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Does Investor Attention Affect Trading Volume In The Brazilian Stock Market?

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Non-technical Summary

The fact that the amount of information available in the financial markets is much greater than people can absorb has recently been investigated by researchers.

Academic literature provides evidence that if the public media spotlights a particular stock, it is more likely to attract investor attention and it might cause price pressure on this asset. This investor attention bias is explained by the fact that unsophisticated investors rely heavily on public media since they do not have access to the full range of information channels that professional investors do.

This paper investigates the relationship between the trading volume in the Brazilian stock market and investor attention. We use as a measure of investor attention the media coverage of each firm released in the Brazil's leading business newspaper and the Brazil's general newspaper with largest circulation.

The results show that there is a positive reaction of the trading volume on the day the news is released (i.e., on the day after the news actually occurred), which suggest that unsophisticated investors react to news published by major newspapers. However, this result is only significant when the news is negative for the firm and in periods when the stock index level is high. Moreover, less visible companies in the media are more susceptible to the attention effect when news is simultaneously in both newspapers.

Sumário Não Técnico

O fato de a quantidade de informações disponíveis nos mercados financeiros ser extremamente maior do que a capacidade de absorção e interpretação dos investidores tem sido recentemente investigado por pesquisadores.

A literatura acadêmica fornece evidências de que quando a mídia em geral destaca uma ação específica, é bem provável que esse ativo atraia a atenção de investidores, o que pode causar pressão em seus preços. Essa atenção a meios de comunicação não especializados é explicada pelo fato de investidores menos sofisticados dependerem mais fortemente de informações públicas, uma vez que não têm acesso a gama de canais de informação dos investidores profissionais.

Este artigo investiga a relação entre o volume de negociação no mercado de ações brasileiro e a atenção do investidor. Utilizamos as coberturas jornalísticas de cada empresa como medida de atenção dos investidores, divulgadas no jornal de maior circulação e no jornal de negócios líder no Brasil.

Os resultados deste artigo mostram que o volume de negociação é alto no dia de publicação das notícias nos jornais (ou seja, no dia seguinte ao evento). Esse resultado sugere que investidores menos especializados são influenciados pelos jornais de grande circulação. Contudo, essa relação positiva ocorre apenas em períodos em que o índice de ações está relativamente alto e para notícias ruins em relação à firma. Além disso, as empresas menos visíveis na mídia são mais suscetíveis a esse efeito quando as notícias são divulgadas simultaneamente em ambos os jornais.

Does Investor Attention Affect Trading Volume In The Brazilian Stock Market?[*]

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Abstract

Given the large amount of information available about companies and stocks, investors have to be selective about the information they process. This behavior is related to the attention effect, which comes from the natural human incapacity to process all existing information. The aim of this paper is to investigate the relationship between a proxy of attention effect, media coverage, and trading volume in the Brazilian stock market. Media coverage may attract unsophisticated investors. The results suggest that, in periods with high stock index level, there is a strong positive reaction of the trading volume on the same day of the news release in printed newspapers. Moreover, this relation occurs only if the news is negative for the firm. In addition, less visible companies in the media are more susceptible to the attention effect when news is more widespread.

Keywords: Attention effect; behavioral finance; investor behavior; media coverage; trading volume.

JEL Classification: G14

1. Introduction

Standard economic models assume that investors understand the nature of the economic problems they face. Hence, they can apply the appropriate tools to reach the best decision. However, Kahneman (1973) points out that the amount of information available is much greater than people can absorb and that attention is a scarce resource. This means that not only is the content of information what matters, but also how it is presented. In financial markets, Hirshleifer et al. (2004) show that the same information presented in a less salient manner (footnotes instead of the body) can affect investor perceptions and asset prices. Meta (2015) claims that if the media spotlights a particular stock, it is more likely to attract investor attention. Barber and Odean (2008) verify the existence of an attention effect in the US stock market and find positive price pressure on assets that receive more attention from investors.

