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The Impact of Dividend Payments on Stock Price: Empirical Evidence From Companies Listed on the Brazilian Stock Exchange

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Abstract

This paper studies the impact of the dividend distribution policy on the valuation of stocks listed on Ibovespa (B3), the main Brazilian stock index. The results of an empirical analysis of the behavior of asset prices are presented for periods from 1 to 90 days after the dividend payment date, ex-dividend date, about the expected normal returns for the period. The sample, consisting of 40 events, includes stocks that paid dividends in 2018 and without overlapping events in the 90 days before or after the ex-date. A direct relationship was found between the dividend yield and the abnormal return accumulated after the payment of dividends, high dividend yield, intermediate dividend yield, and low dividend yield. Our results are useful for the financial literature by bringing empirical evidence to Brazil, as well as for the decision-making of equity investors.

Keywords: Stock market, Dividend, Ibovespa, Brazilian market, Dividend yield

1. Introduction

The interest rate of the Brazilian economy has been showing persistent declines in recent years. It reversed an upward cycle that lasted until the end of 2016, reaching 14.25% per year, and reaching 2% per year in mid-2020. This drop in interest rates follows the downward trajectory of inflation, which was below from the center of the target since 2017, which may reflect the recession in the period from 2014 to 2016, the weak recovery in the following years and the economic crisis caused by the coronavirus.

Low confidence in the economy makes families undertake less and reduce their spending in line with lower expectations of an improvement in the macroeconomic scenario. On the other hand, the drop in interest rates took away part of the attractiveness of fixed-income investments. These factors led the investor to look for options with better chances of gains over time.

A large part of this flow of investors and - consequently - values, was directed to the stock market. According to information from B3, the company responsible for the stock exchange in Brazil, in 2019 alone the number of individual investors went from 813,291 to 1,681,033. This increase is 106.70% compared to 2018 numbers and the numbers are even more impressive if we consider that the average annual entrants in the previous 10 years had not exceeded 5% per year.

When we refer to the stock market, we naturally need to consider dividends. Dividend, in the capital market, refers to the portion of the profit that a company intends to be divided among its owners. It is the remuneration of the capital employed in financing the company's activities by its shareholders. In the same way that this capital is divided into quotas, or stocks, its remuneration is distributed to the quota holders according to this division.

Wolffenbüttel (2006) explains that the term dividend derives from the verb to divide, it names the division of a company's profits among its shareholders, after deductions for income tax and social contribution. This concept condenses similarly to what Brazilian legislation defines on the subject. The main national regulation that cites dividends, the so-called Lei das S.A. of 1976, it regulated corporations, with their capital divided into stocks. The same instituted dividends in Brazil by imposing that such companies must distribute as dividends at least 25% of net income for the year and that dividends must appear in the Statement of Retained Earnings or Losses.

However, the concern with dividend policy is not exclusive to the legislator. In an extremely competitive market, such as the stock market, investors and financial managers seek to capture and interpret the signals that a company's dividend policy can transmit to the market. In this context, it is important to verify whether the payment of higher dividends represents a greater attraction than the appreciation of the stocks sold. In a perfect market, the payment of dividends should be irrelevant to the investor, since the gains received in such a portion are immediately subtracted from the value of the stock (Miller and Modigliani, 1961). But even in Miller and Modigliani (1961), the possibility of impacts from market imperfections is highlighted, in which for the dividend policy what is important is not the imperfection itself, but only the imperfection that can lead an investor to have a preference between one dollar of current dividends and one dollar of current capital gains.

Since Miller and Modigliani (1961), in what is considered the main work on dividend policy, concluded that it is irrelevant in the valuation of stocks, several studies have sought to oppose this point, or to find exceptions to the established rule. In a previous study, Gordon (1959) argues that the stock price is not immune to dividend payments. In a later article, Gordon (1963) criticizes the tone of the work of Miller and Modigliani (1961), who would have declared that there were no grounds for questioning their conclusions.

In line with Gordon (1959), Bodenhorn (1959) proposes his model, where a firm could choose how to focus its efforts, paying dividends or not, and thus influence the perception of value that the company generates. Each of these factors, when the focus of management, would generate results in the value of the company. Theory corroborated by Gordon (1962), where the stock price would derive directly from a relationship between the current dividend, future earnings, and investments.

The literature is varied, but the relevance of dividends to stock price volatility can be tested in a particular market. The hypothesis raised by Miller and Modigliani (1961) lies in raising market imperfections that could affect the relationship between dividends and stocks. Considering the clientele effect, where a corporation would attract the preference of a particular investor with a specific rate of earnings, being able to form according to its particular characteristics, Graham and Kumar (2006), argue that investors with tax exemptions can infer incentives to opt by stocks with payment of dividends, a fact that suits the tax context of the Brazilian market.

The appreciation of dividend payments, and the high Dividend Yield (DY) would corroborate the argument that corporations can influence their stock prices simply by modifying their payout policies, and would confirm the theory of the bird in the hand of Graham and Dodd. (1951), in which an investor would tend to prefer to be remunerated immediately than to have this capital integrated into his equity within his quotas.

For the Brazilian stock market, what would be the impact of distributing a company's profits through dividends on the value of stocks and, consequently, on the market value of a company? And, above all, what should be the behavior of financial managers in a market where distribution is not irrelevant?

The answers to these questions will verify the existence of a relevant correlation between the payment of dividends and the price of stocks, whether due to clientele effect or the bird-in-hand theorem, or if the Miller Modigliani theorem is proven in the Brazilian market in the period in which study.

Thus, the present work seeks to identify this possible relationship between the effective return of stocks of companies listed on the Ibovespa and their dividend distribution policies. Data from 2018 are observed, for companies that remained in the index in the years immediately before and after 2018, and the evolution of any abnormal return in the period of 90 days, the maximum period defined by law for the effective payment of dividends.

The Ibovespa, B3's main stock index and which brings together the most important companies in the Brazilian market, was chosen because it represents a wide variety of assets and has sufficient scope to represent the market as a whole, in addition to ensuring that companies have sufficient levels of controls so that the data obtained are reliable.

With the vast contingent of new investors and the growth of the Brazilian stock market in the last decade described, we replicate the inferences of Bhattacharya (1979), where investors have imperfect information about the profitability of companies, and Ross (1977), in which the privileged information of managers and dividends can act as a signal of capital flows, demonstrating relevance in the valuation of assets and the company's payout policy.

It is worth mentioning that in an expanding market, access to information from ample, reliable and unbiased sources works towards mitigating the risks of asymmetric information and is essential for the process of solidifying the elevation of trust levels of individuals and institutions. This relevance is corroborated by Moreiras, Tambosi, and Garcia (2011) who emphasize the role of transparency to mitigate speculative effects in papers that distribute profit to shareholders in the form of dividends.

The results indicate that the payment of high dividends by companies has a positive association with abnormal returns on their stocks and are important for the financial literature to bring empirical evidence about the assets traded on the Brazilian stock exchange, as well as to help the population in general in their investment decisions.

In addition to this introduction, the work has four more sections. The theoretical framework is present in section two, presenting the theoretical bases that approach the theme, subjects of correlated scope or methodologically relevant. In section three, the methodological procedures are described, detailing the data and the method used. Section four presents the results and interpretation of the data obtained after processing the information and, finally, section five concludes.

