IFRS X REGULATORY GAAP: VALUE RELEVANCE OF BRAZILIAN ELECTRIC UTILITIES' ACCOUNTING INFORMATION

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ABSTRACT

In electric utility companies, financial statements must be presented according to International Financial Reporting Standards (IFRS) or Regulatory Generally Accepted Accounting Principles (GAAP). As such, we investigate which of the models best explains the share price variation of Brazilian electric companies from 2011 to 2018. Data were gathered from the Economatica® database and the National Agency of Electric Energy (ANEEL) website. The analysis was performed using multiple regressions with panel data and model estimation based on the methodology of Collins, Maydew and Weiss (1997), developed from Ohlson (1995). Results showed that the IFRS model shows greater explanatory power (R^2 of 65.39%) in comparison to the regulatory GAAP model (R^2 of 58.96), therefore our research hypothesis that corporate accounting information is more relevant to investors than regulatory accounting information was not rejected. Additionally, further analysis indicated that by segregating the investigation periods into 2011-2014 (prior to the Accounting Standards Committee Technical Orientation - OCPC 08) and 2015-2018 (after the issuance

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of OCPC 08), in the earlier only regulatory accounting information demonstrated statistical significance and in the later, corporate accounting information (R^2 of 73.37%) revealed higher relevance than regulatory (R^2 of 65.41%). This higher relevance may be associated with the fact that IFRS financial statements are based on principles and regulatory financial statements of the power companies are based on tax and tariff sector-specific regulations.

Keywords: Value Relevance. IFRS. GAAP. Corporate Accounting. Regulatory Accounting. Electric Sector.

CONTABILIDADE SOCIETÁRIA X CONTABILIDADE REGULATÓRIA: *VALUE RELEVANCE* DAS INFORMAÇÕES CONTÁBEIS DO SETOR ELÉTRICO BRASILEIRO

RESUMO

Nas empresas do setor de energia elétrica as demonstrações contábeis devem ser apresentadas conforme a Contabilidade Societária e a Contabilidade Regulatória. Sendo assim, esta pesquisa objetiva verificar, entre o modelo contábil societário e regulatório, qual melhor explica a variação do preço das ações das companhias elétricas brasileiras no período entre 2011 e 2018. As informações foram coletadas na base de dados da Economatica® e no sítio eletrônico da Agência Nacional de Energia Elétrica (ANEEL). A análise foi feita por meio de regressões múltiplas com dados em painel e os modelos foram estimados com base na metodologia de Collins, Maydew e Weiss (1997), desenvolvida a partir de Ohlson (1995). Os resultados apontaram que o modelo societário apresenta poder explicativo superior (R^2 de 65,39%) em comparação ao modelo regulatório (R^2 de 58,96), portanto não se rejeita a hipótese de pesquisa levantada de que as informações contábeis societárias são mais relevantes para os investidores em relação às informações contábeis regulatórias. Além disso, a análise adicional indicou que, ao segregar o período de investigação em 2011-2014 (período anterior à vigência da Orientação Técnica do Comitê de Pronunciamentos Contábeis (OCPC) 08) e em 2015-2018 (período posterior à vigência da OCPC 08), no anterior somente as informações contábeis regulatórias foram estatisticamente significativas e no posterior o modelo societário (R^2 de 73,37%) denotou maior relevância em relação ao modelo regulatório (R^2 de 65,41%). Essa maior relevância pode estar atrelada ao fato de que enquanto as demonstrações contábeis societárias têm como base os princípios, as demonstrações contábeis regulatórias do setor elétrico se fundamentam em regras fiscais e tarifárias específicas.

Palavras-Chave: *Value Relevance*. Contabilidade Societária. Contabilidade Regulatória. Setor Elétrico.

1 INTRODUCTION

Accounting plays a vital role in supporting its users to evaluate companies and investments. Through financial statements, indexes and variables, accounting provides relevant information for decision making and, according to

Corrêa, Neto, Nakao and Osajima (2012), this motivates researchers' interest in value relevance literature. However, although financial information is a key form of communication between companies and investors (Guia & Dantas, 2020), recent studies have questioned the relevance of this information for the stock market (Barth, Li & McClure, 2019; Santos, Lemes & Barboza, 2019).

Barth et al. (2019) examined the evolution of value relevance of accounting informations for companies listed on the New York Stock Exchange (NYSE), National Association of Securities Dealers Automated Quotations (NASDAQ) and American Stock Exchange (AMEX) from 1962 to 2014 and found a subtler, but not declining, correlation between stock price and accounting information. Santos et al. (2019) conducted a meta-analysis of published studies on earnings and book value relevance for Brazilian companies from 1997 to 2014 and found reduced relevance for book value and increased relevance for earnings after the adoption of the IFRS.

In this context, we explore evidence on the subject, focusing on the Brazilian electric utility companies which, as a result of ANEEL's Normative Resolution no. 396/2010, are required to report, in addition to IFRS-based financial statements, regulatory GAAP-based financial statements concerning their sector. Considering that different criteria can lead to different values, we question: Which of the models, IFRS or Regulatory GAAP, is more relevant for the share price formation of Brazilian companies in the electric power sector? Hence, our purpose is to determine which of the models best explains the variation in electric companies' share prices in Brazil.

Several reasons motivate this study. The power sector is responsible for providing energy, a vital resource to a country's main operations. According to Pereira, Santana, Mendes and Khan (2008), electricity is a component of the infrastructure network that provides social and economic support, thus the maintenance and development of Brazilian society and economy depend on its supply. In addition, energy is a factor that drives the Human Development Index (HDI), known as a parameter of the population's well-being.