This study investigates the relationship between the trading volume in the Brazilian stock market and investor attention, following Yuan (2015). The proxy we use for investor attention is media coverage. As specialized investors have access to financial data providers, they usually trade a stock on the day the news about it is disclosed. This work focuses on unsophisticated traders, which we hypothesize to trade on the next day the news occurred (the day the news is published by newspapers). .

The attention to a particular factor results from the natural human incapacity to process a large amount of information. Hou, Peng and Xiong (2006) find empirical results that are consistent with the hypothesis that attention should influence underreaction and overreaction of investors. Barber and Odean (2008) claim that individual investors have a tendency to buy stocks that attract the most attention, either because they showed abnormal performance the previous day, with large variations in return or large volumes traded, or because of strong news coverage. Yuan (2015) finds that attention causes individual investors to dramatically reduce stock positions in good times and modestly increase stock positions in bad times. According to the author, the impact of attention is also present in institutional investors' trading. The same result is described in Corwin and Coughenour (2008). Chakrabarty, Moulton and Wang (2017) find that investors' decisions are seriously affected by the day of the week and by days of multiple firms' bad profits, selected as proxies for attention.

How to define a proxy for attention is a significant problem for researchers. As there is no single measure of investor attention, it is necessary to formulate proxies. Some measures used

are media coverage (Chan, 2003; Fang and Peress, 2009; Gadarowski, 2002; Hillert and Ungeheuer, 2016; Hillert, Jacobs and Müller, 2014; Yuan, 2015; Engelberg and Parsons, 2011; Dellavigna and Pollet, 2009; Kaniel *et al*, 2007), internet search frequency (Fink and Johann, 2014; Jiang, 2016) and blog comments (Hu *et al*, 2013). There are other proxies derived from the critical assumption that if a financial variable were extreme, investors would have paid attention to the trading volume (Li *et al.*, 2013), extreme returns (Barber and Odean, 2008) and even advertising expenses (Lou, 2014; Chemmanur and Yan, 2009). However, Da *et al*. (2011) claim that these financial variables may be driven by factors unrelated to investor attention.

In this paper, we work with media coverage, which is a direct measure of investor attention, using Brazil's leading business newspaper and Brazil's general newspaper with largest circulation. Yuan (2015) claims that unsophisticated investors rely heavily on public media since they do not have access to the full range of information channels that professional investors do. Actually, media coverage is the main source of information for individual investors (Hillert and Ungeheuer, 2016; Peress, 2008; Tetlock, 2007; Fang and Peress, 2014) and, therefore, it is an important mechanism for drawing the attention of individual investors.

We measure the firms' media coverage through daily news in the printed newspaper versions contained in the websites. All the news is hand collected. We chose this method for two reasons. First, the general newspaper is not specialized, and an article could use the company's name or the ticker identification out of the desired context. Second, in our methodology, we need to identify whether the news is positive or negative.

We follow Yuan (2015) methodology to measure the relationship between investor attention and trading volume. Our sample is composed of 17 stocks listed on the Brazilian stock exchange selected according to their size and liquidity characteristics from 2010 to 2015. To our knowledge, this is the first research addressing the question of how investor attention, measured by media coverage, affects the trading volume in the Brazilian market.

The results show that the trading volume is negatively related to news on the previous day (which means that the strong positive reaction occurs on the same day of the news). This suggests that unsophisticated investors react to news published by major newspapers. Moreover, this relation occurs only if the news is negative for the firm and in periods when the stock index level is high. In addition, less visible companies in the media are more susceptible to the attention effect when the news is more widespread, i.e., when the news is simultaneously in both newspapers.

The remainder of this paper is organized as follows. The next section contains a brief review of the literature on the subject. We present the database and describe the methodology in the third section. The fourth section presents the results, and fifth section the conclusions.

2. Literature Review

Understanding the dynamics of the financial market and predicting its behavior have always been a fundamental subject for investors. However, only recently investor behavior has been considered an important explanatory factor. This behavior component complements the classic economic models, providing new ground for price discovery studies. Behavioral finance attempts to explain market anomalies from the perspective of psychology and the behavior of market agents. As a new research topic, investor attention has been attracting growing attention (Jiang, 2016).