2. Theoretical Reference

The dividend irrelevance theory introduced by Miller and Modigliani (1961) in their seminal work when discussing dividends, “Dividend Policy, Growth, and the Valuation of Stocks”, is included in any relevant study that seeks to ascertain the relationships between payout policies, the performance of managers, value of stocks or market companies.

The work indicates that, in a perfect market, dividends do not impact the valuation of a company and that dividends are also irrelevant to investors when choosing how to invest. That there is no preference for receiving dividends or capital growth. The value of companies would be more linked to their investment policy and not to the distribution of profits. The investor who needed an increase in his cash flow should sell his stocks, not necessarily expect dividend payments to do so.

In their 1961 work, Miller and Modigliani point out that a market with asymmetric information problems can produce deviations in results from those recommended by their theorem. Later studies by Black and Scholes (1974) and Miller and Scholes (1982) corroborate the theory of dividend irrelevance, but likewise rely on the existence of a perfect market, without transaction costs, with perfect transparency and information symmetry.

Deangelo and Deangelo (2006) criticize the way Miller and Modigliani (1961) suggest that companies would retain no part of profits and their investment policies would reapply all undistributed profit. The authors claim that this more realistic approach to corporate

investment policies shows that other factors, including dividends, can influence the valuation of companies and the value of stocks.

Also strongly present in the literature that discusses the importance of dividend payments, the bird in the hand theory derives from the popular saying "A bird in the hand is worth two in the bush". This theory began with Gordon (1960) with his work "Security and a Financial Theory of Investment" and was corroborated and complemented by Lintner (1962) and Walter (1963).

The theory assumes that an investor prefers a bird in the hand, that is, the receipt of dividends in the present moment, than two in the bush, the future capital gains, even if higher, but uncertain. This theory is often used because it recognizes the imperfection of the markets, a fact relegated by the Miller Modigliani Theorem, and thus the uncertainties would play an important role in the investor's decision making between distributed or reinvested profit, dividends or capital gains. It leads to the argument that such preference leads to a higher price of stocks that distribute present profits versus those that reinvest most of their net income for future appreciation.

As with the theories reported, it is necessary to explain the known clientele effect. The effect, cited among the market imperfections at the end of Miller and Modigliani's (1961) work, focuses on the inclusion of variables other than Dividends or Growth to explain investors' preferences for buying, holding, or selling a company's stocks.

This effect was deeply researched by Elton and Gruber (1970), who state that changes in dividend policy can alter investor preferences positively or negatively. The predictability of these effects would be linked to factors inherent to each individual, such as tax profile, age, sex, marital status, educational level, profession, income, and family size (Lewellen et al., 1978). Thus, any information can represent valuable data in decision-making by corporate finance managers, and knowing your shareholder can represent a great advantage in this process.

Having visited three of the most important concepts on the subject, we will now stick to the evidence present in the literature in question. Abor and Bokpin (2010) argue that profitable companies are less likely to pay dividends to their shareholders, but only in cases where they operate in developed markets. The payment of higher dividends in less developed stock markets, such as the Brazilian one, becomes a kind of risk bonus for the shareholder, who prefers the present profit to the company's retention of the distributed values.

To verify the relevance of dividends, the study seeks to analyze different markets, sectors, and different periods about those already studied by theorists of the subject. The biggest divergence is linked to the verification of the irrelevance of the dividend policy, defended in the Theorem of Miller and Modigliani (1961), and confirmed several times, as in Black and Scholes (1974). Among those who disagree, and those who defend the direct relationship between dividends and the value of firms, Lintner (1962) and Gordon (1963) stand out.

Contrary to this theory or even to Miller and Modigliani's theorem, Litzenberger and Ramaswamy (1979) state that high dividends would reduce the price of stocks, since if the value distributed to the investor is computed, this will have come out in the company's gross value but arrives at the investor after deducting taxes. This difference would be lost by the investor, since the fee would not exist in case of reinvestment for capital gains.

Starting from the dividend life cycle theory of Fama and French (2001) and the work of DeAngelo, DeAngelo, and Stulz (2006), we see the hypothesis that highly profitable companies, but with small growth rates, tend to pay high dividends, while strong growth companies pay less dividends, focusing on maximizing their period of accelerated growth. It is suggested, then, that companies go through the two described moments, start in a high growth phase, without paying dividends and evolve until they become dividend payers with moderate growth. A relevant part of Miller and Modigliani's (1961) reservations is linked to market imperfections, such as information asymmetry. Thus, investors, holders of a smaller volume of information than the managers of a company, would seek signals from companies regarding growth or decline in their value.

Thus, Leary and Michaely (2011) state that there is a belief among managers that the market values companies with stable dividend policies, and that is why managers of large companies tend to avoid sudden variations in their companies' payout levels, while small companies and young people, with fewer well-informed investors, tend to ignore dividend leveling.

These factors are in line with the theory of Bhattacharya (1979), in which managers would be pressured to avoid large variations in the level of dividends since these can send mixed signals to the market. These signals would be picked up by investors who could assume how the company's conditions will evolve in the future. The increase in Payout would point to the sacrifice of the company's growth since it would not be investing in opportunities, while a strong retention of values may indicate that the stocks may gain strong appreciation in the future.

The important reasons reported so far focus on investor markets located outside the Brazilian reality, where most countries tax dividends received by individual investors (La Porta et al., 2000), which can generate distortions in the behavior of investors and investors. managers. Lowering dividend taxation can help firms efficiently allocate capital and eliminate distortions in earnings distribution (Alstadsæter; Jacob; Michaely, 2015), and reduce principal-agent problems for firms with strong earnings flows (Jensen, 1986).

With regard specifically to Brazil, Law 9249 of 1995 exempted dividends from individual income tax withholding and excluded interest on equity (JCP) from the corporate income tax calculation basis, thus avoiding possible double taxation (the JCP are subject to withholding income tax). Both factors encourage both the company to distribute larger portions of its profit and the investor to look for higher-yielding securities. Since JCP, when removed from the Profit base, no longer composes the amounts on which the Corporate Income Tax - IRPJ, and the Social Contribution on Net Income - CSLL are levied, becoming, in addition to remuneration to the shareholder, a form of tax benefit to the company (Ness and Zani, 2000).

The apparent objective of attracting new investors to the capital market is not new to the legislator. The Corporate Law, number 6,404 and created in 1976, generated a series of protections and guarantees for minority shareholders, establishing minimum percentages for the distribution of profits. Public companies, then, must distribute 25% of the net income and may reduce this percentage, provided that the inclusion of a lower percentage in their bylaws is

approved, and the administrators will only be entitled to stock in the profits of the fiscal year about which it is attributed to the shareholders the mandatory dividend.

As for investors, new market entrants tend to seek profitability, but with a moderate risk tolerance profile, as explained by Ferreira (2019). Allied to this, in the same study, a tendency of these investors is verified by the regression to the mean in the profile of investments in B3, in this case, the same moderate profile.

The study by Dantas and Silva (2015) indicates that, when researching the influence of dividends on the market value of financial institutions in Brazil, the irrelevance of payouts advocated by MM is confirmed. In turn, Forti, Peixoto and Alves (2015) found positive correlations between the distribution of dividends and the profitability of companies, stating that it can be inferred that the greater the size of the company, its profitability, its market value, its liquidity. ten and the growth of its profits, the greater the propensity of this firm to distribute money to shareholders.

Thus, the aim is to seek a comprehensive sample combined with the growing flow of new investors on the Brazilian stock exchange after 2016, to verify if there is a clientele effect of dividends or any asymmetry of relevant information in the Brazilian market or if the irrelevance of dividends is confirmed.

