Revista UNEMAT de Contabilidade

v. 12, n. 23, 2023

INFLUENCE OF FREE CASH FLOW ON THE DIVIDEND POLICY OF THE BRAZILIAN ELECTRICITY SECTOR

INFLUÊNCIA DO FLUXO DE CAIXA LIVRE SOBRE A POLÍTICA DE DIVIDENDOS SOBRE O SETOR ELÉTRICO BRASILEIRO

Alexandre Rodrigues da Silva
Universidade Federal do Rio Grande do Sul (UFRGS)
E-mail: alexandrerodriguesdasilva1976@gmail.com

SUMMARY

Companies in the Brazilian electricity sector are known for paying dividends above the average for publicly traded companies. The cash flow of these companies can influence the dividend policy depending on whether they choose to invest in projects or pay shareholders in the form of dividends. The objective of this study is to verify whether there is a correlation between free cash flow and the dividend distribution policy of companies in the Brazilian electricity sector through their respective yields. Methodology: 17 companies from the electricity sector and 92 from other sectors with at least 2 successive statements of cash flow, yield and asset price were selected. Data analysis was performed using Student's t test and ordinary least squares test using the Eviews software. Results and conclusions: free cash flow and yield are higher in the group of companies in the electricity sector, without, however, being able to demonstrate an evident correlation.

Keywords: dividend policy; electricity sector; free flow cash

RESUMO

As empresas do setor elétrico brasileiro são conhecidas por pagarem dividendos acima da média das empresas de capital aberto. O fluxo de caixa destas empresas pode influenciar a política de dividendos a depender da opção de investir em projetos ou pagar os acionistas na forma de dividendos. O objetivo deste estudo é verificar se há correlação entre o fluxo de caixa livre e a política de distribuição de dividendos das empresas do setor elétrico brasileiro por meio de seus respectivos yields. Metodologia: Foram selecionadas 17 empresas do setor elétrico e 92 de outros setores com pelo menos 2 demonstrações sucessivas de fluxo de caixa, yield e preço do ativo. A análise dos dados foi realizada por meio do teste t de Student e teste dos mínimos quadrados ordinários usando o software Eviews. Resultados e conclusões: fluxo de caixa livre e o yield são maiores no grupo de empresas do setor elétrico, sem, no entanto, ser possível demonstrar uma correlação evidente.

Palavras-chave: política de dividendos; setor elétrico; fluxo de caixa livre

1.INTRODUCTION

The Brazilian electricity sector is characterized by the presence of the State, which regulates energy prices and promotes other forms of intervention that may affect market balance (DIVINO; BRANDÃO, 2020). Companies in the Brazilian electricity sector, unlike other sectors, have their own characteristics that place them in a different group than conventional economic theory (SILVA; KIRCH, 2020). The studies by Costa and Oliveira (2004) and Tolmasquim (2012) show the importance of the energy sector for the economic and social development of the country, where they cite the regulatory changes that occurred in the sector that attracted greater investments to the electric energy sector, resulting in greater competitiveness.

The importance of dividend policy for Deshmukh (2005) is based on three main theoretical focuses: information asymmetry, transaction costs and agency costs. According to Almeida (2017), one of the main financial decisions taken by companies refers to the definition of a dividend distribution policy. It is up to the company to decide on the net profit: retain it, to reinvest in its own activity; or distribute it to its shareholders. Silva et al (2018) and John and Knyazeva (2006) found a positive correlation between cash flow and dividend distribution. Rebouças et al (2018), when studying the dividend policies adopted by companies in the electricity sector listed on BM&FBovespa and found that cash flow correlates with the dividend policy.

The objective of this study is to verify whether there is a correlation between free cash flow and the dividend distribution policy of companies in the Brazilian electricity sector through their respective yields. This work is divided as follows: this introduction, followed by the theoretical framework (part 2), where the literature on the subject is reviewed and the working hypotheses are formulated. Section 3 explains the methodology used, both for sample formation and for data analysis. The results are discussed in section 4, where the hypotheses will be tested and discussed in light of the literature. The work ends in section 5, where the conclusions are resumed.

2.THEORETICAL REFERENCE

The Brazilian electricity sector is characterized by the presence of the State, which regulates energy prices and promotes other forms of intervention that may affect market balance (DIVINO; BRANDÃO, 2020). Companies in the Brazilian electricity sector, unlike other sectors, have their own characteristics that place them in a different group than conventional economic theory (SILVA; KIRCH, 2020), which Castro (2018) describes: natural monopoly, greater regulation of this sector, the remuneration, tariff model, would make financial operations more stable with greater predictability of revenues and expenses. As they are public service concessionaires, they operate based on public concessions (hence the term “concessionaire”). Despite the way it operates, which ranges from power generation to transmission and distribution, its service is subject to regulatory bodies that, in addition to overseeing the quality of service provision, define the pricing of the tariffs charged. The studies by Costa and Oliveira (2004) and Tolmasquim (2012) show the importance of the energy sector for the economic and social development of the country, where they cite the regulatory changes that occurred in the sector that attracted greater investments for the electric energy sector, resulting in greater competitiveness and placing Brazil as one of the references in the segment.

Vieira and Alberton (2020) analyzed the return provided by publicly traded companies in the electricity sector to individual investors over a period of 11 years, comparing it with other types of investments. Bearing in mind the conservatism of most Brazilian savers, we sought to analyze the companies in the electricity sector with greater liquidity, as the sector has a volatility below the market average, in addition to being a segment of vital importance for society. The return

provided by companies, according to Vieira and Alberton (2020), followed a good average operating performance for the sector in the years under analysis, demonstrated by the behavior of profitability indicators and EBIT evolution. The sector proved to be a viable option for Brazilians interested in joining the stock exchange, given the good performance combined with the lower risk of the sector. For each variation of 1 percentage point in the Brazilian market, the electricity sector tends to vary, on average, 0.85 percentage points, proving to be less volatile than the average of the Brazilian market and providing greater security to investors seeking lower risk.

Miller and Modigliani (1961), in their classic article, suggested that dividend policy is irrelevant in relation to firm value. Under the hypothesis of perfect markets, when separating investment and financing decisions, the authors concluded that the company's value was determined solely and exclusively by the return on investments made. However, when considering imperfections or market frictions, the hypothesis of irrelevance of dividend policy is often refuted. For Deshmukh (2005), three main theoretical foci are considered as possible explanations for the importance of dividend policy: information asymmetry, transaction costs and agency costs. According to Almeida (2017), one of the main financial decisions taken by companies refers to the definition of a dividend distribution policy. It is up to the company to decide on the net profit: retain it, to reinvest in its own activity; or distribute it to its shareholders.