A second reason is that the Brazilian power sector has undergone restructuring since the 1990s, both in terms of infrastructure and legally, which led to ANEEL's Normative Resolution No. 396 issued on February 23, 2010, implementing regulatory financial statements and establishing practices and guidelines for power companies. Then, since these companies are obliged to comply with the requirements and present their financial statements based on international accounting standards, and based on specific sector regulations, divergences occur in the reconciliation of some accounting groups, which may puzzle part of the investors (Guia & Dantas, 2020), especially as to the relevance of earnings and book value, and consequently affect the share price on the stock exchange.

Hoppe (2012) analyzed differences in accounting practices between corporate financial statements and regulatory financial statements and found inconsistencies, or a lack of application, of the accounting practices required under regulatory accounting. Similarly, the results of Carvalho, Wanderley, Libonati and Santos (2014) stress that between IFRS and regulatory accounting there were significant differences regarding total assets, results of the concession activity, net revenue, operating income and net income. Suzart, Souza,

Carvalho, Rivas, and Martins (2012), meanwhile, examined whether there are significant differences and to what extent between corporate and regulatory accounting in the Brazilian power sector regarding the Return on Equity (ROE) and Return on Assets (ROA), and results indicate that, on average, regulatory earnings are lower, the shareholders' equity and total assets are statistically equivalent, and corporate information alters returns more intensely than regulatory.

A third reason is the differences between value relevance research results in electric companies. Flores and Lopes (2019) evaluated whether post-IFRS (2010 - 2016) there was a statistically significant reduction in the relevance of accounting information in Brazilian power companies relative to the pre-IFRS period (2002 - 2009) and found that the adoption of international standards has reduced relevance, distancing the book value from the market value for power companies. On the other hand, Ferreira, Carmo and Ribeiro (2020) studied the relevance of the financial assets of Brazilian electric companies for the capital market from 2010 to 2018 and found that in addition to the financial assets registered in concession contracts, net income and equity are relevant information for investors, and that the financial assets, as a result of the adoption of IFRS, increase the explanatory power of stock price behavior.

These differences may be linked to the specific accounting nature of the segment since, in recent years, corporate accounting statements of the electricity sector have undergone substantial changes. Following the adoption of the international accounting standards, regulatory assets and liabilities related to tariffing activities are excluded from the corporate statements of electric companies and, according to Flores and Lopes (2019), the decrease in the relevance of the accounting information found for electric companies post-IFRS is probably related to the removal of these regulatory items. There have also been changes in the way concession contracts and revenues accounting are conducted. With the issuing of Technical Interpretation ICPC 01, based on IFRIC 12, fixed assets are split into financial assets and/or intangible assets, since the concessionaire has no control over the use of the public service infrastructure, but rather the access to operate on behalf of the grantor, and the revenue (counterpart of financial assets and/or intangible assets) is registered according to Technical Pronouncement CPC 17 - Building Contracts, if it results from construction or improvement, or according to Technical Pronouncement CPC 30 - Revenue, if it results from operation services (Ferreira et al. , 2020).

In light of this scenario, this research empirically verifies the relevance of accounting information for investors in both corporate and regulatory statements from 2011 to 2018 in the power sector context. For further analysis, we have segregated the time span into a period prior to OCPC 08, from 2011 to 2014, and afterwards, from 2015 to 2018. This segregation occurs because regulatory assets and liabilities, previously excluded from the financial statements of electric companies, were reinstated as of January 1, 2015 in OCPC 08 (2014), as it addresses the recognition of certain assets and liabilities in the financial-accounting reports of electric power companies. Thus, the objective of this further analysis is to verify and compare the impact of OCPC 08, which reinstates the recognition of such regulatory assets and liabilities, on the relevance of corporate and regulatory accounting information to the stock market.

This study's contribution lies in subsidizing normative and regulatory organizations on the implementation of accounting standards, offering a better understanding of the consequences that arise from differences in accounting procedures in the power sector and providing insights that may corroborate the necessity of improving accounting standards. Furthermore, it broadens the researchers' and investors' awareness by comparing the information relevance of corporate and regulatory financial statements of the Brazilian electricity sector, by segregating the pre and post OCPC 08 periods.

Furthermore, Brazil is an interesting country to study. As it is considered an emerging nation and offers relatively low legal protection to minority shareholders, as well as a high shareholder concentration (La Porta, Lopez-de-Silanes, Shleifer & Vishny, 2000; Ermel & Do Monte, 2018; Loch, Silva, Bueno & Marcon, 2020), it tends to show a different behavior from other, more developed countries. Generally, in developing countries, the demand for capital goods imports is higher, long-term credit lines are scarcer, and fundraising more expensive. Additionally, the Brazilian power sector has the direct participation of the government as its major shareholder, which can create potential conflicts and uncertainties for investors (Loch et al., 2020). Another reason is that the adoption of international accounting standards occurs at different periods in each country, in some early and more rapidly and in others, later and more slowly.

2 THEORETICAL FRAMEWORK

2.1 Theoretical and Normative Aspects of Corporate and Regulatory Accounting in the Electric Energy Sector

In Brazil, electric power comes mainly from hydroelectric plants, therefore this sector is interconnected by the segments of generation, transmission, distribution and energy trading. A relevant factor is that part of the companies provides services to the population through government concessions and permissions, as electric utility companies.

In recent years, the accounting standards applied to the power sector underwent normative and regulatory changes that impacted, in particular, accounting practices. In this sense, Carvalho et al. (2014) state that the convergence to international accounting standards, also known as IFRS and, regulatory GAAP accounting were determinant factors for power companies' accounting systems.