3. Methodological Procedures

To assess the relevance of dividend payments on a stock price over time, in contrast to Miller and Modigliani's (1961) model, we will use MacKinlay's (1997) event study method, which focuses on the effect of economic events in the value of firms. This method of analysis consists of a study of events that makes it possible to verify the impact of specific situations on the value of companies, and, according to MacKinlay, must contain the definition of the event, sample selection criteria, calculation of normal returns, calculation of abnormal returns, estimation and tests.

To define the event to be studied, the main variable considered was the dividend yield (DY), which represents the ratio between the value of the stock and the dividend distributed. From these values, the analysis must contemplate the evaluation of abnormal returns after the event in question, as stated by MacKinlay (1997) in which the evaluation of the impact of the event requires a measure of the abnormal return, which is the real ex post return of the security. in the event window minus the company's normal return in the event window.

Dividend Yield indicates shareholder remuneration on invested capital. It is how a company's dividend yield is measured about its stock price. The higher the Dividend Yield, the greater the distribution of profits to the amount invested. As dividends are announced and paid on specific dates during the year, it can be inferred that, if they occur, the signaling effects (Ross, 1977) would start from these dates, thus, for MacKinlay, when studying specific events, we can confirm or refute their impact on the company's market value over time. To this end, we define some basic variables, such as event indication, sample selection, average normal returns, and abnormal returns after the event occurs.

The quantitative technique to be used was adapted from the MacKinlay method, already mentioned, but with insertions of adaptation of this model to the Brazilian market made by Famá, Kuronuma, and Lucchesi (2004), where they use data from the national market, also focused on papers listed in the Ibovespa, due to its higher level of liquidity. The analysis window was defined as 90 days, as in Novis and Saito (2003), who classify this period, both before the analysis and for the window after the event, as long enough to capture any leaks of information without being too extensive to mitigate the influence of other factors in the pricing of stocks.

3.1 Data

The Ibovespa data were obtained through the Bolsa Brasil Balcão - B3 data tool, specifically, through the Up2data on Demand tool, to guarantee the reliability of the sample data, in addition to the data taken from the companies' investor relations websites. studied. The B3 service, combined with the other tools, brought access to the securities listed during the study period on the Ibovespa, the closing prices of these on each trading day, as well as the payment dates for remuneration, Dividends and Interest on Equity, mentioned in the study. The Event to be analyzed focuses on the behavior of the stock price from the date of payment of dividends (ex-date), and its relation to its expected return, focusing on the relative amount of dividends (Dividend yield) of this event.

The start date of the study, where $t = 0$, represents the end date on which the paper generates the right to receive remuneration, called date com or date ex-1. This serves as the basis for the study from $t = 1$, or ex-date of each analyzed event, which is the date on which the stocks are traded ex-dividends of each stock and is understood as the period of $t = 1$ at $t = 90$ (days), totaling approximately 60 trading sessions, to test the variation in the magnitude of possible abnormal returns for each period.

The tests were performed whenever the event of payment of dividends or equity interest occurred within the 2018 calendar year, starting from January 1 to December 31 of that year. So that the effect of each event can be isolated, the events of the same stock that overlapped within the analysis period, 90 days before and after the event, were excluded from the sample.

The choice of the indicated period, year 2018, aimed to align the abundance of consolidated data and encompass the period that presented the two previously mentioned factors, strong growth in the number of individual B3 investors (up 31% in one year) and the constant, and a significant drop in the Brazilian interest rate. The sample consists of companies that make up the Ibovespa index of B3, former São Paulo Stock Exchange (Bovespa) and that have remained listed there for at least 3 years, encompassing the year before and after the analysis, that is, 2017 to 2019.

Thus, by analyzing the events, we will be able to verify whether the pattern of preference for dividends also changes given the new public in the stock market and analyze the bird in the hand effects, signaling or the possible existence of inefficiency in the market. The objective was to select the stocks with the greatest liquidity in the Brazilian capital market and that best represent the market as a whole. Companies were segmented as indicated in MacKinlay (1997)

in Good News, No News and Bad News, which illustrate in the analysis the events with high, medium and low dividend yield.

To exclude unwanted events, the same method used in Famá, Kuronuma and Lucchesi (2004) was used, thus, we excluded companies that pay monthly or quarterly dividends, and, in addition, events of the same company that had among themselves were excluded. separation of less than 90 days, in order to avoid the effect of overlaps within the analyzed period.

By applying the set of parameters mentioned above, we identified a total of 105 events in 2018, of which 54 were events of monthly, quarterly payment or presented overlap between occurrences, and thus were excluded from the sample, leaving 51 events to be analyzed, of which 3 were excluded when linear regression was applied because they had negative β, these remaining were divided into the 3 previously mentioned groups.

3.2 Quantitative Technique

To calculate normal stock returns, MacKinlay's (1997) market model was used, where the linear relationship between the stock's return and that of the market base portfolio, in this case, the Ibovespa, is analyzed in the same period. The period of analysis ex ante to the event was defined in 90 days, and simple linear regression was used on these data.

The closing quotes for the 90 days prior to the event were used in the equation below, which represents the estimation of the market model parameters by performing a simple linear regression between the daily returns of a stock and the Ibovespa variation, according to equation 1:

$$E(R_{it}) = \alpha_i + \beta_i E(R\text{ibv})\#(1)$$

where:

$E(R_{it})$ = expected return of stock *i* in date *t*;

Ribv = return of Ibovespa index in *t*.

The stock and Ibovespa index returns were determined through equations 2 and 3:

$$R(ibv,t) = \frac{P(ibv,t)}{P(ibv,t-1)} - 1\#(2)$$

where:

R(ibv) = return of Ibovespa index in *t*;

P(ibv) = value in points of Ibovespa index in *t*.

$$R_{it} = \frac{P_{it} + D_t}{P_{it} - 1} - 1\#(3)$$

where:

R_{it} = return of stock *i* in *t*;

P_{it} = price of stock *i* in date *t*;

D_t = dividend per stock in *t*.

This is how the abnormal return for each stock is calculated, according to the MacKinlay equation:

$$AR_{it} = R_{it} - E(R_{it}) \#(4)$$

where:

AR_{it} = abnormal return of stock *i* in *t*;

R_{it} = effective return of stock *i* in *t*;

$E(R_{it})$ = expected return of stock *i* in *t*.

The calculated abnormal returns were aggregated for each event and in periods of 1 day (ex date), 7 days (one week), 15 days (half a month), 30 days (one month), 60 days (two months) and 90 days (three of these) according to Brown and Warner (1980 and 1985):

$$CAR_{it} = \sum_{t=1}^{T} AR_{it} \#(5)$$

To classify the events, the dividend yield was calculated for each one of them, according to equation 6:

$$DY = \frac{D}{Pex - 1} \#(6)$$

where:

D = dividend paid per stock;

Pex-1 = stock price on date EX-1.

At the end of a period *t*, the Abnormal Return, which represents the difference between the Expected Return and the Effective Return of an action, can be significantly linked to one of the groups mentioned by MacKinlay (1997), Good News Firms (high DY) or Bad News Firms (reduced DY).

4. Results

Data analysis started with the indication of the Ibovespa index stocks that coincide with the presented parameters. 55 stocks were included in the index during the 3 years in scope, 2018 and the periods immediately before and after that. Equation 6 was used for the events of these papers and the dividend yield values were obtained for each of the events within the indicated parameters.