According to Peng and Xiong (2006), attention is a scarce cognitive resource and requires diversion of cognitive resources from other tasks. Peress (2008) and Dellavigna and Pollet (2009) corroborate this idea by stating that human beings need to focus on a few received signals, since they do not have the capacity to process many tasks at the same time. Although these limitations seem obvious, there is no evidence on how this affects investors' choices.

In fact, the literature on this subject is in general recent and empirical. One of the first studies is Huberman and Regev (2001), which claims that the publication of an article in the New York Times about a new cancer-curing drug generated a daily return of more than 300% in EntreMed stocks, even though the same story had already been published five months earlier in other newspapers. Barber and Odean (2008) document that, since attention is a scarce resource, information that attracts more investors is more likely to be considered. However, it is necessary to separate individual and institutional investors. In theory, institutional investors have more resources to process large amounts of data and thus do not suffer from the attention effect, unlike individual investors, whose limited attention is more obvious.

This is the central point of one of Yuan's (2015) hypotheses, which seeks to understand whether attention levels affect individual and institutional investors' behavior in the same way. Corwin and Coughenour (2008) discuss the impact of effort allocation due to limited attention in financial markets. They point out that individual specialists have constraints that restrict their ability to monitor and process multiple orders simultaneously, particularly during busy trading

periods. They test this hypothesis using information from the portfolios of these experts and conclude that this group of investors also suffers from limited attention, resulting in less frequent attention paid to the trading volume and an increase in the costs of the trades.. They test this hypothesis using information from the portfolios of these experts and conclude that this group of investors also suffers from limited attention, resulting in less frequent attention paid to the trading volume and an increase in the costs of these trades.

Another study focused on this difference is Barber and Odean (2008). They test if individual investors are more likely to buy rather than sell the stocks that catch their attention, and if individual investors suffer more from this effect than professional investors do. Both hypotheses are supported by their results. On the second hypothesis, they conclude that individual investors tend to buy more shares on high attention days, while institutional investors buy more on low attention days.

Barber and Odean (2008) argue that many models deal with buying and selling stocks as two sides of the same coin, differentiated by the sign. However, for rational investors, the decision to buy or sell is fundamentally different. If on the one hand rational investors prefer to sell their loss-making assets by rolling taxes forward, on the other emotional investors prefer to sell gains, rolling forward the possible sense of loss. The authors further conclude that when buying stocks, investors are faced with the human limitation of information processing, due to the large number of alternatives to choose from. However, when deciding which stocks to sell, they no longer suffer from the same problem, so they tend only to trade stocks they already own, meaning a smaller set of possibilities.

Tetlock (2007) also tries to understand the effect of investor attention limitations. The author builds a simple measure of media pessimism from a column in the Wall Street Journal and estimates the relation of this indicator to the market behavior. He finds that high media pessimism predicts decrease in market prices followed by a reversal, and that an unusual index of pessimism (high or low) predicts a high volume of transactions.

Yuan (2015) empirically explores high-profile events (measured by Dow Jones movements and events reported on the cover of two selected journals) to predict investor behavior and market returns. He uses information from the portfolios of these specialists. The results show that the impact of attention is strong. A high level of attention makes individual investors reduce their holdings dramatically when the market is bullish and increase their holdings moderately

when the market is bearish. Aggressive selling by individual investors induces institutional investors to trade, which has a negative impact on market prices.

The impact of psychological factors in decision-making has already been measured by related studies, such as Gerber, Karlan and Bergan (2009), who study random samples of households that subscribe to a newspaper. Their findings suggest that political position is related to the newspaper taken. Green and Jame (2013) find that companies with more easily pronounced names have a higher probability of having greater liquidity.

Regarding articles that use media coverage as an attention measure, it is possible to observe an increase in trading volume at the moment the event occurs and a reversal in the long term. This effect is less pronounced for less visible companies or on days of high distraction (Peress, 2008, Engelberg and Parsons, 2011, Hillert, Jacobs and Müller, 2014).