IFRS are a set of accounting standards developed under the coordination of the International Accounting Standards Board – IASB, adopted by 166 jurisdictions, including Brazil. It seeks to establish transparent, responsible and efficient accounting standards for the global market regarding the preparation and reporting of financial statements (IFRS, 2018). Regulatory accounting for the power sector in Brazil was instituted by ANEEL, through Normative Resolution no. 396/2010, and supported by the Electric Sector Accounting Manual (MCSE), which establishes accounting practices and guidelines necessary for electric companies for the accounting of their respective operations and preparation of regulatory statements (ANEEL, 2013).

According to OCPC 08 (2014), the electricity tariff is formed by manageable and non-manageable costs. Manageable costs result from investments in infrastructure and non-manageable costs represent the costs of acquisition of energy, therefore include regulatory items. When the consumption costs incurred are higher (or lower) than estimated, there is a right to receive (or an obligation to pay), that is, a regulatory asset (or liability). However, with the adoption of international accounting standards in 2010, this regulatory asset (or liability) is no longer accounted for in the corporate statements of energy distributors, since: a) the delivery of energy is a future event not fully controlled by the entity; and b) when this right (or obligation) arises, it is not feasible to determine whether and which buyers would pay (or receive) for this right (or obligation) (OCPC 08, 2014).

Therefore, due to the impediment of accounting these regulatory items, after the adoption of IFRS in 2010 and the consequent implementation of regulatory accounting through Normative Resolution no. 396 also in 2010, the accounting information of the electric companies started to be reported both by corporate and regulatory accounting. Thus, considering that this regulation attempts to address potential gaps, since, according to Normative Resolution no. 396, the accounting of regulatory assets and liabilities approximates financial statements to economic events, studies on the differences caused by this convergence are important. Figure 1 shows some differences between corporate and regulatory accounting before OCPC 08.

Characteristic	Corporate accounting	Regulatory accounting
Regulatory assets and liabilities	There is no correspondence in the IFRS on the treatment of regulatory assets and liabilities.	Recognized solely in the regulatory financial statements.
Fixed assets	ICPC 01 - Concession Agreements adoption by corporate accounting, in which fixed assets classified as intangible and/or financial assets.	According to MCSE, assets must not be affected by ICPC 01 and must be registered at the amount approved by ANEEL.
Fixed assets under construction (used to register costs and expenses with constructions, expansions and renovations in progress)	A rectification account is created to transfer these amounts to the "construction costs" account, according to IFRIC 12, and to the financial and intangible assets account.	Kept by MCSE for regulatory purposes.
Fixed assets in use (used to register costs and expenses with finished constructions, expansions and renovations)	The account is closed, by transferring its amounts to financial and intangible asset accounts.	Kept by MCSE for regulatory purposes.
Regulatory costs and expenses	Operating costs and expenses are not differentiated into regulatory and non-regulatory, as there is no correspondence in the IFRS on the treatment of regulatory operating costs and expenses.	Input for analysis of tariff formation by ANEEL's Superintendence of Economic Regulation. They include: personnel expenses, administrators, material, third-party services, leases and rents, insurance, taxes and others.

Characteristic	Corporate accounting	Regulatory accounting
Construction revenue	Created for corporate purposes only. Corresponds to construction's fair values.	Not present in MCSE, hence not included in regulatory statements.
Financial revenue	Created to update the financial assets subject to indemnity, that is, the residual value of the financial assets, which represents the amount of indemnity to be received from the grantor.	Not present in MCSE, hence not included in regulatory statements.
Other receivables	Current asset account as a counterpart of the cash flow received for the indemnification of the of the financial asset.	Not present in MCSE, hence not included in regulatory statements.

Figure 1 – Differences between Corporate and Regulatory Accounting
Source: Authors, based on the Guideline Manual for Audit Works of Regulatory Accounting Statements and adapted from Brugni, Rodrigues, Cruz and Szuster (2012).

However, in November 2014, the Accounting Pronouncements Committee (CPC) issued OCPC 08, addressing the recognition of certain assets and liabilities in the financial statements of the electric power distributors. Consequently, as of January 1, 2015, corporate accounting began to recognize regulatory assets and liabilities that were previously accounted only in regulatory statements, since ANEEL started to consider the grantor (public agency) as the counterpart of the financial assets and/or liabilities derived from tariff divergences. Consequently, as an additional analysis, we also examine the value relevance of corporate and regulatory accounting information for the stock market by segregating the period from 2011 to 2014 (before OCPC 08) and from 2015 to 2018 (after OCPC 08).

2.2 Value Relevance of Accounting Information

According to Lopes, Sant'Anna and Costa (2007), in the second half of the twentieth century, accounting studies showed a notorious growth in positivist research. These studies were developed based on empirical research that highlighted the coefficient of determination, the regression's R^2, measuring the relevance of accounting information.

From the 1960s on, the first studies on Value Relevance were conducted by Ball and Brown (1968) and Beaver (1968), considered to be the topic's precursors in the accounting and financial literature. Their papers investigated the relationship between stock prices and the disclosed information in financial statements and indicated that the book value and earnings hold an informative power regarding the price of shares.

Guia and Dantas (2020) argue that one of the primary purposes of accounting is the relevance of the information presented in the financial statements. From Sami and Zhou's (2004) point of view, the value relevance, or the relevance of accounting information, is the ability of the accounting figures to represent the information contained in the stock price. Generally, for Lopes and Iudícibus (2012), these studies attempt to investigate several aspects concerning the informational content of financial statements for the capital

market. Such studies are based on the precepts by Malkiel and Fama (1970) on the Efficient Markets Hypothesis (EMH), in which share prices may reflect the relevant and available information and may also be adjusted in view of this set of data. Thus, it is noticeable that these studies focus on capturing how the capital market reacts to the information presented in financial statements.

