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STOCK SPLIT AND GROUPINGS IN THE ELECTRICITY SECTOR AND THEIR INFLUENCE ON TRADED VOLUME, PRICE AND YIELD

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Abstract

The relationship between the dividend policy and the stock unfolding has been blurred, mainly in the information content of both, volume traded and in prices after the split, being little studied in regulated sectors such as the electricity sector. The purpose of this paper is to demonstrate the influence of the stock unfolding on share prices, dividends and volume traded. Daily data of prices and volume traded, as well as amounts paid for dividends and stock unfolding, were selected from companies in the electricity sector listed on the São Paulo Stock Exchange (BOVESPA). The period covered was from January 1, 2009 to July 20, 2019. The sample was divided into two groups: shares that underwent unfolding at some point and companies where there were no unfolding. Conclusions: 1) the unfolding was related to an increase in the volume traded on the first day after its occurrence. 2) the share turnover of the unfolding shares was higher on the first day and in the third month after the unfolding. 3) the price of unfolding shares increased in relation to the control group in the first week after unfolding. 4) the unfolding did not influence the yield in the first 3 years after its occurrence.

Keywords: Dividends. Share splits. Electric Utilities.

DESDOBRAMENTO E AGRUPAMENTOS DE AÇÕES NO SETOR ELÉTRICO E SUA INFLUÊNCIA NO VOLUME NEGOCIADO, COTAÇÃO E YIELD

Resumo

A relação entre a política de dividendos e o desdobramento de ações tem se mostrada nebulosa, principalmente no conteúdo informacional de ambas, no volume negociado e nas cotações após desdobramento, sendo pouco estudado em setores regulados como o setor elétrico. O objetivo deste trabalho é mostrar a influência dos desdobramentos de ações sobre seu preço, dividendos e volume negociado. Foram selecionados, de empresas do setor elétrico listadas na Bolsa de Valores de São Paulo (BOVESPA), dados diários de cotação e volume negociado, bem como dos valores pagos de dividendos e de desdobramentos de ações. O período coberto foi de 01 de janeiro de 2009 a 20 de julho de 2019. Dividiu-se a amostra em dois grupos: ações que sofreram desdobramento em algum momento e empresas onde não ocorreram desdobramentos. Conclusões: 1) o desdobramento esteve relacionado com o aumento do volume negociado no primeiro dia após sua ocorrência; 2) o *turnover* de negociação de ações desdobradas foi maior no primeiro dia e no terceiro mês após o desdobramento; 3) a cotação de ações desdobradas aumentou em relação ao grupo de controle na primeira semana após o desdobramento; e, 4) o desdobramento não trouxe influência sobre o *yield* nos 3 primeiros anos após a sua ocorrência.

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Palavras-Chave: Dividendos. Desdobramentos de ações. Setor elétrico.

1 THE BRAZILIAN ELECTRICITY SECTOR

Firms from the Brazilian electricity sector, unlike other sectors, have their own characteristics that put them in a separate group, distinct from conventional economic theory. Because they are public utility companies (utilities), they operate from public concessions (hence also the term "concessionaires"). Despite its form of operation, which varies from electricity generation to transmission and distribution, its service is subject to regulatory agencies that, in addition to inspecting the quality of service provision, define the pricing of the fees charged. Silva and Kirch (2019), when comparing the shares of the electricity system with those belonging to the Bovespa index, demonstrated that the shares of the electricity system are more likely to generate increases in share prices above 2% than those of the Bovespa index group, after payment of dividends, showing its own behavior, different from other sectors.

Inserted on the Brazilian Stock Exchange, the electricity sector has its own index (IEE), composed of 20 companies, in addition to being part of the main index (IBOVESPA), through 3 companies with a weight of 2.23% of the index. It also has a relevant influence on the dividend index (IDIV) with 7 companies, making up 27.36% of the total (B3.com.br).

There are few studies in Brazil on stock splits (AMORIM, 2017), and no study on stock splits in the Brazilian electricity sector was found in the bibliographic review. Furthermore, studies on this phenomenon have not been found in the international literature in the electricity sector and in public service concessionaires.