Martins and Fama (2012), also, through a literature review, between the years 1990 and 2010, on dividend policies in Brazil, highlighted that the study on the subject of dividends is even more controversial in Brazil due to some particularities, such as Interest on Own Capital (JCP) and its differentiated tax treatment. Almeida (2017), in turn, analyzed the relationship between the return on shares and the distribution of dividends of companies listed on BM&FBOVESPA in 2015. The most relevant result was that there is no relationship between the distribution of additional dividends and the return on shares , that is, for companies that choose to distribute amounts above the minimum legal and contractual amount, companies that created their own dividend policy not based on legal or contractual impositions, it is observed that they do not signal a positive action to the market, therefore, no add value to the share price, being irrelevant.

Dunis and Reilly (2004), using daily data from 31 December 2000 to 31 December 2002 and 5 variables to categorize a panel of 689 stocks from the London FTSE All-Share Stock Index along a value-growth dimension , analyzed the investment returns obtained from the best decile portfolios of "growth" stocks and "value" stocks. The results suggest that a “value growth” factor is significant in the UK equity market, regardless of which of the five relative valuation techniques is used. Value stocks outperformed growth stocks, on average, for all five relative valuation techniques used during the study period, both absolutely and after adjusting for risk. Value stocks also outperformed the market, on average, for all five relative valuation techniques, both absolute and after risk adjustment. Furthermore, the results also showed that the high dividend yield decile portfolio produced significant cumulative performance from the low dividend yield decile portfolio over the period under review. Possible reasons include the “customer effect” of the dividend and/or dividends acting as a signal to financial markets about a company's future prospects.

Keppler (1991) examined the relationship between dividend yield and return on investment for companies around the world. The study covered the 20-year period from December 31, 1969 to December 31, 1989 and assumed an equally weighted investment each quarter in the MSCI national stock indices of 18 countries. Each quarter, country indices were ranked according to dividend yield and ranked into four quartiles. The total return on investment was measured for each of the four quartile groups over the subsequent 3 months. The most profitable strategy was to invest in the highest dividend yield quartile. The compound annual investment return for the

highest yielding stocks was 18.49% in local currencies and 19.08% in US dollars over the 20-year period. The least profitable strategy was investing in the lowest dividend yield quartile, which produced a compound annual return of 5.74% in local currency (and 10.31% in US dollars). The Morgan Stanley Capital International World Index yielded 12.14% in local currency and 13.26% in US dollars, showing that the value quartile (comprised of stocks with the highest dividend yield) outperformed the market over the period studied.

Levis (1989) examined the association between dividend yield and investment returns from January 1955 to December 1988. Using a sample of 4,413 companies listed on the London Stock Exchange, all companies listed each year were ranked according to dividend yield and ranked in deciles. The highest dividend yield decile had an annual ROI of 19.3%, while the lowest dividend yield decile had an annual ROI of 13.8%. Both were higher than the annual return on investment of the FTSE All Share Index (13.0%) over the same thirty-four year period.

Nagel and Amaral (2013) analyzed the relationship between the dividend yield and the cumulative abnormal return in the post-dividend payment period, considering economic instability. The sample consisted of events in which there was payment of dividends or interest on equity of shares of non-financial companies traded on the São Paulo Stock Exchange from May 2009 to December 31, 2011. For data analysis , the event study method was used, more specifically based on the work of MacKinlay (1997). The results found indicate that the difference in abnormal returns between the groups with high and low dividend yield is statistically insignificant for all tests performed, which contradicts the results of other authors, such as Novis Neto and Saito (2003), who reached results which pointed to a direct relationship between dividend yield and cumulative abnormal return in the post-dividend payment period. A similar study was performed a year later by Kuronuma et al. (2004), with similar results.

Antônio et al (2018), through event studies based on the use of the Bootstrap statistical tool, whose main benefit is the adjustment for small samples, for a minimum period of analysis of ten years (January 2006 to December 2015) showed that distributions of dividends and interest on equity positively influenced the market, since the average abnormal return on shares was 0.70% on the day of the event.

Considering that on the date of the announcement of the payment of dividends, information is transmitted to the market, enabling the reaction of interested parties and the consequent impact on share prices, Marchi (2019) verified the behavior of share prices in relation to the announcement of the distribution of dividends . of companies listed on the Brazilian stock exchange (B3), which distributed dividends in 2016 and 2017. Quantitative analysis of the impact of dividend announcements, dividend yield, sector of activity and level of corporate governance on share prices was performed by through the methodology of studying events, explanatory analysis and a proposed mixed linear regression model. The findings indicated that the greater the percentage of the share price distributed in the form of dividends (dividend yield), the greater the accumulated abnormal returns of the shares. In addition, the existence of differences between the average abnormal returns accumulated in shares of companies classified in different sectors of activity and levels of governance was verified. However, according to Marchi (2019), such differences were characterized as statistically insignificant, indicating the non-influence of the sectors in which they operate and the levels of corporate governance on the accumulated abnormal returns of shares, in the periods close to the announcement of the payment of dividends. Silva and Kirch (2019), in turn, when comparing the actions of the electrical system with those belonging to the Bovespa index, through the CAPM model, showed that the actions of the electrical system are more likely to generate increases in the price of shares above 2% than companies belonging to the Bovespa

index after paying dividends. According to the authors, the shares of the electricity sector showed their own behavior, different from other sectors.

Cavalcante Cruz (2019) analyzed the actions of the electricity sector to observe its resilience to crises during the period from 2012 to 2020, as well as the profit distribution policy in this sector. Electric power companies, by virtue of concession contracts, usually have a forecast of revenues and expenses. This financial stability generates, as a consequence, the possibility of a stable dividend policy. It was shown that in the research period, companies tend to continue generating profit and maintain their dividend distribution policy (CAVALCANTE CRUZ, 2019). Also according to the author, the risk versus return analysis showed a positive assessment for the sector, compared to the Ibovespa, which as a rule maintained its growth trajectory, especially for private energy transmission companies. It also concludes that private companies in the electricity sector in the electrical transmission subsector tend to fulfill the function of hedge in variable income, and that this subsector tends to be companies with a better risk-return ratio and more resilient in its dividend payment policy.

According to Wang (2004), stock markets exhibit different behaviors in the short and long term. Dividend investing sees fewer loss years, adding significant utility to the investor (CLEMENS, 2012). Silva and Kirch (2021) showed that there was a positive variation in the value of shares of companies in the Brazilian electricity sector one year later in that group that had a positive variation in dividends in the previous year, compatible with the “Dogs of Dow”, and this relationship was not found for longer periods of time, both for dividends and for quotes. Thus, the authors suggest that the strategy of seeking asset appreciation based on their prior payment of dividends should stick to the period of one year prior to the payment of dividends, aiming at a horizon limited to one year after the purchase of shares in the respective companies. companies.