Operationally, Barth, Beaver and Landsman (2001) have stated that the purpose of value relevance research is to verify whether accounting information is relevant for the capital market, given a certain level of significance. In this sense, to be relevant the accounting information should present determination coefficients and regression equation coefficients that are significantly different from zero. Further in operational terms, Brown, Lo and Lys (1999) and Santos and Silva (2014) note that works on the relevance of accounting information are commonly conducted using regression, in which the dependent variable is the stock price and the independent variables are earnings and book value per share.

2.2.1 Residual Income Valuation (RIV) Model

Empirical research on value relevance had their roots in Asset Valuation Models and, among these, Ohlson's (1995) Residual Income Valuation (RIV) model stands out. The concept of Lopes et al. (2007) on the RIV model shows that the abnormal returns (residual income) are the net (or residual) returns that a company has after subtracting from its results the part that would be due for the investment of its capital at a given minimum rate of return. The differential of this model is that it calculates the abnormal returns using the risk-free interest rate, rather than using the company's cost of capital to arrive at the abnormal returns for the period. Thus, under RIV, earnings (not dividends) are the basis for calculating the value of the firm, which represents the sum of the present value of future residual income and the book value.

Santos and Silva (2014) show that, generally, value relevance studies are based on the model of Collins et al. (1997), developed from Ohlson (1995). Despite criticism regarding earnings coefficient as a measure of information quality (Dechow, Ge & Schrand, 2010) and the absence of control variables (Barth et al., 2019), this model (Equation 1) is employed in several value relevance papers (Brown et al., 1999; Francis & Schipper, 1999; Rezende, 2005; Gonçalves, Conegliam & Carmo, 2017; Ferreira et al, 2020), including in this research, because it presents the advantage of using only two accounting variables - earnings and book value - to calculate the value of the firm's equity, by relating the accounting information with market value assessment, and also by allowing the analysis of the informational content by comparing the R^2 determination coefficients of the models.

$$P_{i,t} = \alpha_0 + \beta_1 E_{i,t} + \beta_2 BV_{i,t} + \varepsilon_{i,t} \qquad \text{(Equation 1)}$$

Where:
P_{it} = price of a share of firm *i* four months after fiscal year-end *t*;
E_{ij} = earnings per share of firm *i* at the end of the year *t*;
BV_{ij} = book value per share of firm *i* at the end of the year *t*;
ε_i = standard error of the regression.

2.2.2 Studies on Value Relevance in Brazil

Several papers on value relevance have been conducted in Brazil. These studies usually highlight an accounting differential to then investigate possible changes in the relevance of accounting information, such as research and development (R&D) (Hungarato & Lopes, 2008); replacement of the Statement of Changes in Financial Position by the Cash Flow Statement (Macedo, Machado, Murcia & Machado, 2011); operational leasing (Martins, Machado & Machado, 2013); fair value to biological assets (Martins, Machado & Callado, 2014); convergence to international accounting standards in Brazil (Gonçalves, Batista, Macedo & Marques, 2014), disclosure of provisions and contingent liabilities (Pinto, Avelar, Fonseca, Silva & Costa, 2014), the Statement of Comprehensive Income (Angotti, Macêdo & Bispo, 2016); intangible assets (Cappellesso, Rocha & Dantas, 2018) and the Statement of Added Value (Santos, Botinha & Lemes, 2019).

However, a gap remains on the topic, since previous studies have neither verified nor compared the relevance of corporate and regulatory accounting information on the electric power sector for the stock market. Thus, when considering that corporate accounting statements are based on principles, whereas regulatory accounting statements of the electric power sector are based on specific tax and tariff regulations, the following research hypothesis is elaborated:

H1: Accounting information collected from corporate statements is more relevant to investors when compared to accounting information collected from regulatory statements.

According to Loch et al. (2020) companies in the electric power sector count on the direct government involvement as the majority shareholder, which may result in potential conflicts and uncertainties for investors, because, according to Peltzman (1976), regulatory agencies seek to benefit various groups of interests, instead of a single economic agent. As such, it is believed that accounting and regulatory structure may offer advantages to certain groups, which may hinder the orderly progress of economic activity. On this basis, and since corporate statements are based on accounting principles and essence over form, it is believed that corporate accounting information is of greater relevance to the stock market.

3 METHODOLOGY

This study comprised Brazilian electric utility firms that have publicly traded on B3 - Brasil, Bolsa, Balcão from 2011 to 2018. The temporal frame began in 2011 because it is the year in which ANEEL's Normative Resolution No. 396 (2010) became effective, thus turning regulatory financial statements mandatory.

The price of shares, corporate accounting information (earnings and book value per share of firm), the number of shares and the National Register of Legal Entities (CNPJ) of each company were taken from the Economatica® database. The regulatory accounting information (net income and shareholders' equity) was obtained from ANEEL's website (http://www.aneel.gov.br/central-de-informacoes-economico-financeiras), which provides the option of searching for the regulatory financial statements by the company's individual CNPJ.

The initial sample consisted of 40 companies, when considering only the class with the highest trading volume at the time of data collection (February/2020). However, since 21 companies did not disclose the Regulatory Balance Sheet and the Regulatory Income Statement in any of the years, the final sample consists of 19 companies. We chose to keep the same number of corporate and regulatory observations per variable.

