulatória brasileira em três atos. *Cadernos EBAPE.BR*, *14*(spe), 473-485. https://doi.org/10.1590/1679-395117190

Dawson, J. F. (2014). Moderation in management research: What, why, when, and how. *Journal of Business and Psychology*, *29*(1), 1-19.

Deegan, C., & Unerman, J. (2011). *Financial accounting theory, second European edition*. McGraw-Hill Education.

Dewenter, K. L., & Malatesta, P. H. (2001). State-owned and privately owned firms: An empirical analysis of profitability, leverage, and labor intensity. *American Economic Review*, *91*(1), 320-334. https://doi.org/10.1257/aer.91.1.320

Fiorio, C. V., & Florio, M. (2013). Electricity prices and public ownership: Evidence from the EU15 over thirty years. *Energy Economics*, *39*, 222-232. https://doi.org/10.1016/j.eneco.2013.05.005

Forti, C. A. B., Peixoto, F. M., & Freitas, K. S. (2011). Retenção de caixa, desempenho operacional e valor: um estudo no mercado de capitais brasileiro. *Revista de Contabilidade e Organizações*, *5*(13), 20-33.

Fremeth, A. R., & Holburn, G. L. F. (2012). Information asymmetries and regulatory decision costs: An analysis of U.S. electric utility rate changes 1980-2000. *Journal of Law, Economics, and Organization*, 28(1), 127-162. https://doi.org/10.1093/jleo/ewp042

García-Valiñas, M. L. Á., González-Gómez, F., & Picazo-Tadeo, A. J. (2013). Is the price of water for residential use related to provider ownership? Empirical evidence from Spain. *Utilities Policy*, 24, 59-69. https://doi.org/10.1016/j.jup.2012.07.009

Guasch, L. J., & Hahn, R. W. (1999). The costs and benefits of regulation: Implications for developing countries. *World Bank Research Observer*, 14(1), 137-158. https://doi.org/10.1093/wbro/14.1.137

Guerrini, A., Romano, G., & Campedelli, B. (2011). Factors affecting the performance of water utility companies. *International Journal of Public Sector Management*, 24(6), 543-566. https://doi.org/10.1108/09513551111163657

Hart, O., Shleifer, A., & Vishny, R. W. (1997). The proper scope of government: Theory and an application to prisons. *Quarterly Journal of Economics*, 112(4), 1127-1161. https://doi.org/10.1162/003355300555448

Holzhacker, M., Krishnan, R., & Mahlendorf, M. D. (2015). The impact of changes in regulation on cost behavior. *Contemporary Accounting Research*, 32(2), 534-566. https://doi.org/10.1111/1911-3846.12082

Klein, C., & Sweeney, G. (1999). Regulator preferences and utility prices: Evidence from natural gas distribution utilities. *Energy Economics*, 21(1), 1-15. https://doi.org/10.1016/S0140-9883(98)00017-6

Laffont, J.-J., & Tirole, J. (1991). The politics of government decision-making: A theory of regulatory capture. *The Quarterly Journal of Economics*, 106(4), 1089-1127.

Levine, M. E., & Forrence, J. L. (1990). Regulatory capture, public interest, and the public agenda: Toward a synthesis. *Journal of Law, Economics, and Organization*, 6(special), 167-198. https://doi.org/10.1093/jleo/6.special_issue.167

Loch, M., Marcon, R., Silva, A. L. P., & Xavier, W. G. (2018). Government's impact on the financial performance of electric service providers as both regulator and shareholder. *Utilities Policy*, 55(September), 142-150. https://doi.org/10.1016/j.jup.2018.09.007

Machado, M. A. V., Medeiros, O. R., & Eid Júnior, W. E. (2010). Problemas na mensuração da estrutura de capital: evidências empíricas no Brasil. *BBR-Brazilian Business Review*, 7(1), 24-47.

Macher, J. T., & Mayo, J. W. (2012). The world of regulatory influence. *Journal of Regulatory Economics*, 41(1), 59-79. https://doi.org/10.1007/s11149-011-9178-8

Martimort, D. (1999). The life cycle of regulatory agencies: Dynamic capture and transaction costs. *Review of Economic Studies*, 66(4), 929-947. https://doi.org/10.1111/1467-937X.00114

Maziotis, A., Saal, D. S., Thanassoulis, E., & Molinos-Senante, M. (2015). Profit, productivity and price performance changes in the water and sewerage industry: An empirical application for England and Wales. *Clean Technologies and Environmental Policy*, 17(4), 1005-1018. https://doi.org/10.1007/s10098-014-0852-2

Mitnick, B. M. (1980). *The political economy of regulation: Creating, designing, and removing regulatory forms.* Columbia University Press.