Silva (2022), with the objective of demonstrating the influence of shareholding concentration and company size on the dividend policy of companies in the Brazilian electricity sector, collected data on the shareholding control of companies in the electricity sector and other sectors listed on B3 during the year 2019. Based on the results, the following conclusions were reached: 1) companies in the electricity sector pay less than companies in other sectors; 2) there was no difference between the companies in the electricity sector and the others in terms of payout in relation to shareholding concentration, both between companies considered large and smaller; 3) regarding the size of the companies, there was no statistically significant difference between the payout paid by the electricity sector and the other companies; 4) the smaller size of the company was related to the greater occurrence of losses both in the electricity sector and in the group of other companies.

Silva and Kirch (2022), when looking for a correlation between non-operating income and the dividend distribution policy of companies in the Brazilian electricity sector through their respective payouts, analyzed using Student's t test and ordinary least squares and demonstrated that the electricity sector stood out from the other sectors for having lower non-operating profit, higher profitability and lower annual appreciation than the other sectors, with no difference in payout. The intra-industry analysis showed an inverse relationship between non-operating profit and payout, as well as non-operating profit and dividend yield. Companies in the electricity sector with high non-operating profits are related to low valuation, yield and payout, and this factor can be a metric of poor prognosis for the asset. According to the authors, these findings showed how the electricity sector differs from other sectors, requiring different strategies for investors who wish to obtain greater profits, such as considering the high non-operating result as a factor of lower profitability and appreciation of assets.

Silva et al (2009) analyzed, through a study with five companies in the electricity sector, randomly selected from 2007 to 2008, which operate on the São Paulo stock exchange and have good liquidity in this market, the following question: the EVA® (Economic Value Added) indicators - added economic value) corresponds to the resulting value after remuneration of creditors (third parties) and partners (shareholders), that is, it is the value that the company added to shareholders. In addition to EVA®, the authors also evaluated how Net Income, Cash Flow and EBITDA influenced stock prices. Correlation analysis, in which we sought to verify to what extent the independent variables interfered in the composition of the dependent variable, that is, the stock price fluctuation. According to the presented results, it was not possible to identify a uniform correlation between the independent variables and the stock price fluctuation.

Free cash flow is an approach that is within the Discounted Cash Flow models, and is similar to dividend discounting, as both start from the same assumptions: estimate the cash flows to the shareholder and bring to present value, discounted at a rate that reflects the cost of capital (ALLEBRANTE, 2018). This method "values the company using free cash flow, that is, the cash flow available to the company or shareholders net of capital expenditures." (BODIE; KANE; MARCUS, 2015, p. 544). Still according to the authors, this method is very useful for valuing stocks that do not pay dividends. According to Damodaran (2002), each company adopts the dividend policy that best suits its particular reality. Developing companies with rapid growth generally do not pay high dividends, while stable companies with high cash flows and fewer projects tend to pay higher amounts.

Gordon (1959) continues on the approach of the relevance of dividends to the value of the company, concluding that an increase in dividends provides several factors, such as the reduction of uncertainty about future cash flows. Easterbrook, with the cash flow hypothesis (EASTERBROOK, 1984) establishes that: greater cash holdings, free cash flow and creditors, maximizes the payment of dividends. The Agency Theory, on the other hand, considers that the company is a set of "contracts", in which the shareholders have rights over the assets and cash flows. These rights generate conflicts between their holders, shareholders and managers, who seek to act in defense of their own interests, in a context of separation between ownership and management, so that the main objective of each one is to maximize their own utility (JENSEN; MECKLING, 1976). In turn, according to the Signaling Theory, when it announces changes in its dividend policy, the company is sending information to the financial market, since its agents examine all the measures implemented in the business environment, with the aim of assessing their implications on the future cash flows and the value of the company, as explained by Ross (1977).

Assaf (2014) states that according to the dividend relevance theory, investors who need constant cash flow prefer companies that have regular dividend policies, as this reduces the risk associated with the instability of company results. Still according to Assaf (2014), the Signaling Theory argues that dividends have informational content and, therefore, the highest dividends can signal to the market and shareholders the expectation of positive future cash flows. In this context, according to Assaf (2014), the payment of dividends is a way to minimize the cash flow available for decision-making by managers, who often do not make decisions that maximize the capital gain of shareholders. Therefore, the greater the variation in operating cash flow, there will be a tendency for managers to try to reduce the basis for calculating dividends in order to keep more resources available for their choice of projects to be executed.

Mota (2007) analyzed the companies listed on the B3, in the period from 2000 to 2005, where he found that the existence of cash flow is due to the non-involvement with debt, having a relationship with corporate governance and the existence of few investment opportunities , as they are factors that generate a high distribution of their profits in the form of dividends. The author

states that companies with positive cash flow have fewer agency problems, since what is being done by managers is generating a positive result, therefore, the opportunity cost of distributing higher dividends to satisfy shareholders is greater than that of reinvesting capital to achieve future gains. In this sense, John and Knyazeva (2006) state that the higher the ROA (indicator of a greater cash flow), the greater the availability for carrying out a dividend distribution.

Mota (2007) also observed that, by also using the variation in revenues, a negative relationship with the distribution of dividends. According to the author, the opportunity for growth and investment have a negative effect on dividends, since companies that have projects capable of generating positive future cash flow minimize their agency conflicts and, therefore, the opportunity cost of distributing dividends. becomes larger, causing entities to choose to invest in growth opportunities.

On the other hand, in studies by Santana (2006), Mota (2007), Jiraporn, Kim, Kim (2011), Adjaoud and Bem-Amar (2010) and Fonteles et. al. (2012) found positive results between the cash flow variable (represented by ROA= Net Income / Total Assets) and the dividend policy. In this context, Fonteles et al. (2012) propose that cash flow is relevant in the policy of high dividends.

Forti, et al. (2015) present a second hypothesis referring to the company already having a high Market to Book and using dividends as a way to signal the occurrence of positive future cash flows. The authors add that the higher the leverage in the previous year, the lower the amount distributed through dividends in the following year and that, with debt, the entity believes that it will increase its cash flow for the next period, allowing for better shareholder remuneration.

Adjaoud and Ben-Amar (2010) investigated the correlation between the quality of corporate governance and dividend policy in Canadian companies. Adopting as a sample the set of companies listed on the Toronto Stock Exchange in the period from 2002 to 2005, they found that companies with stronger corporate governance paid higher dividends. The results also point to a positive association between the size of the company, the level of free cash flows and the payment of dividends.