The data collected were organized into panels and analyzed by using multiple regressions, estimated by the Ordinary Least Squares (OLS) method. According to Baltagi (2009), the panel data or longitudinal data technique consists of a set of data combined in both time series and cross-sectional dimensions. Panel data allows one to simultaneously explore changes in variables over time and across different units or groups.

The study was structured into three stages. The first stage represented the analysis of the value relevance of the corporate and regulatory accounting information for the stock market from 2011 to 2018. In the second stage, the value relevance of the corporate and regulatory accounting information for shareholders was verified between 2011 and 2014, the period prior to OCPC 08. The last stage identified the value relevance of the corporate and regulatory accounting information for the stock market between 2015 and 2018, after OCPC 08 became applicable. Since in the three stages the corporate accounting information was compared to the regulatory information, six empirical models were prepared based on the methodology of Collins et al. (1997):

$$P_{i,t} = \alpha_{0t} + \beta_{1t}E\_IFRS_{i,t} + \beta_{2t}BV\_IFRS_{i,t} + \varepsilon_{i,t} \quad \text{(Equation 2)}$$

$$P_{i,t} = \alpha_{0t} + \beta_{1t}E\_REG_{i,t} + \beta_{2t}BV\_REG_{i,t} + \varepsilon_{i,t} \quad \text{(Equation 3)}$$

Where:
P_{it} price of a share of firm i four months after fiscal year-end t;
E_IFRS_{it} earnings per corporate share of firm i at the end of the year t;
E_REG_{it} earnings per regulatory share of firm i at the end of the year t;
BV_IFRS_{it} is the book value per corporate share of firm i at the end of the year t;
BV_REG_{it} is the book value per regulatory share of firm *i* at the end of the year *t*;
Equations (2) and (3) correspond to the period from 2011 to 2018; from 2011 to 2014 and from 2015 to 2018. The share price is the dependent variable and earnings and book value per share are the independent variables.

It is worth noting that the panel pairs have the same parameter, that is, the same sample of firms and the same time interval, for both the corporate and regulatory accounting data.

The share price used was the closing price on April 30th of the following year after the publication of the statements (Gonçalves et al., 2017; Ferreira et al., 2020) (with a tolerance of one week after this date) and net income was removed from equity, since it already constitutes the equity account in the balance sheet.

To meet the requirements for running the regression, the Jarque-Bera and Breusch-Pagan-Godfrey tests were performed to verify the normality and

homoscedasticity of the residuals, respectively. To determine whether there are multicollinearity and model specification issues, the VIF (Variance Inflation Factor) and the linktest and RESET (Regression Specification Error Test) tests were conducted (Fávero & Belfiore, 2017). In order to define the most appropriate panel data model for this research, whether POLS, Fixed Effects or Random Effects, Chow's F test, Breusch-Pagan's Lagrangian Multiplier and Hausman's tests were performed. Hadi's (1994) technique was used for the exclusion of outliers and the software Stata13® was used for analyzing the data.

4 RESULTS DESCRIPTION AND ANALYSIS

Table 1 presents the descriptive statistics of the share price and corporate and regulatory accounting variables (earnings and book value per share of firm) after excluding outliers for the period of 2011 to 2018.

Table 1
Descriptive statistics of the corporate and regulatory variables

Variables	Mean	Standard deviation	Minimum	Maximum
P	17.9044	12.3885	1.3126	53.2692
E_IFRS	-0.2882	17.2589	-102.1972	95.4247
E_REG	-0.5427	12.4400	-104.1202	24.4407
BV_IFRS	21.5434	55.3867	-140.8049	247.4395
BV_REG	10.7856	40.8661	-147.9376	210.0383

Source: Authors.

On average, corporate earnings and shareholders' equity per share are higher in comparison with the regulatory values. Regarding the book value of equity, the divergences found between the corporate and regulatory amounts of the electric firms can be related to the non-recognition of regulatory assets and liabilities by corporate accounting in the period before the issuance of OCPC 08, as well as the revaluations of fixed assets considering the new replacement value made by regulatory accounting and the effects of the ICPC 01 in corporate accounting, which separates fixed assets into financial assets and/or intangible assets.

Regarding the discrepancies in the amounts related to earnings, such evidence is congruent with the results of Medeiros, Wanderley, Araújo and Santos (2013), that show that on average, the corporate earning values are higher than the regulatory. The standard deviation for the corporate data is higher and, as in Flores and Lopes (2019), the standard deviation of corporate equity is higher when compared to the standard deviation of corporate earnings. While the minimum values are similar, the maximum values are sparser.

Results of Step 1 are evidenced in Table 2. This table is composed of Panel A - Corporate Results, and Panel B - Regulatory Results.

Table 2
Result of E and BV Relevance for the period of 2011 to 2018

Panel A - Corporate			
Variables	**Coefficient**	***t***	**p-value**
E_IFRS	5.5017***	5.70	0.000
BV_IFRS	1.5664***	4.99	0.000
C	-8.3207*	-2.33	0.027
Additional Information	**Values**	**Additional Information**	**Values**
Jarque-Bera (p-value)	0.7736	*RESET* (p-value)	0.4327
Breusch-Pagan (p-value)	0.1064	*F of Chow* (p-value)	0.0000
VIF (E_IFRS)	2.44	*LM Breusch-Pagan*	0.0004
VIF (BV_IFRS)	2.44	*Hausman*	0.0018
Linktest _hatsq (p-value)	0.455	R^2 *Within*	0.6539
Panel B – Regulatory			
Variables	**Coefficient**	***t***	**p-value**
E_REG	3.8794**	2.72	0.007
BV_REG	0.8982**	3.05	0.002
C	2.9701	0.88	0.381
Additional Information	**Values**	**Additional Information**	**Values**
Jarque-Bera (p-value)	0.7638	*RESET* (p-value)	0.1842
Breusch-Pagan (p-value)	0.1318	*F of Chow* (p-value)	0.0000
VIF (E_REG)	2.27	*LM Breusch-Pagan*	0.0000
VIF (BV_REG)	2.27	*Hausman*	0.0575
Linktest _hatsq (p-value)	0.227	R^2 *Between*	0.5896

Note: ***Statistically significant at the 0.01% level (p-value < 0.0001); **Statistically significant at the 1% level (p-value < 0.01); *Statistically significant at the 5% level (p-value < 0.05).
Source: Authors.