Stocks not covered by the media have higher extreme returns than stocks with high media coverage. These results are stronger among small caps and confirm that news affects returns (Fang and Peress, 2009; Gadarowski, 2002). However, due to the limited attention, investors tend not to respond immediately to news published on Fridays (Dellavigna and Pollet, 2009) and prices reflect bad news slowly (Chan, 2003). In general, the evidence shows that media coverage can intensify investor bias. Finally, it is important to note that the majority of these empirical works are about the U.S. market, followed by the Asian and the European markets. For Brazil, we are not aware of any literature in this area.

3. Data

The database of this study is composed of news releases by two high-circulation national newspapers, as a measure for investors' attention, and of market indicators of the firms' stocks. The data are daily from January 2010 to July 2015.

3.1 Company Selection

Since the daily news was manually collected, we worked only with stocks of the main Brazilian companies. Therefore, we only used firms contained in the most important Brazilian stock market index, the Ibovespa. We also filtered companies based on the market value and

stock liquidity. This choice assumes that larger companies and more liquid stocks have a higher level of exposure in the media. The five largest and smallest companies were selected, as well as the five most and least liquid stocks.

Table 1 – Stocks of Ibovespa divided into two groups by market value and liquidity. The Sample of the Group 1 contains the largest and the most liquid companies of the Ibovespa, and Group 2 contains the firms with the highest market value among the least liquid companies of the Ibovespa.

Company	Ticker	Percentage of Participation in Ibovespa	Liquidity Ranking	Market Value Ranking	Group
Ambev	ABEV3	9.01%	18	4	
Bradesco	BBDC4	7.85%	4	3	
	BBDC3	1.83%			
Banco do Brasil	BBAS3	2.39%	5	6	
ItauUnibanco	ITUB4	10.10%	3	5	1
Petrobras	PETR4	4.10%	2	1	
	PETR3	3.48%			
Vale	VALE5	2.81%	1	2	
	VALE3	2.63%			
CPFL Energia	CPFE3	0.76%	45	20	
Equatorial	EQTL3	1.12%	48	48	
Estacio	ESTC3	0.48%	34	46	
Marfrig	MRFG3	0.26%	37	47	
MRV	MRVE3	0.33%	21	45	2
Multiplan	MULT3	0.55%	44	35	
RaiaDrogasil	RADL3	1.43%	46	44	
Weg	WEGE3	0.97%	47	23	
Total		50.10%			

The final sample was composed of the sum of these two sets, resulting in 14 companies and 17 stocks. We divided them into two groups, to enable evaluating the impact of news on companies with different characteristics. As shown in Table 1, Group 1 contains the largest and the most liquid companies, while Group 2 contains the firms with the highest market value among the least liquid companies.

The stocks of the sample account for 50.1% of the Ibovespa. The average participation of those stocks in the Ibovespa is 2.95%. The remaining Ibovespa stocks have an average participation of 1.19%.

3.2 News Published by the Newspapers

According to Yuan (2015), media is one of the main sources of information for investors. This is especially important for unsophisticated investors since they do not have access to the wide range of information channels that professional investors do. We chose media exposure as the proxy of investor attention.

The newspapers used in this study are *Folha de São Paulo* (a general interest newspaper) and *Valor Econômico* (a financial and business newspaper). These newspapers were selected because of their national relevance. *Folha de São Paulo* (*Folha*) was the Brazilian newspaper with the largest circulation (digital and printed) in the studied period. *Valor Econômico* (*Valor*) is the first among financial newspapers (ranked 18th overall). Table 2 details the ranking and the average daily circulation per year.

Table 2 – Ranking and Average Daily Circulation of Folha de São Paulo e Valor Econômico

Newspaper	*Folha*		*Valor*	
Year	Position	Average Daily Circulation	Position	Average Daily Circulation
2010	2	294,498	21	54,627
2011	2	286,398	19	60,005
2012	1	297,650	18	61,861
2013	2	294,811	18	58,539
2014	1	351,745	18	59,798
2015	3	189,254	17	41,431

Source: Newspaper Association of Brazil

The news was manually collected from each newspaper's website in the printed version section. The news coming from *Folha* is identified by company name and every news item is computer-filtered and classified as positive, negative or "not relevant". This classification was confirmed by personal evaluation of the news.