For Forti and Freitas (2014), the relationship between debt and dividend distribution is positive. Because according to the authors, the company's indebtedness signals an expectation of an increase in cash flow in the following period and therefore companies pay more dividends to confirm to investors the optimistic position regarding future results.

Santos (2020), when studying the variation in operating cash flow, showed that companies that paid above the mandatory dividends had less variation in operating cash flow (OCF) and that they also paid higher dividends in the previous year. The author concluded that decisions on dividend policy were determined by the policy of the previous year and by the FCO variation. On the other hand, companies with a greater variation in FCO tended to manage the calculation basis for dividends, that is, the greater the variation in operating cash flow, the lower the proportion of dividends in relation to profit.

Silva et al (2018) verified the relationship between distributed dividends and ROA (as an indicator of cash flow) in Brazilian electric energy companies listed on B3 - formerly BM&FBovespa - between 2010 and 2016. The research sampled 44 companies listed on B3 in the electricity sector. The results found showed that the ROA variable showed a statistically significant positive relationship at 1% with the behavior of distributed dividends (SILVA et al, 2018). The result also agrees with John and Knyazeva (2006) where they state that the higher the ROA (indicator of a greater cash flow), the greater the availability for carrying out a dividend distribution.

Rebouças et al (2018) analyzed the financial statements and reference forms of 33 companies in the electricity sector listed on BM&FBovespa, referring to 2014 with respect to: listing segment, shareholding concentration, cash flow, size, risk and origin of capital. Correlation analysis indicated that only cash flow would correlate with dividend policy. The findings, according to the authors, are in line with the precepts of the Bird in the Hand Theory, given that companies with high cash flow distribute more dividends, corroborating the findings of Adjaoud and Ben-Amar (2010), Fonteles et al. (2012), Jiraporn, Kim, Kim (2008), Mota (2007) and Santana (2005).

Moutinho et al (2019), with the objective of verifying whether the free cash flow/price indicator is capable of predicting the stock return of publicly traded companies in the Brazilian market. Quarterly data from 2008 to 2016 for 245 common shares and 157 shares of other classes were analyzed. The main results obtained were: the statistical significance of the free cash flow/price to predict the stock return with one and three quarters of lag by the dynamic panel method, conclusion similar to that found by Lewellen (2004). The dividend yield, according to Moutinho et al (2019), obtained an inverse relationship with the stock return.

In view of the above, in relation to companies in the electricity sector in relation to other sectors, two hypotheses were formulated:

H_{0a}: There is no difference in free cash flows between companies in the electricity sector and other sectors.

H_{1a}: There is a difference in free cash flows between companies in the electricity sector and in other sectors.

Still in view of the above, in relation to companies in the electricity sector, two hypotheses were formulated:

H_{0b}: Free cash flow is not correlated with the yield of companies in the electricity sector.

H_{1b}: Free cash flow is related to the yield of companies in the electricity sector.

In addition, they will be evaluated along with free cash flow and yield, the variable annual variation in the price of the asset.

3. METHODOLOGY

The publicly traded companies listed on B3 were selected on the Yahoo Finance website (YAHOO FINANÇAS, 2022). The time period covered was from January 2, 2018 to December 31, 2021. The data used to calculate the study's two main variables were also extracted from this website: free cash flow, yield, and price change.

Given the large annual variability between free cash flows, it was calculated annually on the first difference. The yield was calculated from the dividends paid in the current year divided by the value of the share on the day of payment and added up within the year. In addition, data were obtained on the variation in stock prices on the last day of each year, calculating the annual variation. Thus, the result resulting from variations between the years 2021-2020, 2020-2019 and 2019-2018 was obtained.

Within an intrasectoral analysis of the electricity sector, the study variables were tested with companies in the electricity sector divided into two groups: the group with a non-operating profit/gross profit ratio above the 75th percentile and the group with this ratio below the 25th percentile. Data analysis was performed using Student's t test and ordinary least squares test using

the Eviews software. For the electricity sector, a dummy variable was used (value 1, when belonging to the sector). In addition, given the peculiarity of the financial sector, whose statements do not differentiate operating profit, they also gained a dummy variable (value 1, when belonging to the sector). The level of statistical significance was set at 0.1.

4 RESULTS

Seventeen companies from the electricity sector and 92 from other sectors with at least 2 successive statements of cash flow, yield and asset price were selected. Companies with IPOs carried out in 2021, therefore, were not used. On the other hand, companies undergoing merger and acquisition processes that ceased to exist in 2021 and 2020, if they had data available by the end of the current year, were still used. The next subsections will analyze the data using Student's t test (subsection 4.1) and in 4.2 the multivariate statistical analysis will be performed using Ordinary Least Squares (OLS). In both subsections, analysis within the group of companies in the electricity sector and in comparison with other companies will also be addressed.

4.1 Analysis by Student t test

Through the sample collected, 46 companies/year in the electricity sector (hereinafter ELET) and 264 companies/year in other sectors (hereinafter referred to as OUTROS) were reached. Due to the high variability of the DFCL, the sampling of both the ELET group and the OUTROS group was divided into quartiles, as also done by Rebouças (2018), the first quartile being all values below the 25th percentile and so on. It should be noted that the free cash flows were tabulated as the annual variation in the form of the first difference (and henceforth referred to as DFCL). The results are shown in table 1. The analysis between the ELET and OUTROS groups within the same quartiles shown in table 2 shows a significantly higher DFCL in the ELET group in quartiles 2 and 3, which rejects the null hypothesis H_{0a}. Likewise, there was a higher yield in the ELET group in quartiles 1, 2 and 3.

However, when applying Pearson's linear coefficient, shown in Table 3, the only positive (weak) correlation between DFCL and yield was in the first quartile, which raises the possibility of an inverse relationship between DFCL and yield in the ELET group. . As for price variation, no significant differences were found.

When comparing different quartiles within the same group (Table 4), no significant relationships were found, either in the ELET group or in the OUTROS group in terms of DFCL and yield, which shows that both yield and price variation were not influenced of the DFCL, which is in line with the null hypothesis H_{0b}, which is in disagreement with the results of Rebouças et al (2018) and Silva et al (2018), for the Brazilian electricity sector, as well as for Adjaoud and Ben - Amar (2010), Fonteles et al. (2012), Jiraporn et al. (2008), Mota (2007) and Santana (2005) that were not restricted to a single sector. A possible explanation for this discrepancy lies in the fact that most of these studies used return on assets as a cash flow proxy, while in this study annual free cash flow data were collected. In addition, they underwent the first difference compared to the previous year.