The Jarque-Bera and Breusch-Pagan tests indicate that the residuals follow normal distribution and present constant variance. A VIF of less than 4 indicates that the explanatory variables are neither perfectly nor highly correlated. The linktest does not reject the null hypothesis that the models are correctly estimated in terms of functional form, and RESET test suggests that there is no omission of relevant explanatory variables. Chow's F-test, Breusch-Pagan's Lagrangian Multiplier and Hausman's tests indicate that the model with fixed effect (within-dominant variance) is the most appropriate for the corporate data, while the model with random effects (between-dominant variance) is the most appropriate for the regulatory data (Fávero & Belfiore, 2017).

Notably, all variables (E_IFRS, BV_IFRS, E_REG and BV_REG) are statistically significant at 0.01% or 1% level, therefore corporate and regulatory accounting information are relevant for the stock price formation in Brazilian electric sector companies from 2011 to 2018. Other studies also confirm the influence of earnings and equity on the stock price of publicly traded companies (Barth, Landsman & Lang, 2008; Gonçalves et al., 2014; Cappellesso et al., 2018).

Barth et al. (2019) uncovered increases in relevance, especially, of values related to intangible assets, growth opportunities, and alternative performance measures. According to Moura, Fank, and Varela (2012) most Brazilian power companies account for concession contracts in the intangible asset account,

and because these contracts can persist for decades, they perhaps substantially impact shareholder decisions.

Panel A shows that, on average, 65.39% of the share price variation is explained by the variation in corporate earnings and book value. On the other hand, Panel B reveals that, on average, this variation is 58.96%. The higher the value of these variables, the higher the share price, since these variables have positive coefficients. When comparing the R^2 (coefficient of determination) of the two panels, it is noted that the R^2 of Panel A - Corporate (65.39%) is higher than the R^2 of Panel B - Regulatory (58.96%). The coefficient of determination (R^2) is a measure of the adjustment of a statistical model and indicates, in percentage, how much can be explained by the model from the observed values. The higher the R^2, the more explanatory the model is considered, in other words, the better it fits the sample.

Furthermore, the statistical significance level of corporate variables (0.01%) is higher than that of regulatory variables (1%). This evidence does not reject the research hypothesis that accounting information collected from corporate statements is of more relevance to investors than accounting information collected from regulatory statements, because the explanatory power of Equation (2) is greater than that of Equation (3).

Following the convergence towards international accounting standards in 2010, regulatory assets and liabilities have been removed from the corporate statements of companies in the power sector. However, as of January 1, 2015, OCPC 08 (2014) is implemented, therefore these regulatory items are once again recognized by electric companies. Thus, as a further analysis, the value relevance of the corporate and regulatory accounting information for shareholders from 2011 to 2014, prior to OCPC 08 (2014), as well as from 2015 to 2018, after OCPC 08 (2014), is examined. Results are presented in Tables 3 and 4.

Table 3
Result of E and BV Relevance from 2011 to 2014

Panel C - Corporate			
Variables	**Coefficient**	***t***	**p-value**
E_IFRS	0.6691	0.66	0.521
BV_IFRS	1.0513	1.58	0.139
C	-0.7559	-0.08	0.938
Additional Information	**Values**	**Additional Information**	**Values**
Jarque-Bera (p-value)	0.861	*RESET* (p-value)	0.6449
Breusch-Pagan (p-value)	0.1853	*F of Chow* (p-value)	0.0070
VIF (E_IFRS)	1.07	*LM Breusch-Pagan*	0.4102
VIF (BV_IFRS)	1.07	*Hausman*	0.0024
Linktest _hatsq (p-value)	0.796	R^2 *Within*	0.1852

Panel D - Regulatory				
Variables	**Coefficient**	**Robust standard error**	***t***	**p-value**
E_REG	1.0613*	0.4133	2.57	0.030
BV_REG	1.5357**	0.3339	4.60	0.001
C	-8.2778	4.9580	-1.67	0.129

Additional Information	**Values**	**Additional Information**	**Values**
Jarque-Bera (p-value)	0.7884	*RESET* (p-value)	0.0967
Breusch-Pagan (p-value)	0.0042	*F de Chow* (p-value)	0.0001
VIF (E_REG)	1.00	*LM Breusch-Pagan*	0.2350
VIF (BV_REG)	1.00	*Hausman*	0.0007
Linktest _hatsq (p-value)	0.142	R^2 *Within*	0.5363

Note: ***Statistically significant at 0.01% level (p-value < 0.0001); **Statistically significant at 1% level (p-value < 0.01); *Statistically significant at 5% level (p-value < 0.05).
Source: Authors.