The news coming from *Valor*, in the same period, are also collected by company name. Taking into account that this newspaper is already restricted to financial matters, we classify all news as relevant. Since the *Valor* website does not allow any kind of filtering, we did not classify the news as positive or negative.

We used two control measures for human error. The first was comparison of total compiled news items (automatically counted by a computer program) with the number indicated at the newspaper's website by searching for the company name. The second was to redo the news sample of one year for each company for each newspaper and to compare with the previous database. For both controls, if we verified an error greater than 1% between the two total compiled news items, we built the sample again.

Figure 1 – Number of News Items per Month in *Folha de São Paulo* and *Valor Econômico* Considering all Companies
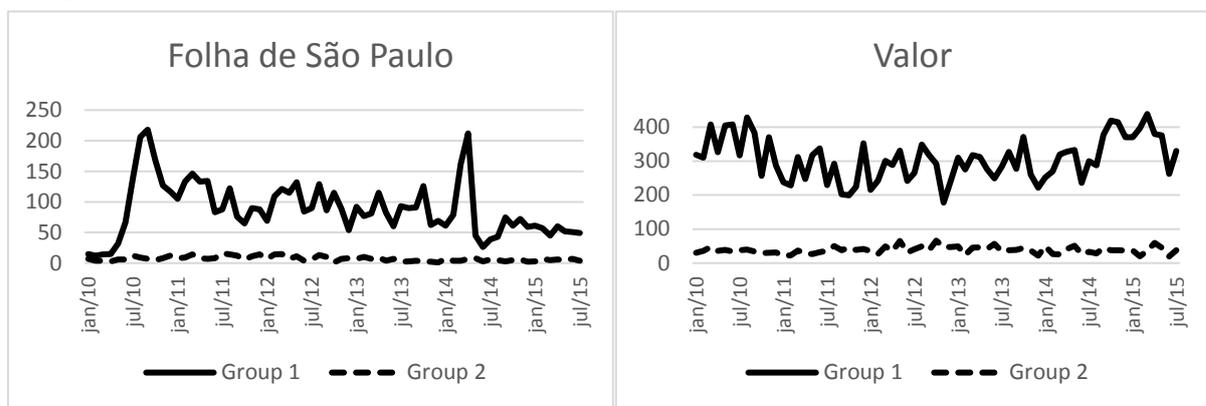
Figure 1 shows that the firms of Group 1 presents a much larger amount of data (number of news items) than the ones of Group 2, both in *Folha* and *Valor,* during all the studied period and it can be explained by the selection criteria.

Table 3 corroborates the difference between the two groups. The daily average number of circulated news items per firm in Group 1 is 0.66 for *Folha* and 2.14 for *Valor*. For Group 2, the average number of items is 0.04 for *Folha* and 0.20 for *Valor*. Since *Valor* is more specialized, it is supposed to have more news about the companies.

Table 3 – Descriptive Statistic from the Sample of News Items Split by Group

	Group 1			Group 2		
	Only Folha	*Only Valor*	*Both Folha and Valor*	*Only Folha*	*Only Valor*	*Both Folha and Valor*
Number of News Items	5,559	18,052	15,510	432	2,290	412
Average (per day, per firm)	0.66	2.14	1.84	0.04	0.20	0.04
Maximum (per day, per firm)	18	32	32	4	9	9

3.3 Market Data

Following the model of Yuan (2015), the market variables we used in this study are the volume on day t (the day the news is published by the newspaper) and on day $t+1$, return on day t and the cumulative return in the previous 250 business days. The hypothesis that volume is related to investor attention has been investigated by several authors (Peress, 2008; Pollet and Dellavigna, 2009; Engelberg and Parsons, 2011; Tetlock, 2007).