Table 1 – DFCL quartiles for the ELET and OUTROS groups

	ELET				OUTROS			
Quartile	Range DFCL (in thousands of Reais)	DFCL (Mean ± standard error)	Yield (Mean ± standard error)	Dpreco (Mean ± standard error)	Range DFCL (in thousands of Reais)	DFCL (Mean ± standard error)	Yield (Mean ± standard error)	Dpreco (Mean ± standard error)
1º	< -650,982	-2682880 ± 494,462	0.053 ± 0.014	-0.09 ± 0,093	< -388,211	-1679,252 ± 189,883	0.031 ± 0.005	0.216 ± 0.077
2º	-650,982 a 84,635	-301,423 ± 83,652	0.092 ± 0.007	0.173 ± 0.083	-388,211 a 10,804	-66,221 ± 8114	0.01 ± 0.002	0.094 ± 0.046
3º	84,635 a 752,342	420,132 ± 59920	0.051 ± 0.008	0.197 ± 0.074	10,804 a 602,582	110,879 ± 9252	0.034 ± 0.008	0.558 ± 0.088
4º	> 752,342	2813,108 ± 619,764	0.064 ± 0.014	0.115 ± 0.114	> 602,582	2720,329 ± 295,754	0.024 ± 0.007	0.283 ± 0.07

Abbreviations: Elet: group of companies in the electricity sector; Others: other companies; DFCL: free cash flow on first difference; Dpreco: annual variation of the share price.

Table 2 – Student t test between ELET and OUTROS within the same quartile

Quartil	DFCL	Yield	Dpreco
1º	ELET < OUTROS	ELET > OUTROS*	ELET< OUTROS
2º	ELET > OUTROS**	ELET > OUTROS**	ELET< OUTROS
3º	ELET > OUTROS**	ELET > OUTROS*	ELET< OUTROS
4º	ELET > OUTROS	ELET > OUTROS	ELET< OUTROS

Abbreviations: Elet: group of companies in the electricity sector; Others: other companies; DFCL: free cash flow on first difference; Dpreco: annual variation of the share price; *: $p < 0.1$; **: $p < 0.01$.

Table 3 - Pearson's linear correlation

	ELET			OUTROS		
Quartile	DFCL and yield	DFCL and dpreco	Yield and dpreco	DFCL and yield	DFCL and dpreco	Yield and dpreco
1º	0.185	-0.236	-0.049	-0,245	0.057	0.037
2º	-0.477	-0.41	0.044	-0.262	0.19	-0.112
3º	-0,1	0.484	-0.246	-0.199	-0.147	-0.003
4º	-0.026	-0.047	-0.048	-0.037	-0.085	-0.144

Abbreviations: Elet: group of companies in the electricity sector; Others: other companies; DFCL: free cash flow on first difference; Dpreco: annual variation of the share price.

Table 4 – Student t test between quartiles 1 and 4 within the same group

Quartile	DFCL	Yield	Dpreco
ELET	1 < 4**	1 < 4	1 < 4
OUTROS	1 < 4**	1 > 4	1 < 4

Abbreviations: Elet: group of companies in the electricity sector; Others: other companies; DFCL: free cash flow on first difference; Dpreco: annual variation of the share price; **: $p < 0.01$.

Table 5 shows the result of the merger between the 1st and 4th percentile groups and between the 2nd and 3rd groups for both ELET and OUTROS. In the analysis using the Student's t test shown in Table 6, there were no differences between the extremes and centrals in both the ELET group and the OUTROS group. However, in the OUTROS group, the yield was higher at the extremes, which could demonstrate a greater payment of dividends in situations where the FCL

variation was greater, regardless of whether it was positive or negative, which contradicts the results of Santos (2020). In addition, the payment of dividends was always higher in the ELET group, both in the central and extreme groups in relation to the Others group. These differences occurred in situations where the DFCL was not statistically different between the groups, which shows that there is no relationship between DFCL and yield. As for price variation, at no time were there statistically significant findings, both between the extreme and central groups, and between ELET and OUTROS, in line with Silva et al (2009) and counting Moutinho et al (2019) and Lewellen (2004).

Table 5 - Extreme quartiles and central quartiles*

	ELET			OUTROS		
	DFCL (Mean ± standard error)	Yield (Mean ± standard error)	Dpreco (Mean ± standard error)	DFCL (Mean ± standard error)	Yield (Mean ± standard error)	Dpreco ()Mean ± standard error
Extremes	65,114 ± 691,839	0.059 ± 0.010	0.013 ± 0.075	-725,297 ± 3,246,189	0.037 ± 0.004	0.159 ± 0.053
Centrals	77,110 ± 88,291	0.055 ± 0.009	0,144 ± 0.107	41,206 ± 17,141	0.025 ± 0.003	0.278 ± 0.066

*Extremes: sum of quartiles 1 and 4; central: sum of quartiles 3 and 4.

Table 6 – Student t test between ELET and OUTROS with extreme and central percentiles

	Variables		
Groups	dfcl	yield	dpreco
ext vs cent			
ELET	ext < cent	ext > cent	ext < cent
OUTROS	ext < cent	ext > cent*	ext < cent
ELET vs OUTROS			
extremes	elet > outros	elet > outros*	elet < outros
Centrals	elet > outros	elet > outros**	elet < outros

*: $p < 0.1$; **: $p < 0.01$.

4.2 Analysis by OLS

As shown in Table 7, the heterogeneity of free cash flow data, even applying the first difference between successive years, was very high, especially in the group of companies not belonging to the electricity sector (hereinafter called the OUTROS group) . To mitigate this effect, it was decided to remove from the sample of both groups, both the electricity sector (hereinafter called the ELET group) and the OUTROS group, all data below the 5th percentile and above the 95th percentile. For the ELET group, the percentile 5 for free cash flow was -4,522,487 (values in thousands of Reais). The 95th percentile was 3,865,452. In the OUTROS group, the 5th percentile was -3,680,202 and the 95th percentile was 8,190,487.

The result, shown in Table 7, led to a 15-fold decrease in the standard error of the cash flow in the OUTROS group, but without significant changes in the other parameters (yield and price), even in the ELET group. The sample, initially of 46 companies/year in the ELET group, dropped to 40, while in the OUTROS group it decreased from 264 to 236. Of the exclusions made (table 2), only one company from the ELET group was excluded, while the others data deletions occurred in other companies that already had data from other years. In the OUTROS group, 5

companies were excluded. Three of them from the financial sector (itub4, sanb11 and bpac11) and two B3 giants (itsa4 and ggbr4). In this case, unlike the ELET group, the exclusion in each of these companies was their 3 years of registration (2021-2020, 2020-2019, 2019-2018). The wide variation in cash flow within companies in the financial sector stands out.