Companies in the electricity sector are characterized by paying high dividends (BRIGHMAN *et al.*, 2001), in some cases with a payout of more than 100%, a fact also presented in companies belonging to Brazilian electricity sector (RODRIGUES *et al.*, 2016, SILVA, 2019a). High profitability, associated with low profit volatility, according to Myers (1984), also ends up serving as a motivation for paying high dividends. Rebouças *et al.* (2018), demonstrated that firms in the Brazilian electricity sector, with higher cash flow, distribute a larger portion of the profit in the form of dividends, corroborating the precepts of the Theory of the Bird in the Hand (LINTNER, 1956; GORDON, 1959). In these circumstances, and according to Assaf Neto and Lima (2010), a greater current distribution of dividends reduces investor uncertainty; that is, even though the dividends represent a smaller profit distribution, when compared to an eventual future gain, the shareholders prefer to take them, resulting in possible variations in the company's risk level.

Silva (2019b), studying the dividend policy of the Brazilian electricity system, during the period from 1994 to 2007, showed that the dividend distribution is detached from investments. Companies, especially the larger ones, that have greater access to credit, often subsidized, can afford this greater payment of dividends. This greater payment of dividends, in turn, could be used as a sign of the company's good functioning (Signaling Effect).

The events that occur in the stock markets, related to stock splits and reverse stock splits or inplits of shares, are topics commonly discussed by experts who have tried to find evidence that

allows the convergence between theories and real data. There is currently no consensus on the possible implications of these events for shareholders' wealth. Whether these effects are positive or negative, this theme seems to arouse a lot of curiosity, in addition to some criticisms about companies that adopt strategies based on developments and groups (AMORIM, 2017). In theory, the stock split does not affect a company's added market value. However, companies generally split their shares to keep the price in the desired trading range and, perhaps, to make the stock more accessible to individual investors (SMITH, 2019).

The relationship between the dividend policy and the stock split, therefore, has been fuzzy, mainly in the information content of both and its influence on the volume traded and on the prices after the split (GRINBLATT *et al.*, 1984; MCNICHOLS; DRAVID, 1990).

Thus, based on the above, the following study hypotheses were formulated:

Hypothesis 1: companies that split/group shares create greater liquidity, that is, they increase the volume of shares traded.

Hypothesis 2: the greater liquidity resulting from the greater volume traded increases the prices.

Hypothesis 3: The increase in prices, with the other parameters constant, decreases the yield.

The purpose of this paper is to show the influence of the stock unfolding on share prices, dividends and volume traded. This article is divided, in addition to the introductory section, into the theoretical framework, in methodology presented in the next section, followed by the results and discussion, as well as the final considerations and references.

2 THEORETICAL FRAMEWORK

2.1 Theories of stock split

2.1.1 Hypothesis of transaction costs and desired trading range

Although the administrative costs of dividing a stock are significant (MCGOUGH, 1993), company managers often report that they like to have their shares traded in a usual range and then sell their shares when the price rises well above that desired range (BAKER; GALLAGHER, 1980; BAKER; POWELL, 1992). Lakonishok and Lev (1987) found that stock prices for firms that promote their stock splits frequently rise above the stock prices of firms that do not promote their stock splits. Consistent with this perception of a desired trading range, they also find that the split indices that companies choose are related to the distance that a company's stock price differs from comparable stock prices.

In theory, the stock split does not affect a company's added market value. However, companies generally split their shares to keep the price in the desired trading range and, perhaps, to make the stock more accessible to individual investors (SMITH, 2019). An alternative justification for a desired trading range is that if a company allows its price to rise, some investors will not be able to buy the shares. Periodic divisions that keep the price per share in a desirable trading range keep the shares accessible to ordinary investors, expanding the shareholder base and increasing liquidity, which benefits all shareholders.