As three of the sample companies (Banco do Brasil, Petrobras and Vale) have more than one stock in the Ibovespa and the news variable is measured by company name, we choose the share type (common or preferred shares) that have higher liquidity in the studied period. The preferred shares (BBAS3, PETR4 and VALE5) were selected for the three companies.[1]

Table 4 – Average Trading Volume per Working Day by Stock

Company	Ticker	Average Trading Volume (R$)	Average Trading Volume (% of total)
Group 1		**1,947,063,183**	**91.8%**
Ambev	ABEV3	49,721,915	2.3%
Bradesco	BBDC4	165,362,142	7.8%
Banco do Brasil	BBAS3	206,946,328	9.8%
ItauUnibanco	ITUB4	297,577,524	14.0%
Petrobras	PETR4	600,350,209	28.3%
Vale	VALE5	627,105,064	29.6%
Group 2		**173,894,651**	**8.2%**
CPFL Energia	CPFE3	18,385,904	0.9%
Equatorial	EQTL3	9,222,280	0.4%
Estacio	ESTC3	27,299,142	1.3%
Marfrig	MRFG3	24,926,521	1.2%
MRV	MRVE3	47,560,591	2.2%
Multiplan	MULT3	19,157,590	0.9%
RaiaDrogasil	RADL3	16,162,942	0.8%
Weg	WEGE3	11,179,681	0.5%

Table 4 shows the average trading volume of the stocks per day. Petrobras and Vale together represent about 60% of the total sample, and also are the companies with the largest

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[1] Preferred shares in the Brazilian stock market work as common shares, but with no voting rights.

individual participation, with more than 600 million reais (R$) traded on average per working day, each. On the other hand, Equatorial Energia has the lowest participation, representing 0.4% of the sample, with a trading volume of approximately 9 million reais per working day.

Table 5 shows that the market variables have quite different characteristics, supporting the analysis of distinct groups. For instance, the average trading volume of Group 1 is about 15 times higher than that of Group 2.

Table 5 – Descriptive Statistics (per day) of Trading Volume, Return and Previous One-Year Return

	Group 1			Group 2		
	Volume	*Ret(t)*	*Ret(t-250)*	*Volume*	*Ret(t)*	*Ret(t-250)*
Average	R$ 324,510,530	0.0%	219.3%	R$ 21,734,633	0.0%	136.4%
Minimum	R$ 417,980	-12.3%	-39.3%	R$ 2,150	-24.8%	-77.8%
Maximum	R$ 3,042,594,245	11.9%	1,374.3%	R$ 453,249,917	12.9%	1,030.7%
Standard Deviation	R$ 290,410,985	2.0%	233.9%	R$ 23,666,801	2.2%	183.5%
Median	R$ 240,512,419	0.0%	134.1%	R$ 15,355,309	0.0%	74.9%

4. Methodology

According to Yuan (2015), news can cause variations in attention levels, causing a significant impact on transaction patterns and market prices. Based on this assumption, we investigated the relationship between media coverage in Brazil, as a proxy of investor attention, and the trading volume of stocks listed in the Ibovespa.

Our tests are based on the model of Yuan (2015). The author comments in his work that the main challenge of this type of research is related to the manual collecting work. Therefore, to make this study feasible we limited the number of stocks.

Similar to the original paper, we used news published in two newspapers with large national circulation. Yuan (2015) classifies as "news event" when the company appears with news on the cover (of the newspaper or business section), with the title containing information about the stock performance. In this point, we made something different. The adjustment was the fact that, for both newspapers, the news was collected when the company appears on any place of the article. Then, for *Folha*, we filter the article by keywords to see if the news has contents

related to financial market. For *Valor*, this filtering was not possible. However, we believe this limitation had no impact on the result, since the news circulated by this newspaper already has the characteristic of being focused on the financial market. For *Folha*, we also classified the items as positive or negative.