Table 3 shows that residues follow normal distribution (p-value of the Jarque-Bera test > 0.05), explanatory variables show no high percentage of shared variance (VIF < 4), models are correctly estimated in terms of functional form (p-value of _hatsq > 0.05), there is no omission of relevant explanatory variables (p-value of RESET test > 0.05) and Chow's F-test, Lagrangian Multiplier of Breusch-Pagan and Hausman's tests indicate that the model with fixed effect (within-dominant variance) is the most suitable for the corporate and regulatory data (Fávero & Belfiore, 2017). On the Breusch-Pagan heteroscedasticity test, the variance of the residues is constant in the corporate model (Panel C) and not constant for the regulatory model (Panel D, p-value < 0.05). Because of this, regulatory regression model is estimated with robust standard errors clustered by firm, i.e., with robust standard errors with clustering by individual (Fávero & Belfiore, 2017).

Between 2011 and 2014, period prior to OCPC 08 (2014), only regulatory accounting variables are found to be statistically significant at the 1% or 5% level, that E_REG and BV_REG have positive coefficients, and that the model's explanatory power is 53.63%. This evidence suggests that when a company discloses accounting information that is business-specific to the market, it adds relevance to the financial statements.

Accordingly, Braga, Carmo and Cunha (2021) analyzed whether there is a difference in the relevance of accounting information, regarding market value, between civil construction and real estate development and other sectors and found that revenue recognition methods specific to the civil construction and real estate development industry impact the relevance of accounting information. The lack of statistical significance for corporate data, on the other hand, may arise from the non-recognition of regulatory assets and liabilities by corporate accounting in power companies considering the period prior to OCPC 08 (2014), since, according to Flores and Lopes (2019), this non-recognition negatively affects such companies in Brazil.

Table 4
Result of E and BV Relevance from 2015 to 2018

Panel E - Corporate			
Variables	**Coefficient**	***t***	**p-value**
E_IFRS	6.9299***	4.22	0.000
BV_IFRS	0.2289	0.71	0.477
C	3.9301	1.18	0.237
Additional Information	**Values**	**Additional Information**	**Values**
Jarque-Bera (p-value)	0.8946	*RESET* (p-value)	0.7799
Breusch-Pagan (p-value)	0.3090	*F of Chow* (p-value)	0.0013
VIF (E_IFRS)	2.81	*LM Breusch-Pagan*	0.0023
VIF (BV_IFRS)	2.81	*Hausman*	0.0704
Linktest _hatsq (p-value)	0.963	R^2 *Between*	0.7337
Panel F - Regulatory			
Variables	**Coefficient**	***t***	**p-value**
E_REG	5.1818**	2.60	0.009
BV_REG	0.5175	1.48	0.138
C	5.9997	1.63	0.103
Additional Information	**Values**	**Additional Information**	**Values**
Jarque-Bera (p-value)	0.7496	*RESET* (p-value)	0.2292
Breusch-Pagan (p-value)	0.2681	*F of Chow* (p-value)	0.0019
VIF (E_REG)	2.31	*LM Breusch-Pagan*	0.0000
VIF (BV_REG)	2.31	*Hausman*	0.4459
Linktest _hatsq (p-value)	0.471	R^2 *Between*	0.6541

Note: ***Statistically significant at 0.01% level (p-value < 0.0001); **Statistically significant at 1% level (p-value < 0.01); *Statistically significant at 5% level (p-value < 0.05).
Source: Authors.

Regarding the period from 2015 to 2018, in both cases (corporate and regulatory), the null hypothesis of normal distribution and constant residual variance is not rejected. The VIF shows that there are no multicollinearity concerns in the explanatory variables, the linktest does not reject the null hypothesis of correct model specification in terms of functional form, and the RESET test reveals that there is no omission of relevant explanatory variables. Chow's F-test, Breusch-Pagan's Lagrangian Multiplier and Hausman's tests demonstrate that the model with random effect (between-predominant variation) is the most suitable for corporate and regulatory data (Fávero & Belfiore, 2017).

Only the corporate and regulatory earnings per share is found to be statistically significant at the 0.01% (E_IFRS) and 1% (E_REG) levels. The relationship found between the variables price per share and earnings per share is positive for both models, therefore, on average, a R$1.00 increase in earnings per share results in a R$6.93 (corporate) or R$5.18 (regulatory) increase in the share price. Panel E reveals that, on average, 73.37% of the stock price variation is explained by the variation in the corporate earnings per share. Panel F, on the other hand, indicates that, on average, this variation is 65.41% for the regulatory data. Macedo, Machado, Machado and Mendonça (2013), Gonçalves et al. (2014) and Santos et al. (2019b) found that the earnings per share variable became more relevant than the book value per share variable after the international accounting convergence process. In addition, Santos et al. (2019a) researched whether the informational content of the Value-Added Statement (VAS) is relevant to investors and the findings showed that the explanatory power of earnings per share is higher compared to VAS. It is believed that in emerging countries where legal protection of shareholders is lower, such as Brazil (La Porta et al., 2000), the greater relevance of earnings can be justified by the fact that earnings reflect the financial condition of companies in a risky environment faster. In contrast, Lima (2010) states that after the adoption of international accounting standards, book value approximates the market value of companies listed on the stock exchange, therefore its relevance should also be confirmed.

When comparing Panels C (Corporate - 2011 to 2014) and E (Corporate - 2015 to 2018), it is observed that the variables earnings and book value are not significant in Panel C, but that earnings become significant at the level of 0.01% in Panel E. This demonstrates that, after OCPC 08 (2014), corporate earnings became relevant for investors of Brazilian power companies. This finding underscores the importance of the issuance of OCPC 08 that took effect as of January 1, 2015, and suggests that the relaxation of procedures in specific sectors, such as the electricity, technology, and intellectual capital-intensive sector, can increase the relevance of accounting information. When comparing the R^2 of Panels D (Regulatory - 2011 to 2014) and F (Regulatory - 2015 to 2018), it can be seen that the R^2 of Panel F (65.41%) is higher than the R^2 of Panel D (53.63%). This means that, after OCPC 08 (2014), there was a boost in the explanatory power of their share price through the regulatory earnings variable.