In Brazil, there is the figure of book-entry shares, which do not require the issuance of certificates, making the costs for carrying out stock splits and stock dividends very low, when compared to the countries whose printing of certificates is mandatory (VIEIRA; PROCIANOY, 2003). Nor is there, in Brazil, the figure of the minimum price variation - tick size - directly interfering in the price of the security on the Brazilian stock exchanges, as verified by Angel (1997) for the North American ones. The model of Brennan and Hugles (1991) is also weakened, as in developing countries the market is represented mainly by institutional investors and they have access to other forms of information about companies, in addition to contact with brokers.

2.1.2 Signaling hypothesis

Some researchers believe that managers with favorable information carry out actions to signal good news. Brennan and Hughes (1991), Ikenberry *et al.* (1996), Ikenberry and Ramnath (2002) and Hwang *et al.* (2008), found supporting evidence for the information hypothesis. More evidence in support of signaling comes from operational performance and abnormal stock returns. Other researchers believe that the stock split does not signal any information and is a bad vehicle for transmitting new information. They argue that the stock split can be designed only to improve the tradability of the split shares or because the post-split price meets certain specific investor preferences (see LAKONISHOK; LEV, 1987; DYL; ELLIOTT, 2006 for the range hypothesis) or because divisions provide other market participants, such as market makers, more incentives to promote stocks (see ANGEL, 1997 and SCHULTZ, 2000, for the ideal tick size hypothesis; and KADAPAKKAM *et al.*, 2005, for the broker promotion hypothesis).

In contrast to the existing evidence, Chen *et al.* (2011), demonstrated that stock splits are followed by an abnormally positive growth in future earnings, suggesting that stock splits contain information about future, not past, operational performance. The authors suggest that some developments contain positive information about future performance and that sophisticated market participants, such as institutional investors, are able to select these developments.

The signaling hypothesis is not necessarily a reason for the division of a share, but rather an explanation of why a share's price may rise after a split. Smith (2019) exemplifies in a practical way, by showing that if the price of a share rises to $ 80 and the company declares a split two by one, reducing the price back to $ 40, the division signals investors that the board of directors is confident that the hike was justified, and not unreasonable speculation that when it ends, it will bring the price down to less than $ 20, where smaller shares are traded.

Signaling also explains why reverse divisions are rare. If the stock price falls below $ 20, the company can divide 1 by 2 which halves the number of shares and doubles the value. However, the use of this tactic can be interpreted as a harmful admission by the company's board that the company's prospects are not clear enough to increase the price in a predictable manner without a reverse split (SMITH, 2019).

Lakonishok and Lev (1987) found that companies that share their shares tend to grow above average earnings before divisions and, to a lesser extent, after divisions. However, studies have been inconclusive on the effects of share splits on shareholder returns and, when there are effects, whether they are due to accessibility or signaling. Several authors concluded that the

return on shares tends to be abnormally positive after a division announcement and, to a lesser extent, after the ex-division date (GRINBLATT *et al.*, 1984; IKENBERRY *et al.*, 1996; DESAI; JAIN, 1997) and negative after the announcement of a reverse division (WOOLRIDGE; CHAMBERS, 1983; DESAI; JAIN, 1997; KIM *et al.*, 2008). On the other hand, Aggarwal and Chen (1989) found greater variability in stock returns after split announcements, but no increase in average returns. Byun and Rozeff (2003) and Boehme and Danielsen (2007) also concluded that there are no persistent abnormal returns after divisions.

2.1.3 Hypothesis of neglected company and liquidity

There is ample empirical evidence that, in the USA, the stock split is associated with abnormal positive returns around the announcement and on the day of execution, in addition to an increase in variation after the former day (CHRISTIAN, 1999). Since the stock split appears to be purely cosmetic corporate events, these results are intriguing. Several hypotheses have been put forward to explain the market's reaction on the day of the announcement. Of these, the signaling hypothesis (ASQUITH *et al.*, 1989; ANKINE; STICE, 1997) and the liquidity hypothesis (BAKER; POWELL, 1993; MUSCARELLA; VETSUYPENS, 1996) received more attention, although the empirical evidence for the latter be mixed. In addition, several studies find that the neglected company hypothesis also provides some explanatory power (GRINBLATT *et al.*, 1984, ARBEL; SWANSON, 1993; RANKINE; STICE, 1997).