To identify the expected returns of the events, the closing values of the quotations were used and equation 2 was applied, at the same time, equation 3 was used in the variation of the Ibovespa index to obtain the returns observed in the index for the period, both calculations used the period in the 90 days prior to each event.

With these data, it was possible to perform a simple linear regression between the returns observed in the Ibovespa and in the assets for each event and its respective time window, resulting from this calculation the angular coefficient and intersection obtained with the returns observed in the base parameter, the Ibovespa and with the return of each asset before the events. When we apply these parameters in the trading sessions of the next 90 days after each of the events (equation 1), we obtain the expected return of each security, $E(R_{it})$.

A total of 105 events from companies that meet the indicated parameters were identified, of which 54 presented overlapping events in the same asset within the sample period, 90 days, and, therefore, were excluded from the analysis. The 51 events that meet all the requirements were named from "evt_01" to "evt_51" and ordered in descending order according to the Dividend Yield of each one and divided into 3 groups according to this last parameter, as shown in Table 1.

Table 1. Events

High DY - *Good News Firms*				**Medium DY - *No News Firms***				**Low DY - *Bad News Firms***			
Event	**Code**	**Firm**	**dy**	**Event**	**Code**	**Firm**	**dy**	**Event**	**Code**	**Firm**	**dy**
evt_01	EQTL3	Equatorial	7,7%	evt_18	SBSP3	Sabesp	2,9%	evt_35	EQTL3	Equatorial	0,8%
evt_02	CMIG4	CEMIG	6,2%	evt_19	VALE3	Vale	2,8%	evt_36	MULT3	Multiplan	0,7%
evt_03	YDUQ3	YDUQS	5,8%	evt_20	CSAN3	Cosan	2,8%	evt_37	CVCB3	CVC	0,7%
evt_04	ENBR3	EDP Brasil	4,9%	evt_21	VIVT4	Vivo	2,7%	evt_38	CMIG4	CEMIG	0,6%
evt_05	BBSE3	BB Seg.	4,8%	evt_22	UGPA3	G. Ultra	2,6%	evt_39	SANB11	Santander	0,5%
evt_06	VIVT4	Vivo	4,2%	evt_23	CIEL3	Cielo	2,5%	evt_40	JBSS3	JBS	0,5%
evt_07	BRKM5	Braskem	4,1%	evt_24	UGPA3	G. Ultra	2,4%	evt_41	VIVT4	Vivo	0,5%
evt_08	SANB11	Santander	4,0%	evt_25	BRAP4	Bradespar	2,2%	evt_42	GOAU4	M. Gerdau	0,5%
evt_09	CYRE3	Cyrela	3,9%	evt_26	VIVT4	Vivo	1,7%	evt_43	MULT3	Multiplan	0,5%
evt_10	CYRE3	Cyrela	3,9%	evt_27	CIEL3	Cielo	1,7%	evt_44	CVCB3	CVC	0,1%
evt_11	ECOR3	EcoRodovias	3,7%	evt_28	CIEL3	Cielo	1,4%	evt_45	LAME4	Americanas	0,5%
evt_12	ECOR3	EcoRodovias	3,6%	evt_29	GOAU4	M.Gerdau	1,2%	evt_46	CIEL3	Cielo	0,5%
evt_13	ENBR3	EDP Brasil	3,6%	evt_30	VALE3	Vale	1,1%	evt_47	USIM5	Usiminas	0,4%
evt_14	BRAP4	Bradespar	3,5%	evt_31	YDUQ3	YDUQS	0,9%	evt_48	SANB11	Santander	0,4%
evt_15	BBSE3	BB Seg.	3,2%	evt_32	GOAU4	M.Gerdau	0,9%	evt_49	SANB11	Santander	0,4%
evt_16	BBSE3	BB Seg.	3,1%	evt_33	GGBR4	Gerdau	0,9%	evt_50	GGBR4	Gerdau	0,2%
evt_17	MULT3	Multiplan	2,9%	evt_34	GGBR4	Gerdau	0,8%	evt_51	CVCB3	CVC	0,1%

Source: Elaborated by authors.

Finally, we apply these values to equation 4 and, subtracting the effective return of each security from the expected return for that same period, we arrive at the Abnormal Return (AR of Stock *i*, for a given period *t*, AR_{it}). To indicate the persistence of abnormal returns, equation 5 was applied, which demonstrates the accumulation of these returns in the periods of one day, one week, two weeks, one month, one two-month period and one quarter of the deadline on which the securities were traded paying the respective remuneration, date with, according to Table 2.

As in Famá, Koruma and Lucchesi (2004), events in which negative β values were observed after the application of linear regression were excluded from the analysis, these being events 06, 19 and 30 (evt_06 VIVT4, evt_19 VALE3 and evt_30 VALE3), leaving 48 events divided into 3 groups and renumbered in an ordinal manner to reflect the levels of dividends paid.

Condensed and ordered, each of the events by its dividend yield (Annex 1), we thus have events 01(evt_01) to 17(evt_16), with a dy range of 7.74% to 2.91%, were classified as high value dividend payers, from event 17(evt_17) to 32(evt_32), 2.88% to 0.78%, as median dividend payers, and, paying reduced dividends, 0.74% to 0.14%, events 33(evt_33) to 48(evt48), listed in the table in Annex 1.

This same metric was used to identify, respectively, the Good News Firms, No News Firms, and Bad News Firms, according to the event classification proposed by MacKinlay (1997), used to classify asset compensation events, whether these are payments of Dividends or Interest on stock capital.

Thus, it is verified that the events that pay the most dividends (16 largest DY of the Ibovespa in the period, events 01 to 16) recorded, on average, over the 90 days observed, abnormal accumulated returns higher than those recorded in events that remunerate their (events 17 to 32), 3.7% against -3.9%, which, in turn, accumulated abnormal returns higher than the events that pay less dividends among those studied (events 33 to 48), which reached abnormal accumulated returns in the order of -8.1%.

The Accumulated Abnormal Return (CAR), according to the model of Brown and Warner (1980), shows the performance of the price of an asset when compared to a benchmark. This reference must be comprehensive enough to show what the normal returns would be, and these, when compared to the observed returns of each asset in the period, allow the inference of the Accumulated Abnormal Return (CAR).

When calculating the Abnormal Returns Accumulated after the payment of dividends for the 3 groups observed, these proved to be relevant, when the student's t statistic was applied, it showed results different from zero for a 5% level of significance.

Brown and Warner (1980) warn of the need to specify a model in order to obtain such abnormal returns, and suggest, among others, the adopted model of Average Abnormal Returns, which assumes that it is the ex ante expected return for a given security. *i* is equal to a constant $E(R_{it})$ that can differ between securities and, as already mentioned, The abnormal return A(R_{it}) is equal to the difference between the observed return, R_{it}, and the predicted return $E(R_{it})$.

Still in Brown and Warner (1980), it is emphasized that this Average Accumulated Return model is consistent with another model, the Asset Pricing model, assuming that a stock has constant systemic risk, and as in the Adjusted Average Returns model, also, Asset Pricing assumes constant normal returns.

Thus, for analysis purposes, the average variations of the accumulated returns of each asset were grouped according to the three categories of dividends paid, high, medium and low, with the cumulative data ranging from the date of each event to each of the six periods. studied.