Table 7 - Sample before and after removing outliers

Group	Variable	Mean ± standard error	n
ELET			
	DFCL	70,851±359,692	46
	DFCL_S	51,660±228,383	40
	Dpreco	0.075±0.064	46
	Dpreco_S	0.086±0.07	40
	Yield	0.06±0.007	46
	Yield_S	0.057±0.007	40
OUTROS			
	DFCL	-342,045±1,535,313	264
	DFCL_S	260,472±102,467	236
	Dpreco	0.22±0.04	264
	Dpreco_S	0.24±0.046	236
	Yield	0.031±0.0025	264
	Yield_S	0.028±0.003	236

Abbreviations: Elet: group of companies in the electricity sector; Others: other companies; DFCL: free cash flow on first difference; Dpreco: annual variation of the share price; _S: result after removing the outliers (see text).

Table 8 - Time of Inclusion of Companies and Exclusions

Time of Inclusion (years)	ELET	OUTROS
3	14	85**
2	1	2
1	2*	5
Excluded companies	1	5
Total after exclusions	16	87

*the company excluded from the electricity sector came from this group; **all excluded companies came from this group

Intersectoral analysis using the ordinary least squares method showed no statistically significant correlation between DFCL and yield (Table 9). Yield also had no statistically significant correlation with price variation, which is in line with Nagel and Amaral (2013) and Silva et al (2009), but which contradicts studies by Antônio et al (2018), Novis Neto and Saito (2003), Kuronuma et al. (2004), Moutinho (2019), Levis (1989) and Keppler (1991). A possible explanation would be in the work of Silva and Kirch (2021) who showed that the appreciation of assets of companies in the Brazilian electricity sector occurred in the year following the payment of dividends. On the other hand, there was a statistically significant positive relationship between free cash flow and change in the share price (Table 9). Positive variations in free cash flow are related to increases in the share price, in line with Moutinho et al (2019) and Lewellen (2004).

Table 9 – Analysis means of OLS

Independent Variable		c	DFCL	Yield	ELET
Dependent Variable					
Yield		0.03**	2.45E-09		0.029**
Dpreco		0.25**	4.50E-08*	-0.89	-0.12
Dpreco		0.23**	4.29E-08*		-0.14
Dpreco		0.26**		-0.72	-0.13

Abbreviations: Elet: group of companies in the electricity sector; Others: other companies; DFCL: free cash flow on first difference; Dpreco: annual variation of the share price; *: $p < 0.1$; **: $p < 0.01$.

4.2.1 Intrasectoral Analysis

In intrasectoral analysis, as shown in Table 10, there was no correlation between DFCL and the ELET group. There were also no statistically significant differences when stratifying the ELET group into 3 groups (below the 25th percentile, above the 75th percentile, and between the 25th and 75th percentiles), thus accepting hypothesis H0b. One of the explanations could be the small sample size.

Table 10 - Analysis of the ELET by means of OLS

Independent Variable		c	DFCL	Yield	<25	>75
Dependent Variable						
Yield		0.06**	5.96E-09			
Yield		0.05**	1.79E-08		0.04	-0.02
Yield		0.05**	1.25E-08		0.03	
Yield		0.06**	7.15E-09			-0.01
Dpreco		0.11	-2.12E-08	0.2	-0.25	0.1
Dpreco		0.13	8.96E-09	0.12	-0.21	
Dpreco		0.09	5.24E-08	-0.19		0.01

Abbreviations: Elet: group of companies in the electricity sector; Others: other companies; DFCL: free cash flow on first difference; Dpreco: annual variation of the share price; *: $p < 0.1$; **: $p < 0.01$.

Resuming, in the intersectoral analysis it was found in the t test that the DFCL and the yield are higher in the ELET group, without, however, being able to demonstrate an evident correlation. In the multivariate regression by OLS, positive correlation was found between DFCL and price in the OUTROS group, in addition to an already known correlation of the yield of the ELET group being higher than that of the OUTROS group, according to Silva and Kirch (2022). The intrasectoral analysis of the ELET group showed no correlation between DFCL and Yield or DFCL and price in both the t-statistics and the multivariate analysis by OLS.

CONCLUSIONS

Vieira and Alberton (2020), by demonstrating that shares in the electricity sector represent a good investment option within the capital market, opened up space for the search for different parameters to optimize profitability, both for the appreciation of the asset and for its dividend policy. Finding parameters for the dividend policy serves for a better selection of assets within the sector. The study by Rebouças (2018) and Silva et al (2018), when working on the relationship between cash flow and yield within the electrical system, opened space to address the subject as a line of research.

The objective of this study was to verify the correlation between free cash flow and the dividend distribution policy of companies in the Brazilian electricity sector through their respective yields. The results of this work, which did not find correlations between free cash flow and yield, can be explained by the small sample, smaller than that of other works, such as Rebouças (2018) and Silva et al (2018), these dedicated to Brazilian electrical system and those of Adjaoud and Ben-Amar (2010), Fonteles et al. (2012), Jiraporn et al (2008), Mota (2007) and Santana (2005) that were not restricted to the electricity sector. In addition, the option to use annual statements instead of quarterly, contributed to this smaller sample. Another possible explanation for this discrepancy lies in the fact that most of these studies used return on assets as a cash flow proxy, while in this study annual free cash flow data were collected. Moreover, the free cash flow data underwent the first difference compared to the previous year.

The perspectives of work include a larger sampling, as well as the use of time series with econometric instruments to demonstrate not only correlations, but also causality.

REFERENCES

ADJAOUD, F.; BEN-AMAR, W. Corporate governance and dividend policy: shareholders' protection or expropriation. **Journal of business finance & accounting**, v. 37, n. 5-6, 648-667, 2010.

ALLEBRANTE, Paula Daniela do Rosário. Análise do uso do Modelo de Gordon de Desconto de Dividendos para avaliação de Ações do índice IDIV da B3. Advisor: Prof. Roberto Lamb. 2018. 104 sheets. Completion monograph of the Graduation Course in Administration presented to the Department of Administrative Sciences of the Universidade Federal do Rio Grande do Sul, 2018. Avaiable in: https://lume.ufrgs.br/handle/10183/194911?locale-attribute=en. accessed on November 24, 2022.

ALMEIDA, Rayanne Ferreira Rodrigues. A relação entre a distribuição de dividendos e o retorno das ações no Brasil. Advisor: Prof. doctor Moses Ferreira da Cunha. 2017. 25 sheets. Completion monograph of the Undergraduate Course in Accounting at the Universidade Federal de Goiás. Goiânia, 2017. Avaiable in: https://repositorio.bc.ufg.br/bitstream/ri/14635/2/TCCG%20-%20Ci%C3%AAncias%20Cont%C3%A1beis%20-%20Rayanne%20Ferreira%20Rodrigues%20Almeida%20-%202017.pdf. Last accessed on November 23, 2022.