Neglected company hypothesis: with regard to their preferences, institutional fund managers may not want to take the greatest risk perceived to be associated with small businesses. They are expected to follow a prudent investment policy, which often means doing what everyone else does. In addition, many institutions require that an investment produce dividend income, and few small companies do so (CARVELL; STREBEL, 1983).

Liquidity hypothesis: Despite the common notion that stock divisions improve liquidity, Copeland (1979), Lamoureux and Poon (1987) and Conroy, Harris and Benet (1990) report that trading liquidity decreases after a stock split. These studies measure liquidity using proportional trading volume and percentage buy and sell spreads. On the other hand, Murray (1985) finds no evidence that stock splits have a significant adverse impact on the proportional trading volume or the percentage of buy and sell spreads. In addition, Lakonishok and Lev (1987) report that spin-offs do not appear to have a permanent effect on turnover. However, there is empirical evidence that trading liquidity improves after a split involves increases in share ownership and in the number of transactions (BAKER; POWELL, 1993). Several studies (DOLLEY, 1933; BARKER, 1956; LAMOUREUX; POON, 1987) report that the number of shareholders increases after a split. This evidence suggests that the stock split increases the number of shareholders, lowering the share price to a more popular range. Therefore, liquidity increases because more people are buying or selling the shares. Lamoureux and Poon (1987) reported an increase in the number of daily post-division transactions, which can also increase trading liquidity.

Even so, the unfavorable evidence of the liquidity hypothesis does not necessarily mean that there is no link between book value and liquidity. Recent work by Dennis and Strickland (1998) suggests that it is not liquidity itself, but conditioned to changes in institutional ownership around stock splits, which explains abnormal ad returns.

2.1.4 The behavioral hypothesis

According to Weld *et al.* (2009), US stock prices have remained constant at around $ 35 in nominal terms since the Great Depression, while the overall price level in the US economy has increased more than tenfold. These constant stock prices are not a coincidence, but are the result of a proactive effort by companies that share their shares. This pattern cannot be explained by standard explanations for stock splits, such as restrictions on negotiability and investor budgets, nor by "pay to play" considerations, such as buy and sell spreads and brokerage fees, or by signaling. The choice of the average price of companies and mutual funds in the United States remained stable in the face of changes in tick size, investor composition, trading costs, inflation, real wealth and market returns. The authors conclude that nominal stock prices are an enigma when viewed through conventional lenses.

Companies follow rules when determining their "ideal" trading range. Specifically, keeping stock prices in the same range for 70 years is the result of companies that follow traditions and standards that have evolved over time (WELD *et al.*, 2009). Tradition can also explain other aspects of corporate behavior (AKERLOF, 2007; CRONQVIST *et al.*, 2009; BEN-DAVID *et al.*, 2007).

Adhering to the standard and actively maintaining nominal stock prices in a narrow range through splits is expensive. Based on discussions with lawyers and bankers who were involved in these transactions, Smith (2019) estimates that the direct administrative costs of the developments range from $ 250,000 to $ 800,000 for large companies, similar to the estimate offered by Ryser (1996).

Given the economic consequences for investors, why do companies proactively keep their share prices in a nominally narrow range? Waërneryd (1994) suggests norms as a potential explanation. The role of norms in the economy was established as a mechanism to coordinate actions in environments where there are multiple balances.

Vieira and Procianoy (2003), studied the shares of public companies traded on BOVESPA that announced and executed stock splits and / or stock dividends from January 1987 to May 1997, totaling 685 events[3]. Its results suggest that, as measured by the volume of securities, liquidity is less after the split is carried out. The behavior of turnover, in turn, differs from the behavior of other variables. In all test periods, the average pre-split turnover is lower than the average after the split. And yet, it is clear that as the number of days after the split increases, the average turnover increases; that is, investors start to do more business with the shares that performed splits.