Thus, even if the abnormal returns are not observed in all events in a linear way, when we analyze the aggregated data of the three mentioned blocks we can see, in Table 3, trends of different behaviors regarding the accumulation of Abnormal Returns.

We also observe in Table 3, data referring to the standard deviation, analyzed separately within each of the six fortnights of the sample, as in the total period of the study. These data demonstrate the dispersion of the observed Abnormal Returns, the amplitude of the variations of each one of the studied blocks. We can observe that the companies with the highest return on assets have a lower Standard Deviation, 2.47%, compared to the others, 2.8% and 2.49%, which leads us to believe, according to Markowitz (1976) that, in addition to lower abnormal returns, these are associated with a higher level of risk.

For comparison purposes, the aggregate performance values of the Ibovespa index were included, accumulated in each of the study periods on the dates corresponding to the intervals of each of the 48 events and later grouped, in order to portray not the exact variation of the Ibovespa index during 2018, but a view of the 90 days studied proportional to the values obtained in each of the events and their respective dates.

To more clearly illustrate the analysis of the previous table, Table 2 (below) shows the abnormal returns accumulated in aggregate according to the 3 distribution profiles of Dividends or Interest.

Table 2. Descriptive statistics

										Period (days)
	dy%	***DY***	**1**	**7**	**15**	**30**	**45**	**60**	**75**	**90**
Accumulated Abnormal Returns	4,30%	High	1,3%	2,3%	2,9%	2,4%	4,8%	4,4%	4,1%	3,7%
	1,86%	Medium	1,6%	1,0%	0,0%	-1,2%	-4,4%	-5,4%	-2,8%	-3,9%
	0,47%	Low	0,5%	-2,3%	-1,7%	-3,6%	-4,7%	-4,1%	-6,7%	-8,1%
		Ibovespa index	0,1%	0,2%	1,6%	0,9%	0,9%	1,2%	1,2%	3,4%

		Period (15 days)						**Total**
		1 ª	**2 ª**	**3 ª**	**4 ª**	**5 ª**	**6 ª**	**90 days**
Standard Deviation (sample for 15 days)	High	2,39%	2,55%	2,72%	2,30%	2,15%	2,37%	2,47%
	Medium	2,67%	2,99%	2,86%	2,45%	2,39%	2,79%	2,82%
	Low	2,24%	2,69%	2,78%	2,18%	2,26%	2,63%	2,49%

Source: Elaborated by authors.

The chart below illustrates these gains in stocks with high dividend distribution over the period studied, as well as the trend reversals observed near the end of the study. It appears that, initially, the income of dividend payers demonstrates lower performance than the others, which can be explained by the strong fall in the value of an asset after the payment of dividends, in a value similar to the amount paid. Figure 1 presents the accumulated abnormal

returns.

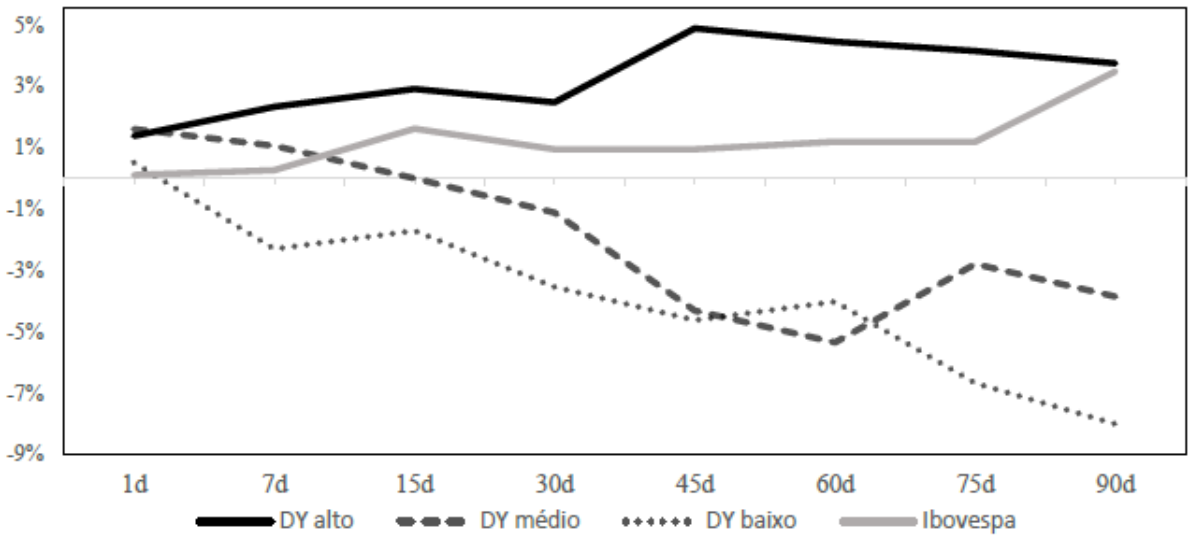

Figure 1. Accumulated abnormal returns

Source: Elaborated by authors.

Still regarding the table, we can see that the average of abnormal returns of events with high dividends have a higher performance in the first 15 days after the ex-date, and, although some gains persist, the behavior of these assets is closer of the performance of the Ibovespa portfolio index in this interval, from the fifteenth to the ninetieth day.

Thus, with similar final returns, the Ibovespa presents returns very close to those observed in Good News Firms, but at a lower risk level, since the Coefficient of Variation, which demonstrates this ratio between the amplitude of an asset's price and its expected return, shows a relationship between risk and reward, when considering the 90 days of the study, better in the index than in any of the groups of dividend and interest payers.

A more punctual and focused analysis can be done when we verify the increase in the accumulated returns between the periods, thus isolating the gains of the different groups of events in relation to the immediately previous moments, as shown in Table 3.

Table 3. Variation in Accumulated Returns between periods

			Period (days)					
	dy%		**15**	**30**	**45**	**60**	**75**	**90**
Δ Accumulated Returns between periods	4,30%	High DY	1,3%	-0,4%	2,4%	-0,4%	-0,3%	-0,4%
	1,86%	Medium DY	1,6%	-1,1%	-3,2%	-1,0%	2,6%	-1,1%
	0,47%	Low DY	0,5%	-1,8%	-1,1%	0,6%	-2,7%	-1,3%

Source: Elaborated by authors

The events were grouped by the 3 types of dividend payers and the performance of the Ibovespa in the period, we noticed that the accumulated returns, which on the first day are higher in events with average dividends, grow at a stronger pace in securities that pay high dividends, and gain strength in the first month and up to the 60-day mark.

From the second to the third month. at the 90-day mark, it is possible to see a drop in the accumulated returns of companies paying high dividends, in the face of a strong growth in the accumulated returns of the Ibovespa index and recovery of stocks with events of average remuneration. Only events that pay low dividends had similar driving performance to large payers, but with an even greater negative impact.

In the table above, we can see that the high abnormal returns of the High DY events are concentrated between the first and seventh day after the date-com, 1.3% and 1.0% respectively, with a positive abnormal return until the fifteenth day, although at that point lower than the Ibovespa index. Its returns have a strong rise between the thirtieth and sixtieth days, growing 2.0%, when they reach the peak of the accumulated abnormal return. Figure 2 presents the variation of accumulated returns.