Mizutani, F., & Nakamura, E. (2017). Regulation, public interest, and private interest: an empirical investigation of firms in Japan. *Empirical Economics*, 56(4), 1433-1454. https://doi.org/10.1007/s00181-017-1389-0

Niesten, E., & Jolink, A. (2012). Regulating opportunism in the electricity industry and consumer interests. *Utilities Policy*, 20(1), 38-45. https://doi.org/10.1016/j.jup.2011.11.004

Pamplona, E., Mazzuco, M. A. S., & Silva, T. P. da. (2019). Influência da política de investimentos no desempenho econômico de empresas industriais brasileiras em períodos pré-crise e crise econômica. *Enfoque: Reflexão Contábil*, 38(3), 19-36. https://doi.org/10.4025/enfoque.v38i3.42658

Peltzman, S. (1976). Toward a more general theory of regulation. *The Journal of Law and Economics*, 3, 211-240.

Peltzman, S., Levine, M. E., & Noll, R. G. (1989). The economic theory of regulation after a decade of deregulation. *Brookings Papers on Economic Activity. Microeconomics*, 1989, 1-59. https://doi.org/10.2307/2534719

Porcher, S. (2017). The 'hidden costs' of water provision: New evidence from the relationship between contracting-out and price in French water public services. *Utilities Policy*, 48(August), 166-175. https://doi.org/10.1016/j.jup.2017.08.002

Posner, R. A. (1974). Theories of economic regulation. *The Bell Journal of Economics and Management Science*, 5(2), 335-358.

Potter, M. R., Olejarski, A. M., & Pfister, S. M. (2014). Capture theory and the public interest: Balancing competing values to ensure regulatory effectiveness. *International Journal of Public Administration*, 37(10), 638-645. https://doi.org/10.1080/01900692.2014.903266

Ramos, Y. E. R., & Murillo, J. W. R. (2021). The profitability of electricity, oil, and gas utilities in America. *Revista Facultad de Ciencias Económicas*, 29(1), 27-48. https://doi.org/10.18359/rfce.4525

Reynaud, A., & Thomas, A. (2013). Firm's profitability and regulation in water and network industries: An empirical analysis. *Utilities Policy*, 24(2013), 48-58. https://doi.org/10.1016/j.jup.2012.07.002

Romano, G., & Guerrini, A. (2014). The effects of ownership, board size and board composition on the performance of Italian water utilities. *Utilities Policy*, 31, 18-28. https://doi.org/10.1016/j.jup.2014.06.002

Santos, J. O. dos. (2006). A contribuição da determinação do valor da empresa e do EVA no processo de análise de crédito. *Revista de Gestão*, 13(3), 41-55.

Sanvicente, A. Z. (2012). Problemas de estimação de custo de capital de empresas concessionárias no Brasil: Uma aplicação à regulamentação de concessões rodoviárias. *Revista de Administração*, 47(1), 81-95. https://doi.org/10.5700/rausp1027

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15

Sirtaine, S., Pinglo, M. E., Guasch, J. L., & Foster, V. (2005). How profitable are private infrastructure concessions in Latin America ? Empirical evidence and regulatory implications. *The Quarterly Review of Economics and Finance*, *45*(2005), 380-402. https://doi.org/10.1016/j.qref.2004.12.010

Stigler, G. J. (1971). The theory of economic regulation. *The Bell Journal of Economics and Management Science*, *2*(1), 3-21. https://doi.org/10.2307/3003160

Tapia, J. (2012). The 'duty to finance', the cost of capital and the capital structure of regulated utilities: Lessons from the UK. *Utilities Policy*, *22*(2012), 8-21. https://doi.org/10.1016/j.jup.2012.02.003

Thomsen, S., & Pedersen, T. (2000). Ownership structure and economic performance in the largest European companies. *Strategic Management Journal*, *21*(6), 689-705.

Wait, I. W., & Petrie, W. A. (2017). Comparison of water pricing for publicly and privately owned water utilities in the United States. *Water International*, *42*(8), 967-980. https://doi.org/10.1080/02508060.2017.1406782

Walker, R. G. (1987). Australia's ASRB. A case study of political activity and regulatory "capture". *Accounting and Business Research*, *17*(67), 269-286.

Wang, K. T., & Shailer, G. (2018). Does ownership identity matter? A meta-analysis of research on firm financial performance in relation to government versus private ownership. *Abacus*, *54*(1), 1-35. https://doi.org/10.1111/abac.12103

Willner, J., & Parker, D. (2007). The performance of public and private enterprise under conditions of active and passive ownership and competition and monopoly. *Journal of Economics*, *90*(3), 221-253. https://doi.org/10.1007/s00712-006-0230-6

Windmeijer, F. (2005). A finite sample correction for the variance of linear efficient two-step GMM estimators. *Journal of Econometrics*, *126*(1), 25-51.

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Rev. Contab. Financ. – USP, São Paulo, v. 35, n. 94, e1839, 2024