Such results suggest that the split provides an increase in the amount of business; but as there is a decrease in the number of shares involved in each trade, the financial volume traded does not reach the same proportions prior to the split. In addition, the results reveal that, based on publicly available information, investors achieved higher than expected returns, contrary to what would be expected, which suggests a market inefficiency, in the semi-strong form. It can be conjectured that, despite being publicly advised, not all investors would be aware of the new share

[3] In this paper there is a note on energy sector: For the stock splits the banking sector is again the leader with seven different shares, followed by the 6 shares of energy companies.

value after the event, thus allowing well-informed investors to obtain extra returns. For administrators, only the notion of prices and the volatility of returns are relevant to the definition of the split factor (VIEIRA; BECKER, 2011).

Antônio *et al.*, (2018), from a database of 11,317 events using the methodology of the study of events with a 15-day window pre and post event, based on Bootstrap (statistical technique that performs simulations to verify which is the best distribution in which the sample fits), showed that the event that was able to influence positively the market was the disclosure of stock splits, since on the day of the event the average abnormal return of the shares was 1.96%, also considering a 95% confidence interval, results in line with what was previously pointed out by Lamoureux and Poon (1987) and Xiao-Xuan (2003). Splits usually lead to greater liquidity for shares in the market with a reduction in the prices of these papers. In addition, despite the fact that the groups of shares do not present abnormal statistically significant returns, it can be graphically inferred that the return on shares around this event follows a downward trend, indicating a negative signal to the market.

Leite (1994), based on data from the São Paulo Stock Exchange, concluded that the hypothesis whose part of investors may have, in relation to splits, some kind of "monetary illusion", making them feel "richer" because they would have more shares, in a behavior as according to classic texts, would be totally irrational. The alternative hypothesis to irrationality may be, necessarily, the existence of informational content in the bonuses. The split would have intrinsic value in itself, or some "embedded value" would be admitted in this split, or investors will be in fact irrational in valuing what does not exist. Unquestionably, there is a flagrant inefficiency within the semi-strong concept: the market reacts positively to an event that, in addition to being publicly known, has been expected for some time. The inefficiency transcends the hypothesis of irrationality: even if the existence of informational content in the split is considered, its prices should react promptly, as soon as its announcement was made, which did not happen as according to Leite (1994) study.

Reverse Stock Splits

Although reverse stock splits (henceforth grouping) decrease the number of shares, existing shareholders still retain the same proportional investment in the company (MICHAYLUK, 2009). In an early study, Woolridge and Chambers (1983) report significantly negative abnormal returns over the announcement period for grouping. Although Peterson and Peterson (1992) find overall negative abnormal returns, they document some positive wealth effects for those companies forced to undergo a grouping. The researchers offer several reasons for managers choosing to have their company stock undergo grouping. Common explanations include complying with different listing and institutional rules, reducing transaction costs and increasing liquidity, allowing stock marginability, signaling, and removing costly small stockholders (MICHAYLUK, 2009).

3 METHODOLOGY

From the yahoo finance website, in the electricity sector firms listed on the São Paulo Stock Exchange (BOVESPA) were selected their daily prices and trading volume data, as well as the amounts paid for dividends and stock unfolding. Both stock split and grouping were placed within a single group, given the low number of occurrences of both (thus the term "unfolding" was used as a common term. The time covered was from January 1, 2009 to July 20, 2019. The sample was divided into two groups: shares that underwent unfolding at some point and companies in which there were no unfolding.