The present research is in alignment with Carvalho et al. (2014), which points out differences in specific accounting data between the two accounting systems, corporate and regulatory. Evidence is consistent with Suzart et al. (2012) on the importance of these two systems. Authors show that regulatory earnings are lower than corporate earnings and that corporate data are more expressive than regulatory data in explaining ROE and ROA, i.e., they alter returns more intensely. The findings further corroborate to Santos et al.'s (2019b) study, which indicates less relevance of book value and higher relevance of earnings after the of IFRS.

In general, possible explanations for the results found are due to the different criteria practiced by corporate and regulatory accounting in the recognition of regulatory assets and liabilities in the period before OCPC 08. Furthermore, fixed assets can be revalued by regulatory accounting and, after the issue of ICPC 01, fixed assets were split into financial assets and/or intangible

assets, which can impact the value of the tariffs charged by Brazilian electric utility companies.

It is also important to stress the that corporate accounting is based on the international standards. These standards are submitted to publicly traded companies, which in turn are supervised by the respective Securities and Exchange Commission (CVM), therefore it is believed that the corporate accounting statements correspond better to the interests of investors. On the other hand, regulatory accounting is ruled by the MCSE, then seeks to meet the demands of the specific regulatory agency, which in the case of electric companies is ANEEL.

5 CONCLUDING REMARKS

Given the mandatory disclosure of regulatory financial statements by companies in the electricity sector, according to Normative Resolution No. 396/2010 instituted by ANEEL, regulatory accounting is another source of accounting information, being part of the data available to stock market analysts.

Initially, our study verifies the relevance of the accounting information reported by corporate and regulatory accounting, by identifying the explanatory power of each of them in influencing the share price of Brazilian electric utility companies from 2011 to 2018. That is, this research seeks to determine which of the corporate and regulatory accounting models best explains the variation in the stock prices of energy companies in Brazil.

Results show that corporate variables (earnings and book value per share) have higher explanatory power (R^2 of 65.39%) compared to the values of the same regulatory variables (R^2 of 58.96%). Hence, the research hypothesis that accounting information collected from corporate statements is more relevant to investors in relation to accounting information collected from regulatory statements was not rejected.

Subsequently, as an additional analysis, the value relevance of the corporate and regulatory accounting information for shareholders is verified from 2011 to 2014, period prior OCPC 08, and from 2015 to 2018, the period after OCPC 08. In the pre-OCPC 08 period only the regulatory accounting variables are statistically significant and in the post-OCPC 08 period regulatory book value is not statistically significant, corporate earnings becomes relevant, and there is an increase in the explanatory power of the share price of Brazilian power companies through the relevance of corporate earnings. As Brazil is an emerging country, characterized by low legal protection for minority shareholders, high shareholder concentration, and scarcer long-term credit lines (La Porta et al., 2000; Ermel & Do Monte, 2018; Loch et al., 2020), it is believed that the higher relevance of earnings can be justified by the fact that earnings reflect more quickly the financial condition of companies in a risky environment.

Overall, the results demonstrate that accounting information (earnings and book value per share) are relevant for the Brazilian capital market, whether reported by corporate ccounting or regulatory accounting, emphasizing that for the periods from 2011 to 2018 and from 2015 to 2018, corporate information presents a higher relevance. Other studies have also shown the influence of

earnings and equity per share on the stock price of publicly traded companies (Barth et al., 2008; Gonçalves et al., 2014; Cappellesso et al., 2018).

Thus, we conclude that the corporate accounting information, based on IFRS, is more relevant than the regulatory information, and that investors react positively to this information in both cases. This greater relevance of corporate accounting can be linked to the fact that international standards are more focused on the capital market, and that corporate information provides numbers that are closer to the economic reality of the company, since this accounting reflects, in a broader way, the economic fact. Furthermore, while the corporate financial statements are prepared based on international accounting standards, which are based on principles and essence over form, the regulatory financial statements, in this case, of the electric power sector, are based on specific tax and tariff rules.

Although the number of analyzed companies is similar to other studies that on publicly traded companies from the electricity sector (Carvalho et al., 2014; Flores & Lopes, 2019), this study's major limitation lies in the unavailability of the regulatory financial statements, on the part of several companies listed on ANEEL's website. Future research can be conducted with the aim of ascertaining whether regulatory standards are being applied in accordance with the MCSE. Finally, this study has contributed to the developing literature that investigates the changes in the relevance of accounting information for the capital markets with respect to the electric power sector.

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AUTHORS' CONTRIBUTIONS

Contributions	Marília Paranaíba Ferreira	Alex Mussoi Ribeiro	Jackelline Ferreira Cordeiro Milhomem	Carlos Henrique Silva do Carmo
1. Idealization and conception of the research subject and theme				✓
2. Definition of the research problem		✓		✓
3. Development of Theoretical Platform	✓		✓	
4. Design of the research methodological approach	✓	✓		
5. Data collection	✓		✓	
6. Analyses and interpretations of collected data	✓	✓	✓	✓
7. Research conclusions	✓	✓	✓	✓
8. Critical review of the manuscript	✓	✓		✓
9. Final writing of the manuscript, according to the rules established by the Journal.	✓			
10. Research supervision		✓		✓