ANTÔNIO, R. M.; STICCA, R. M.; AMBROZINI, M. A. Quais eventos corporativos influenciam os retornos das ações? Um estudo baseado em bootstrap. **Revista Universo Contábil**, v. 14, n. 3, p. 28-45, 2018.

ASSAF, A.N. **Finanças corporativas e valor.** 7ª edição. São Paulo: Atlas, 2014.

BODIE, Z.; KANE, A.; MARCUS, A. J. **Investimentos.** 10º. ed. Porto Alegre: Amgh, 2015.

CASTRO, N.; MARTINI, S.; BRANDÃO, R.; LUDOVIQUE, C. O papel dos leilões na expansão do segmento de transmissão do setor elétrico brasileiro. Rio de Janeiro, 2018. Electric Sector discussion text. Electric Sector Study Group/ Universidade Federal do Rio de Janeiro.

CAVALCANTE CRUZ, Rafael. Ações do setor elétrico alternativas de investimento. Advisor: Prof. doctor Paulo Jorge Melo Neto. 2019. 50 sheets. Master's dissertation to obtain the title of Master in Economic Sciences at the Faculty of Economics, Administration, Actuarial Science and Accounting. Universidade Federal do Ceará. Fortaleza, 2019. Avaiable in: https://repositorio.ufc.br/bitstream/riufc/59315/1/2021_dis_rccruz.pdf. Accessed in November 25, 2022.

CLEMENS, M. Dividend Investing: Strategy for Long-Term Outperformance, 2012. Available in: https://ssrn.com/abstract=2056317 or http://dx.doi.org/10.2139/ssrn.2056317. Accessed in November 22, 2022.

COSTA, Leonardo Morgado da; OLIVERIA, Edson Aparecida Querido. Análise da Importância da Energia Elétrica no Crescimento Econômico Brasileiro. In: **Encontro Latino Americano de Iniciação Científica**. v. 8., 2000, São José dos Campos. Artigo. São José dos Campos: Universidade do Vale do Paraíba, 2000. p. 837 - 839. Avaiable in: https://www.inicepg.univap.br/cd/INIC_2004/trabalhos/inic/pdf/IC6-76.pdf Accessed in November 25, 2022.

DAMODARAN, A. **Finanças corporativas aplicadas**: manual do usuário. Porto Alegre: Bookman, 2002.

DESHMUKH, S. The effect of asymmetric information on dividend policy. **Quarterly Journal of Business & Economics**, v. 44, p. 107-127, 2005.

DIVINO, J. A.; BRANDÃO, L. Uma análise da dinâmica do setor elétrico brasileiro utilizando VAR em painel. **Revista Econômica do Nordeste**, v. 51, n. 2, p. 47-64, 2020.

DUNIS, C.; REILLY, D. Alternative valuation techniques for predicting UK stock returns. **Journal of Asset Management**, v. 5, n. 4, p. 230–250, 2004.

EASTERBROOK, F. H. Two agency-cost explanations of dividends. **The American Economic Review**, v. 74, n. 4, 650-659, 1984.

FONTELES, I.; AZEVEDO PEIXOTO JÚNIOR, C.; CARVALHO DE VASCONCELOS, A.; MENDES DE LUCA, M. M. Política de dividendos das empresas participantes do Índice Dividendos da BM&FBovespa. **Contabilidade Vista & Revista**, v. 23, n. 3, p. 173-204, 2012.

FORTI, C. A. B.; PEIXOTO, F. M.; LIMA, D. Fatores determinantes do pagamento de dividendos no Brasil. **Revista Contabilidade & Finanças**, v. 26, n. 68, 167-180, 2015.

FORTI, Cristiano; FREITAS, Kellen. Relação entre a distribuição de dividendos e a classificação de rating das empresas listadas na Bovespa. In: **Encontro Brasileiro de Finanças**, 2014, Recife. Anais... Recife:2014. Avaiable in: http://sbfin.org.br/encontros-anteriores-assets/2014/artigos/ID4559.pdf. Accessed in November 24, 2022.

GORDON, M. J. Dividends. Earnings and stock prices. **The Review of Economics and Statistics**, Cambridge, v. 41, n. 2, Part 1, p. 99-105, May. 1959.

JENSEN, M. C.; MECKLING, W. H. Theory of the firm: Managerial behavior, agency costs and ownership structure. **Journal of financial economics**, v. 3, n. 4, p. 305-360, 1976.

JIRAPORN, P.; KIM, J. C.; KIM, Y. S. Dividend payouts and corporate governance quality: An empirical investigation. **Financial Review**, v. 46, n. 2, 251-279, 2011.

JOHN, K.; KNYAZEVA, A. Payout policy, agency conflicts, and corporate governance. **Agency Conflicts, and Corporate Governance,** May, 2006.

KEPPLER, A. The Importance of Dividend Yields in Country Selection, **Journal of Portfolio Management**, v. 17, n. 2, p. 24-29, 1991.

KURONUMA, Alexandre Maurício; LUCCHESI, Eduardo Pozzi; FAMÁ, Rubens. Retornos anormais acumulados das ações no período pós-pagamento de dividendos: um estudo empírico no mercado brasileiro. In.: **Congresso USP de Controladoria e Contabilidade**, v. 4, 2004, São Paulo. Anais... São

Paulo: 2004. Avaiable in: https://congressousp.fipecafi.org/anais/artigos42004/393.pdf. Accessed in November 25, 2022.

LEVIS, M. Stock Market Anomalies: A Reassessment based on the UK Evidence**, Journal of Banking and Finance**, v. 13, n. 4-5, p. 675-696, 1989.

LEWELLEN, J. Predicting Returns With Financial Ratios. **Journal of Financial Economics**, v. 74, p. 209-235, 2002.

MACKINLAY, A. C. Event studies in economics and finance. **Journal of Economic Literature**, Nashville, v.35, n.1, p.13-39, 1997.

MARCHI, Joelma Cristiane. Anúncios de dividendos e seus reflexos nos preços das ações negociadas no mercado de capitais brasileiro. Advisor: Prof. doctor Claudio Marquez. 2019. 101 sheets. Master's thesis to obtain the title of Master in Accounting at the Center for Applied Social Sciences at Universidade Estadual de Maringá. Maringá, 2019. Avaiable in: http://repositorio.uem.br:8080/jspui/bitstream/1/6570/1/Joelma%20Cristiane%20Marchi_2019.pdf. Accessed in November 22, 2022.