The groups were paired according to the share unfolding (henceforth split or grouping) date. Thus, for example, for a stock split occurring on date X, all shares of companies belonging to the non-split group were paired, as a control group. Searching for stationarity, the variation between different periods was evaluated. In this way, the data of traded volume, turnover of traded shares and price on date 0, day 1[4], week 1, 1 month, 3 months, 6 months and 1 year after the split or grouping date were plotted. Turnover was measured using the following formula: value traded on the day divided by the product of the share price by the number of shares outstanding. Likewise, yield data were plotted in the year prior to the split or grouping and in year 1, 2 and 3 after the split or grouping. Given the great variability of share value between different companies and within themselves during the period evaluated, it was decided to normalize the values of date 0 and yield of the year prior to the unfolding by the index 100. This approach made possible decrease the standard error, and consequently the statistical analysis more sensitive.

The statistical test used was the Student's paired t-test, with a p-value set at 0.1. Simple linear regression was also performed between traded volume (as an independent variable) and share price (as a dependent variable), between stock turnover (as an independent variable) and share price (as a dependent variable) and between share price (as a dependent variable) and yield (as a variable independent).

4 RESULTS AND DISCUSSION

Seventeen electricity sector companies listed on the Bovespa from January 1, 2009 to July 20, 2019 were selected. During this period, 10 splits or groupings of shares occurred. Two of them were removed from the analysis: one for being at the final end of data collection (April 2019) and another for being a case of dividend stocks[5] (**Table 1**). Four unfoldings occurred within the same company (Cmig4). Two cases were of share grouping, while the others were of share split.

However, there was no uniform distribution of the split / groupings of stocks: while in 2016 there were 3 events, in another 5 years they did not. There was a preponderance of occurrences in the 2nd quarter (60% of the cases) and 7 of the 10 stock splits / groupings were in the first half of the month.

[4] If the corresponding date in any of the studied times coincided with a holiday or weekend, the following day was adopted.

[5] The difference of both in accounting is that dividends stocks is a increase of less than 25% in the number of shares.

Table 1: Splits / Groupings		
Stock	Split/grouping date	Characteristic
Cmig4	27/12/13	100/130
Cmig4 *	02/05/13	100/112
Cmig4	30/04/12	100/125
Cmig4	30/04/10	1/1
Eeel3	15/06/16	40/1
Egie3	12/12/18	4/5
Enbr3	11/04/12	1/3
Tiet4	04/01/16	1/5
Cbee3	15/01/16	40/1
Trpl4**	05/04/19	1/4

Font: Research Data (2020)

* excluded from analysis due to be a case of stock dividend

** excluded from the analysis because it is at the end of the sample

Table 2 compares the groups in relation to the volume traded (in Reais) in six different periods. There was a statistically significant difference on the first day after the split, with an increase in the trading volume of the split shares, which is in line with hypothesis 1, and also in line with the results of Antônio *et al.*, (2018), who registered greater liquidity. However, these results go in the opposite direction to the works of Copeland (1979), Lamoureux and Poon (1987), Vieira and Procianoy (2003) and Conroy *et al.*, (1990) who reported that the liquidity of the negotiations decreases after a stock split. It was also found that the split/grouping led to an increase in the dispersion of values, according to Anshuman and Kalay (2002). Contrary to the results of Vieira and Procianoy (2003), the volume of trade did not increase over the longest distance after the split date.

Table 2: Traded Volume of split / grouped vs. non-split shares		
	Unfolded / grouped shares (mean ± standard error) in relation to day 0 (value = 100)	P value in relation to controls (day 0)
Day 1	135±30	0,23
Week 1	162±18	0,001*
Month 1	165±28	0,02*
Month 3	127±26	0,29
Month 6	148±21	0,025*
Year 1	138±18	0,03*
	Unfolded / grouped actions (mean ± standard error) in relation to day 0 (value = 100)	P value in relation to Shares not split / grouped on the equivalent day
Day 1	458±341	0,02*
Week 1	293±149	0,107
Month 1	82±16	0,43
Month 3	155±91	0,78

Month 6	80±15	0,39
Year 1	226±72	0,25

Font: Research Data (2020)
* Statistical significance.