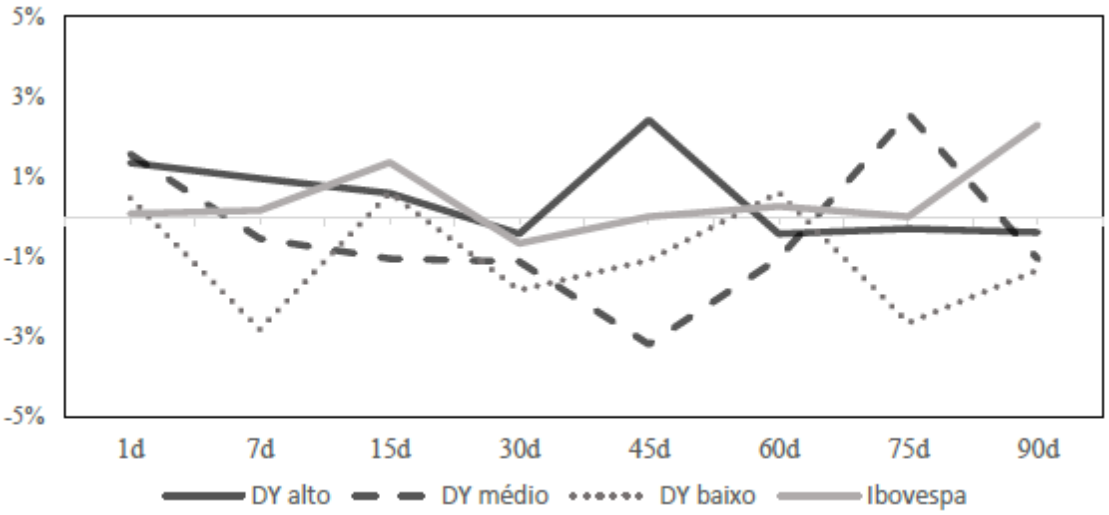

Figure 2. Variation of accumulated returns

Source: Elaborated by authors

The Figure illustrates how in the last period, 60 to 90 days, the cumulative return dropped 0.7%, in high dividend payers, losing to the average dividend-paying events and the index, which grew 1.5% and 2.3%, respectively, being ahead only of the events that pay their assets little, accelerate their fall sharply.

5. Conclusions

As in the study by Famá, Koruma, and Lucchesi (2004), there is evidence of a positive association between high dividend payers and abnormal returns, different from those with lower remuneration, albeit for a reduced time window. The results are similar even with the

choice of a different market benchmark, since this study uses the Bovespa Index, and the aforementioned study innovated using the FV-100 index.

Still observing the Brazilian market, Nunes (2020) observes the occurrence of abnormal returns after the payment of dividends, contrary to market expectations, but as in the work of Nunes (2020), the possibility or feasibility of exploring the Abnormal Returns, since barriers to asset mobility and strategies to capture the observed phenomenon were not analyzed, factors that can be addressed in future studies.

Other associations may be the advent of the political-economic period that the sample covers, from the end of 2017 to the beginning of 2019, by influencing the perception of investors, since the country, although growing, was coming from recession and recent political instability, which seems to have led the investor to pursue immediate gains at the expense of future advantages. In addition, the aforementioned growth in the participation of new individual investors may have contributed to the preference for immediate gains, which justifies the preference for papers with high gains in the short term, even if this choice does not remain in time.

With the result obtained, it is possible to verify a positive association between the behavior that investors demonstrate, in the short term, a preference for present gains to the detriment of capital accumulation by companies, but with a tendency to return to the average in the medium term. As for the continuity of abnormal earnings over time, the study infers that these defaults may be limited to the first 60 days after each event, and that this one-quarter time interval between new payments can initiate new cycles of abnormal returns, a once indicated the maintenance in the proportion of the dividend in relation to the value of the stock.

Future research may focus on analyzing effects in longer time intervals, before and after the events, as in Boeheme and Surescu (2000), who analyzed the data window from 1927 to 1998, and, thus, looking for long-term effects of payment of Dividends or Interest for periods longer than the 90 days analyzed here. In this sense, the research would demand the inclusion of controls regarding new events in a timeline of each asset, pointing out and neutralizing the overlaps in order to minimize their distortions in the analysis.

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Annexes

Annex 1. Events Sorted by Dividend Yield

Abnormal Returns Accumulated by period - AR_{it}

Event	Code	*DY (evt)*	1 day	7 days	15 days	30 days	60 days	90 days
evt_01	EQTL3	**7,74%**	7,74%	5,86%	-2,61%	-1,12%	-5,03%	-3,27%
evt_02	CMIG4	**6,15%**	-2,23%	3,43%	0,14%	6,25%	6,02%	-3,50%
evt_03	YDUQ3	**5,78%**	6,13%	2,59%	11,73%	14,16%	28,73%	34,90%
evt_04	ENBR3	**4,91%**	-0,47%	-0,90%	3,08%	10,50%	8,96%	5,71%
evt_05	BBSE3	**4,75%**	-0,35%	-1,26%	1,11%	-4,23%	-11,55%	-14,30%
evt_06	BRKM5	**4,13%**	0,29%	3,97%	15,99%	15,21%	37,07%	37,05%
evt_07	SANB11	**3,98%**	1,09%	-0,06%	-0,20%	0,81%	-2,02%	-1,35%
evt_08	CYRE3	**3,88%**	0,56%	-3,44%	6,72%	-9,50%	6,57%	10,35%
evt_09	CYRE3	**3,86%**	-0,28%	0,79%	-5,60%	-5,83%	-17,06%	-23,80%
evt_10	ECOR3	**3,75%**	0,48%	4,42%	-0,99%	-0,69%	2,85%	13,56%
evt_11	ECOR3	**3,64%**	-2,07%	-3,49%	-0,39%	1,43%	1,37%	5,14%
evt_12	ENBR3	**3,61%**	7,30%	5,12%	3,82%	7,08%	18,30%	23,57%
evt_13	BRAP4	**3,52%**	0,75%	2,02%	-0,68%	0,91%	-1,13%	-9,46%
evt_14	BBSE3	**3,18%**	-2,23%	11,04%	5,68%	5,25%	12,53%	11,52%
evt_15	BBSE3	**3,10%**	0,05%	-0,92%	0,31%	-0,48%	-6,55%	-4,56%
evt_16	MULT3	**2,91%**	-1,14%	-1,45%	-1,09%	-0,62%	0,65%	-4,85%
evt_17	SBSP3	**2,88%**	1,38%	-2,24%	-19,03%	-12,75%	-16,37%	-15,85%
evt_18	CSAN3	**2,79%**	-1,17%	2,17%	5,84%	12,57%	12,43%	12,77%
evt_19	VIVT4	**2,71%**	5,97%	8,40%	10,64%	3,62%	12,56%	26,23%
evt_20	UGPA3	**2,56%**	-3,22%	6,51%	5,87%	-3,80%	-6,62%	-6,39%