MARTINS, A. I.; FAMÁ, R. O que revelam os estudos realizados no Brasil sobre política de dividendos? **RAE-Revista De Administração De Empresas**, v. 52, n. 1, p. 24-39, 2012.

MILLER, M.; MODIGLIANI, F. Dividend Policy, Growth, and the Valuation of Shares. **Journal of Business**, n. 34, p. 411-433, 1961.

MOTA, Daniel Camarotto. Dividendos, juros sobre capital próprio e recompra de ações: um estudo empírico sobre a política de distribuição no Brasil. Advisor: Prof. doctor William Eid. 2007. 71 sheets. Master's dissertation presented to the School of Business Administration in São Paulo. Fundação Getúlio Vargas- FGV. São Paulo, 2007. Avaiable in: https://bibliotecadigital.fgv.br/dspace/bitstream/handle/10438/2311/113230.pdf?sequence=2&isAllowed=y. Accessed in November 24, 2022.

MOUTINHO, R. A.; MAGNANI, V. M.; AMBROZINI, M. A. Análise do impacto do fluxo de caixa livre sobre o retorno acionário das companhias de capital aberto no mercado acionário brasileiro. **Revista Mineira de Contabilidade**, v. 20, n. 2, p. 55-69, maio/agosto 2019.

NAGEL, L. M.; AMARAL, H. F. Retornos Anormais das Ações Pós-Pagamento de Dividendos: Um Estudo Empírico no Mercado Brasileiro a partir de 2009. **Revista de Contabilidade e Controladoria**, v.5, n.2, p. 61-73, 2013.

NOVIS NETO, J. A.; SAITO, R. Pagamentos de dividendos e persistência de retornos anormais das ações: evidência do mercado brasileiro. **Revista de Administração da USP**, São Paulo, v.38, n.2, p. 135-143, 2003.

REBOUÇAS, N. A.; ALMENDRA, R. S.; VASCONCELOS, A. C. Políticas de Dividendos em Empresas do Setor Elétrico. **Revista Ambiente Contábil,** v. 10. n. 1, p. 308 – 328, 2018.

ROSS, S. A. The determination of financial structure: the incentive-signalling approach. **Bell Journal of Economics**, n. 8, p. 23-40, 1977.

SANTANA, Luciene. Relação entre Dividend Yield e Retorno das Ações Abordando Aspectos Determinantes da Política de Dividendos. Advisor: Prof. doctor Victor Gomes e Silva. 2006. 82 sheets. Master's dissertation presented to the Graduate Program in Accounting at Fundação Instituto Capixaba de Pesquisas em Contabilidade, Economia e Finanças (FUCAPE). Vitória, 2006. Avaiable in: https://fucape.br/producao-academica-1/relacao-entre-dividend-yield-e-retorno-das-acoes-abordando-aspectos-determinantes-da-politica-de-dividendos-um-estudo-empirico-em-empresas-com-acoes-negociadas-na-bovespa-2/. Accessed in November 23, 2022.

SANTOS, Dayane Pereira. Características Determinantes Para o Pagamento de Dividendos Estatutários Superiores aos Dividendos Obrigatórios: análise nas companhias do setor elétrico em 2019. Advisor: Prof. doctor José Lucio Tozetti Fernandes. 2020. 44 sheets. Master's dissertation presented to the

Department of Accounting and Actuarial Sciences of the Faculty of Economics, Administration, Accounting and Public Policy Management.Universidade de Brasília. Brasília, 2020. Avaiable in: https://bdm.unb.br/handle/10483/24117. Accessed in November 23, 2022.

SILVA, A. M. G.; LAGIOIA, U. C. T.; LEISMANN, E. L.; MIRANDA, L. C.; MACIEL, C. V. Análise da relação entre o preço das ações na bolsa de valores e indicadores contábeis: um estudo aplicado a empresas do setor de energia elétrica. **Revista de Negócios**, v. 14, n. 2, p. 52-70, 2009.

SILVA, A. R. Shareholder Concentration and Dividend Policy in the Brazilian Electricity Sector. **Administração de Empresas em Revista**, v. 3, n 29, p. 131-151, 2022.

SILVA, A. R.; KIRCH, G. Are non-operating profits related to dividend policy of companies in the Brazilian electricity sector? **Administração de Empresas em Revista**, v. 3, n 29, p. 1-14, 2022.

SILVA, A. R.; KIRCH, G. Could increasing dividends predict asset valuations in the Brazilian electricity sector? **Revista UNEMAT de Contabilidade**, v. 10, n. 20, p. 111-122, 2021.

SILVA, A.; KIRCH, G. Efeito clientela no setor elétrico brasileiro e suas possibilidades de arbitragem. **Revista de Administração da UEG**, v. 10, n. 3, p. 7-23, 2019.

SILVA, A.; KIRCH, G. Stock split and groupings in the electricity sector and their influence on traded volume, price and yield. **RAUEG – Revista de Administração da UEG**, v. 11, n. 2, p. 111-129, 2020.

SILVA, Erica Souza; PINTO, Ligiane Muniz; MORAIS, Paula Roberta Costa e Silva; LIMA, Marcus Vinícius Rodrigues. Relação dos Dividendos Distribuídos e Níveis de Governança Corporativa nas Empresas Brasileiras de Energia Elétrica. In.: XV **Congresso USP de Iniciação Científica em Contabilidade**, 2018, São Paulo. Anais... São Paulo: 2018. Avaiable in: https://congressousp.fipecafi.org/anais/18UspInternational/ArtigosDownload/981.pdf. Accessed in November 24, 2022.

TOLMASQUIM, M. T. Perspectivas e planejamento do setor energético no Brasil. **Estudos Avançados, São Paulo**, v. 26, n. 74, p. 249-260, 2011.

VIEIRA, Gabriel Godinho. ALBERTON, Luiz. Qual o retorno obtido pelo acionista ao investir em empresas de capital aberto do setor elétrico no longo prazo? In: **Anais do 10º Congresso UFSC de Controladoria e Finanças**, 2020. Avaiable in: https://repositorio.ufsc.br/bitstream/handle/123456789/217422/Arquivo%20Congresso%20UFSC%20-%20Identificado.pdf?sequence=1&isAllowed=y Accessed in November 22, 2022.

WANG, C. Short-Term and Long-Term Market Inefficiencies and Their Implications, 2004. Available in: https://www.semanticscholar.org/paper/Short-Term-and-Long-Term-Market-Inefficiencies-andWang/e663d51421b277c1c8658fad86ddab581db2fa33#references. Accessed in November 22, 2022.

YAHOO FINANÇAS. Avaiable in: https://br.financas.yahoo.com Accessed in November 14, 2022.