Table 3 compares the groups in relation to share turnover in six different periods. There was a statistically significant difference on the first day after the split/grouping, where there was an increase in the traded volume of the split/grouping shares, which is in accordance with hypothesis 1 and in opposition to the authors mentioned in the previous paragraph (COPELAND, 1979; LAMOUREUX; POON, 1987; CONROY, HARRIS; BENET, 1990), in addition to also showing greater dispersion of data, as previously demonstrated. This finding also could demonstrate the informational content of the unfolding, in according to Brennan and Hughes (1991), Ikenberry *et al.* (1996), Ikenberry and Ramnath (2002) and Hwang *et al.* (2008) and diverging the results of Leite (1994).

Table 3: Unfolded / Grouped vs. Unfolded shares Trading Turnover

	Unfolded / grouped shares (mean ± standard error) in relation to day 0 (value = 100)	P value in relation to controls (day 0)
Day 1	121±32,1	0,5
Week 1	146±20,6	0,02*
Month 1	145±18,6	0,106
Month 3	98,5±24,4	0,95
Month 6	121±20,9	0,3
Year 1	127±36,5	0,41
	Unfolded / grouped actions (mean ± standard error) in relation to day 0 (value = 100)	P value in relation to Shares not split / grouped on the equivalent day
Day 1	356±292	0,08*
Week 1	237±141	0,24
Month 1	72,7±18,67	0,44
Month 3	116,4±76,1	0,82
Month 6	67,13±24	0,40
Year 1	158,9±61,7	0,78

Font: Research Data (2020)
* Statistical significance.

Table 4 compares the groups in relation to the stock prices in six different periods. There was a statistically significant difference only in the first week after the split, where there was an increase in the price of the split / grouping shares in relation to the non-split shares, being in accordance with hypothesis 2. On the other hand, the maintenance of the similarity between the price variations between the groups in the other periods show that the signs of future growth demonstrated by the split are not confirmed, unlike several authors (GRINBLATT *et al.*, 1984;

IKENBERRY *et al.*, 1996; DESAI; JAIN, 1997), but in agreement with Aggarwal and Chen (1989), who found greater variability in stock returns after split announcements, but no increase in average returns. Byun and Rozeff (2003) and Boehme and Danielsen (2007) also concluded that there are no persistent abnormal returns after divisions.

Table 4: Price of unfolded / grouped vs. non-unfolded / grouped shares

	Unfolded / grouped shares (mean ± standard error) in relation to day 0 (value = 100)	P value in relation to controls (day 0)
Day 1	99±0,27	0,02*
Week 1	98±0,53	0,008*
Month 1	102±1,46	0,07*
Month 3	109±2,09	< 0,00001*
Month 6	111±3,63	0,0027*
Year 1	117±5,87	0,003*
	Unfolded / grouped actions (mean ± standard error) in relation to day 0 (value = 100)	P value in relation to Shares not split / grouped on the equivalent day
Day 1	99±0,72	0,75
Week 1	106±11,6	0,02*
Month 1	103±6,05	0,87
Month 3	108±7,93	0,84
Month 6	117±18,3	0,61
Year 1	128±30,38	0,61

Font: Research Data (2020)
* Statistical significance.

No statistically significant differences were found between the yield of the unfolded and non-unfolded shares, despite the yield of the shares of the first two years being lower in the group of unfolded shares (**Table 5**), which contradicts hypothesis 3.

It is observed that, despite the yield of undisclosed shares being twice (or close to double) the controls, these differences were not statistically significant. This is due both to the high variability of the data, demonstrated in the standard errors. In spite of this, the absence of evidence of differences in yield between groups goes against the signaling hypothesis, as seen with Lakonishok and Lev (1987).

Within the group of split / grouped shares, no statistically significant differences were found in relation to yield in years 1, 2 and 3 in relation to year 0 (results not shown). This non-significance may be due to small sample. As an example, in year 3 there were only 3 data to be compared with the 8 cases in year 0.