evt_21	CIEL3	**2,51%**	4,26%	-6,75%	-12,88%	-12,45%	-42,34%	-38,23%
evt_22	UGPA3	**2,43%**	1,30%	0,88%	-0,53%	-2,57%	-23,34%	-22,46%
evt_23	BRAP4	**2,24%**	-1,47%	-0,26%	1,57%	-7,39%	4,76%	14,78%
evt_24	VIVT4	**1,74%**	2,23%	0,79%	3,39%	9,53%	-3,62%	7,17%
evt_25	CIEL3	**1,70%**	-2,48%	0,84%	-5,53%	-13,34%	-17,82%	-25,58%
evt_26	CIEL3	**1,39%**	4,70%	6,24%	17,29%	28,25%	49,17%	55,31%
evt_27	GOAU4	**1,20%**	0,24%	-4,00%	0,30%	-1,31%	-4,87%	-1,07%
evt_28	YDUQ3	**0,92%**	-1,03%	0,68%	-10,49%	-25,15%	-19,80%	-27,34%
evt_29	GOAU4	**0,90%**	3,67%	2,79%	0,35%	-2,86%	-21,58%	-31,73%
evt_30	GGBR4	**0,88%**	4,39%	-0,35%	0,64%	3,45%	-16,64%	-21,36%
evt_31	GGBR4	**0,85%**	1,91%	0,07%	5,04%	4,11%	2,12%	3,85%
evt_32	EQTL3	**0,78%**	-0,59%	0,13%	-0,97%	-0,24%	2,36%	0,64%
evt_33	MULT3	**0,74%**	2,99%	5,87%	9,20%	14,35%	20,75%	33,93%
evt_34	CVCB3	**0,72%**	5,50%	4,40%	7,50%	-11,01%	-12,63%	-32,61%
evt_35	CMIG4	**0,56%**	-2,26%	-8,28%	-18,56%	-28,76%	-45,62%	-62,52%
evt_36	SANB11	**0,54%**	1,40%	1,87%	8,14%	20,57%	21,62%	25,27%
evt_37	JBSS3	**0,53%**	-0,03%	-2,44%	11,33%	16,74%	27,65%	22,83%
evt_38	VIVT4	**0,53%**	-1,90%	-0,72%	-2,80%	-2,82%	-7,06%	-4,96%
evt_39	GOAU4	**0,51%**	1,20%	-9,60%	-0,86%	-5,90%	3,86%	-0,91%
evt_40	MULT3	**0,48%**	-0,09%	-8,79%	-12,24%	-10,85%	-22,69%	-27,01%
evt_41	CVCB3	**0,14%**	0,46%	-4,43%	-14,09%	-3,42%	-12,04%	-21,43%
evt_42	LAME4	**0,47%**	0,20%	-1,47%	1,84%	2,71%	7,60%	20,33%
evt_43	CIEL3	**0,46%**	-1,57%	-3,08%	7,82%	-9,57%	1,15%	-12,79%
evt_44	USIM5	**0,44%**	2,44%	0,11%	2,79%	-9,81%	-5,95%	8,57%
evt_45	SANB11	**0,42%**	0,31%	-2,65%	-3,79%	-15,00%	-24,96%	-43,89%
evt_46	SANB11	**0,39%**	0,22%	-1,09%	-4,51%	-9,94%	-9,55%	-15,65%
evt_47	GGBR4	**0,19%**	-0,78%	-5,22%	-6,43%	-4,60%	-1,62%	-5,34%
evt_48	CVCB3	**0,14%**	0,46%	-4,43%	-14,09%	-3,42%	-12,04%	-21,43%

Source: Elaborated by authors

Annex 2. Daily Average of Accumulated Abnormal Returns ($A(R_{it})$ / t)

Daily average of Abnormal Returns per period - AR_{it}

Event	Code	*DY (evt)*	1 day	7 days	15 days	30 days	60 days	90 days
evt_01	EQTL3	7,74%	7,7%	1,2%	-0,2%	-0,1%	-0,1%	-0,1%
evt_02	CMIG4	6,15%	-2,2%	0,7%	0,0%	0,3%	0,1%	-0,1%
evt_03	YDUQ3	5,78%	6,1%	0,5%	1,1%	0,6%	0,7%	0,6%
evt_04	ENBR3	4,91%	-0,5%	-0,2%	0,3%	0,5%	0,2%	0,1%
evt_05	BBSE3	4,75%	-0,3%	-0,3%	0,1%	-0,2%	-0,3%	-0,2%
evt_07	BRKM5	4,13%	0,3%	0,8%	1,5%	0,7%	0,9%	0,6%
evt_08	SANB11	3,98%	1,1%	0,0%	0,0%	0,0%	0,0%	0,0%
evt_09	CYRE3	3,88%	0,6%	-0,7%	0,6%	-0,4%	0,2%	0,2%
evt_10	CYRE3	3,86%	-0,3%	0,2%	-0,5%	-0,3%	-0,4%	-0,4%
evt_11	ECOR3	3,75%	0,5%	0,9%	-0,1%	0,0%	0,1%	0,2%
evt_12	ECOR3	3,64%	-2,1%	-0,7%	0,0%	0,1%	0,0%	0,1%
evt_13	ENBR3	3,61%	7,3%	1,0%	0,3%	0,3%	0,4%	0,4%
evt_14	BRAP4	3,52%	0,8%	0,4%	-0,1%	0,0%	0,0%	-0,2%
evt_15	BBSE3	3,18%	-2,2%	2,2%	0,5%	0,2%	0,3%	0,2%
evt_16	BBSE3	3,10%	0,0%	-0,2%	0,0%	0,0%	-0,2%	-0,1%
evt_17	MULT3	2,91%	-1,1%	-0,3%	-0,1%	0,0%	0,0%	-0,1%
evt_18	SBSP3	2,88%	1,4%	-0,4%	-1,7%	-0,6%	-0,4%	-0,3%
evt_20	CSAN3	2,79%	-1,2%	0,4%	0,5%	0,6%	0,3%	0,2%
evt_21	VIVT4	2,71%	6,0%	1,7%	1,0%	0,2%	0,3%	0,4%
evt_22	UGPA3	2,56%	-3,2%	1,3%	0,5%	-0,2%	-0,2%	-0,1%
evt_23	CIEL3	2,51%	4,3%	-1,3%	-1,2%	-0,6%	-1,0%	-0,6%
evt_24	UGPA3	2,43%	1,3%	0,2%	0,0%	-0,1%	-0,5%	-0,4%
evt_25	BRAP4	2,24%	-1,5%	-0,1%	0,1%	-0,3%	0,1%	0,2%
evt_26	VIVT4	1,74%	2,2%	0,2%	0,3%	0,4%	-0,1%	0,1%
evt_27	CIEL3	1,70%	-2,5%	0,2%	-0,5%	-0,6%	-0,4%	-0,4%
evt_28	CIEL3	1,39%	4,7%	1,2%	1,6%	1,3%	1,1%	0,9%
evt_29	GOAU4	1,20%	0,2%	-0,8%	0,0%	-0,1%	-0,1%	0,0%
evt_31	YDUQ3	0,92%	-1,0%	0,1%	-1,0%	-1,1%	-0,5%	-0,4%
evt_32	GOAU4	0,90%	3,7%	0,6%	0,0%	-0,1%	-0,5%	-0,5%
evt_33	GGBR4	0,88%	4,4%	-0,1%	0,1%	0,2%	-0,4%	-0,3%
evt_34	GGBR4	0,85%	1,9%	0,0%	0,5%	0,2%	0,0%	0,1%
evt_35	EQTL3	0,78%	-0,6%	0,0%	-0,1%	0,0%	0,1%	0,0%