Table 5: Yield of unfolded / grouped shares vs. non-unfolded		
	Unfolded shares (mean ± standard error) in relation to year 0 (value = 100)	P value in relation to controls (year 0)
Year 1	222±57	0,03*
Year 2	199±66	0,13
Year 3	177±55	0,13
	Shares split / grouped (mean ± standard error) in relation to year 0 (value = 100)	P value in relation to Shares not split / grouped in the equivalent year
Year 1	85±46	0,36
Year 2	87±32	0,56
Year 3	165±158	0,94

Font: Research Data (2020)
* Statistical significance.

In order to correlate traded volume with stock price and stock price with yield, linear regression was performed within the groups of shares unfolded and not unfolded in year 1 post-split / grouping. However, no statistically significant correlation was found (**Tables 6 and 7**).

Table 6- Linear Regression in year 1 of shares split / grouped		
	Split / grouped stocks	statistical significance
Dependent variable (y)	price	NS
Independent variable (x)	Stocks Trading volume	NS
Line equation	Y = -0,083 + 0,06x	
Determination coefficient (R^2)	0,235	
Correlation coefficient (R)	0,48	
Dependent variable (y)	price	NS
Independent variable (x)	Stocks trading turnover	NS
Line equation	y = 1201,8x + 33,448	
Determination coefficient (R^2)	0,0983	
Correlation coefficient (R)	0,31	
Dependent variable (y)	Yield	NS

Independent variable (x)	price	NS
Line equation	Y = 0,006 + 1,295x	
Determination coefficient (R^2)	0,048	
Correlation coefficient (R)	0,22	

Font: Research Data (2020)
NS: absence of statistical significance

Table 7- Linear regression in year 1 of shares not split / grouped

	Not Split / grouped actions	statistical significance
Dependent variable (y)	price	NS
Independent variable (x)	Stocks Trading volume	NS
Line equation	Y = 0,22 - 0,057x	
Determination coefficient (R^2)	0,034	
Correlation coefficient (R)	0,18	
Dependent variable (y)	price	NS
Independent variable (x)	Stocks trading turnover	NS
Line equation	y = 25,194x + 23,516	
Determination coefficient (R^2)	0,0197	
Correlation coefficient (R)	0,14	
Dependent variable (y)	Yield	NS
Independent variable (x)	price	NS
Line equation	Y = 0,24 - 0,93x	
Determination coefficient (R^2)	0,0013	
Correlation coefficient (R)	0,03	

Font: Research Data (2020)
NS: absence of statistical significance

5 CONCLUSIONS

Despite the vast literature that supports the different assumptions adopted about the stock split, it was not possible to find studies on specific sectors within the stock market. Therefore, it would be questioned how different sectors would make use of this resource. In addition, there are few studies in Brazil on the subject: in this study five works are mentioned and, like their international peers, without sector analysis, just mentioning the discrimination among sectors when describing the sample (VIEIRA; PROCIANOY, 2003).

This work, in turn, has an unprecedented character in dealing with the unfolding of shares in Brazil on a specific sector (the electricity sector). Despite the small sample, some important correlations were demonstrated, which contributes to a better discussion on the theories of split and reverse split shares, such as the liquidity hypothesis. A limitation of the study is also in the fact that both stock splits and grouping have been put together for analysis, given the low number of occurrences of both which difficult of analyzing them separately.

It was not the aim of this work, nor was it possible to resolve the issue of multiple theories on stock splits. However, some conclusions can be drawn:

First: the split/grouping was related to an increase in the volume traded on the first day after its occurrence, which could demonstrate the informational content.

Second, the share turnover for split/grouping shares was higher on the first day and in the third month after the unfolding.

Third: the price of unfolded shares increased in relation to the control group in the first week after split/grouping.

Fourth: no significant relationship was found in the linear regression between the share price and its respective volume and share trading turnover in any of the groups.

Fifth: the split did not influence the yield in the first 3 years after the split. The level of yield between the groups (unfolded and unfolded) was not statistically different.

Sixth: linear regression did not demonstrated statistical correlation between yield and stock prices.

Additional studies are necessary for a better understanding of the phenomenon of share splits and groupings, whether working with other sectors of the economy, or with larger samples.

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