evt_36	MULT3	0,74%	3,0%	1,2%	0,8%	0,7%	0,5%	0,5%
evt_37	CVCB3	0,72%	5,5%	0,9%	0,7%	-0,5%	-0,3%	-0,5%
evt_38	CMIG4	0,56%	-2,3%	-1,7%	-1,7%	-1,3%	-1,1%	-1,0%
evt_39	SANB11	0,54%	1,4%	0,4%	0,7%	0,9%	0,5%	0,4%
evt_40	JBSS3	0,53%	0,0%	-0,5%	1,0%	0,8%	0,6%	0,4%
evt_41	VIVT4	0,53%	-1,9%	-0,1%	-0,3%	-0,1%	-0,2%	-0,1%
evt_42	GOAU4	0,51%	1,2%	-1,9%	-0,1%	-0,3%	0,1%	0,0%
evt_43	MULT3	0,48%	-0,1%	-1,8%	-1,1%	-0,5%	-0,5%	-0,5%
evt_44	CVCB3	0,14%	0,5%	-0,9%	-1,3%	-0,2%	-0,3%	-0,3%
evt_45	LAME4	0,47%	0,2%	-0,3%	0,2%	0,1%	0,2%	0,3%
evt_46	CIEL3	0,46%	-1,6%	-0,6%	0,7%	-0,4%	0,0%	-0,2%
evt_47	USIM5	0,44%	2,4%	0,0%	0,3%	-0,4%	-0,1%	0,1%
evt_48	SANB11	0,42%	0,3%	-0,5%	-0,3%	-0,7%	-0,6%	-0,7%
evt_49	SANB11	0,39%	0,2%	-0,2%	-0,4%	-0,5%	-0,2%	-0,3%
evt_50	GGBR4	0,19%	-0,8%	-1,0%	-0,6%	-0,2%	0,0%	-0,1%
evt_51	CVCB3	0,14%	0,5%	-0,9%	-1,3%	-0,2%	-0,3%	-0,3%

Source: Elaborated by authors

Annex 3. Standard Deviation - *AR(it)*

Standard Deviation of Abnormal Returns Accumulated for 15 days

			Period (15 days)					
Event	**Cod**	***DY(evt)***	**1 ª**	**2 ª**	**3 ª**	**4 ª**	**5 ª**	**6 ª**
evt_01	EQTL3	7,74%	3,0%	2,0%	1,5%	2,5%	1,5%	1,8%
evt_02	CMIG4	6,15%	2,2%	4,4%	2,8%	3,8%	1,2%	2,8%
evt_03	YDUQ3	5,78%	3,3%	2,0%	2,3%	3,5%	4,1%	3,8%
evt_04	ENBR3	4,91%	1,3%	1,5%	2,0%	2,5%	2,1%	3,9%
evt_05	BBSE3	4,75%	1,5%	1,5%	1,4%	2,5%	2,0%	1,8%
evt_07	BRKM5	4,13%	2,5%	3,1%	6,7%	1,7%	2,4%	1,5%
evt_08	SANB11	3,98%	1,3%	3,1%	1,7%	0,7%	0,9%	1,4%
evt_09	CYRE3	3,88%	3,9%	4,2%	2,3%	2,1%	2,7%	3,0%
evt_10	CYRE3	3,86%	1,5%	1,9%	1,8%	2,2%	2,5%	2,2%
evt_11	ECOR3	3,75%	1,9%	3,5%	3,7%	2,2%	2,6%	1,8%
evt_12	ECOR3	3,64%	3,3%	3,3%	1,9%	1,2%	2,1%	3,7%
evt_13	ENBR3	3,61%	3,2%	1,8%	5,7%	2,7%	2,2%	1,8%
evt_14	BRAP4	3,52%	3,0%	2,8%	4,0%	3,1%	2,3%	2,6%
evt_15	BBSE3	3,18%	2,8%	2,3%	1,8%	2,3%	1,5%	2,8%
evt_16	BBSE3	3,10%	1,1%	1,6%	1,5%	1,4%	1,4%	2,5%
evt_17	MULT3	2,91%	1,9%	2,3%	2,2%	2,9%	2,0%	2,0%

evt_18	SBSP3	2,88%	3,3%	2,5%	2,4%	2,4%	1,7%	2,9%
evt_20	CSAN3	2,79%	1,6%	2,5%	1,8%	1,8%	2,3%	3,1%
evt_21	VIVT4	2,71%	3,1%	8,2%	3,0%	1,2%	1,7%	1,6%
evt_22	UGPA3	2,56%	3,8%	3,1%	2,4%	4,0%	2,4%	5,7%
evt_23	CIEL3	2,51%	2,8%	3,6%	1,9%	3,0%	3,8%	2,2%
evt_24	UGPA3	2,43%	1,3%	1,2%	1,1%	3,0%	3,1%	4,4%
evt_25	BRAP4	2,24%	3,0%	6,4%	2,9%	1,7%	2,0%	1,8%
evt_26	VIVT4	1,74%	3,0%	1,4%	8,2%	2,4%	1,8%	1,4%
evt_27	CIEL3	1,70%	2,0%	1,7%	1,8%	2,2%	2,0%	2,9%
evt_28	CIEL3	1,39%	3,9%	3,7%	3,8%	3,8%	2,8%	2,2%
evt_29	GOAU4	1,20%	2,7%	1,5%	1,9%	2,4%	3,4%	1,9%
evt_31	YDUQ3	0,92%	2,9%	5,8%	4,2%	2,4%	1,4%	3,3%
evt_32	GOAU4	0,90%	3,8%	3,0%	3,7%	3,4%	2,8%	3,0%
evt_33	GGBR4	0,88%	3,1%	2,5%	3,8%	3,2%	3,2%	3,2%
evt_34	GGBR4	0,85%	2,3%	1,9%	2,4%	1,8%	2,7%	1,8%
evt_35	EQTL3	0,78%	1,3%	1,7%	1,5%	1,1%	1,3%	1,2%
evt_36	MULT3	0,74%	3,5%	2,3%	3,7%	2,3%	1,7%	2,0%
evt_37	CVCB3	0,72%	2,8%	2,0%	2,5%	3,4%	2,0%	2,5%
evt_38	CMIG4	0,56%	2,7%	2,3%	3,0%	1,7%	1,6%	4,8%
evt_39	SANB11	0,54%	1,4%	1,5%	0,8%	0,9%	1,0%	0,9%
evt_40	JBSS3	0,53%	2,1%	2,1%	3,0%	2,2%	2,7%	2,9%
evt_41	VIVT4	0,53%	1,9%	2,2%	1,7%	1,7%	1,8%	2,5%
evt_42	GOAU4	0,51%	3,8%	3,2%	3,1%	3,3%	3,3%	3,2%
evt_43	MULT3	0,48%	1,5%	1,6%	2,0%	1,7%	2,1%	1,8%
evt_44	CVCB3	0,14%	2,1%	4,9%	4,2%	2,8%	2,8%	2,9%
evt_45	LAME4	0,47%	1,4%	2,5%	2,5%	2,2%	1,9%	2,0%
evt_46	CIEL3	0,46%	2,3%	3,4%	3,6%	1,5%	1,9%	2,2%
evt_47	USIM5	0,44%	3,1%	3,7%	5,5%	3,0%	4,3%	4,6%
evt_48	SANB11	0,42%	1,7%	1,3%	1,9%	1,8%	2,7%	2,2%
evt_49	SANB11	0,39%	1,1%	2,6%	1,8%	1,2%	1,6%	1,9%
evt_50	GGBR4	0,19%	3,1%	3,5%	2,3%	3,4%	3,0%	4,1%
evt_51	CVCB3	0,14%	2,1%	4,9%	4,2%	2,8%	2,8%	2,9%

Source: Elaborated by authors