Yuan (2015) also includes a dummy variable that identifies good periods, i.e., when the market price levels are high, either because the economy is better or because there is optimism in the market. He defines this variable when the US NYSE-AMEX index closes within the highest 10% of the previous two years. For this study, we follow the same criterion using the Ibovespa rather than a US index. The model based on Yuan (2015) is:

$$Vol_{i,t+1} = a + \beta_1.News_{i,t} + \beta_2.D_t^G + \beta_{12}.News_{i,t}.D_t^G + c.Vol_{i,t} + d_1.ret_{i,t} +$$
$$d_2.ret_{i,t-250:t} + \varepsilon_{t+1} \quad , \tag{1}$$

where the dependent variable, $Vol_{i,t+1}$ is the trading volume of the company *i* on day *t+1*, $News_{i,t}$ is the dummy variable for news event of the company *i* on day *t*, and D_t^G is the dummy variable for time periods with high index level ("good days"). The coefficient β_1 indicates the predictive ability of market news in "no good days", and β_{12} shows the difference between the predictive abilities of news items in "good days" and "no good days". The terms $ret_{i,t}$ and $ret_{i,t-250:t}$ are, respectively, the past (one-day) stock return on day *t* and the past one-year return on day *t* of the stock *i*.

We ran the regression in the Stata program, with robust standard deviation selection to mitigate the effect of outliers. The model was applied three times for each group: first with news circulated only by *Valor*, second with news circulated only by *Folha*, and finally with news published in both newspapers.

We tested an additional model, based on days when there was positive financial market news (positive news) about the company *i* published in *Folha*:

$$Vol_{i,t+1} = a + \beta_1.NewsB_{i,t} + \beta_2.D_t^G + \beta_{12}.NewsB_{i,t}.D_t^G + c.Vol_{i,t} + d_1.ret_{i,t}$$
$$+ d_2.ret_{i,t-250:t} + \varepsilon_{t+1} \quad , \tag{2}$$

where $NewsB_{i,t}$ is the dummy variable for positive news and $NewsB_{i,t}.D_t^G$ is the dummy variable for positive news in "good days". The aim is to analyze the relationship between news events and aggregate trading volume when the news is classified as positive.

5. Results

In this section, we present the results of the regressions (1) and (2) and then we briefly relate our results to the previous literature.

5.1 Empirical results

We investigated the impact of news in newspapers on trading volume and the impact of this news during "good days". The panels of Table 6 present the results of regression (1). The relation between event news and the trading volume (coefficient β_1) is not significant for Group 1. However, for the stocks of Group 2, considering news in both newspapers, the relationship is negative and significant. This can be explained by the fact that the firms in Group 2 do not usually attract media coverage and that there is a tendency that the volume falls on a day after the new is in the newspapers, showing that investors trade relatively more on the day of publication.

According to Yuan (2015), the effects of news are expected to increase volume on "good days" as investors sell more in these periods and to decrease trading volume on the next day. Our results confirm the claims of Yuan (2015). First, the coefficient of the variable for "good days", β_2, is most of the times negative and significant. Second, the coefficient of the variable news on good days, β_{12}, is negative and significant for the total sample (*All*) in the three panels.

As expected, the trading volume coefficient (*c*) is positive and significant to explain the next day trading volume. This means there is a positive correlation of the trading volume from one day to the next during the period analyzed.[2] The results also show a certain homogeneity throughout the regressions, with the R^2 remaining between 0.295 and 0.371 in all cases. The coefficient of the past stock return is negative and non-significant as is the one-year past stock return, similar to Yuan's results.

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[2] The correlation between the trading volume variable on day *t* and *t*+1 is high and statistically significant. This can influence the R² of the regression, which is usually low for regressions analyzed in panel in this kind of research and, in this case, presents a slightly higher value, similar to the results obtained by Yuan (2015).

Table 6 – Regression of the Trading Volume Following News in the Newspapers

$$Vol_{i,t+1} = a + \beta_1.News_{i,t} + \beta_2.D_t^G + \beta_{12}.News_{i,t}.D_t^G + c.Vol_{i,t} + d_1.ret_{i,t} + d_2.ret_{i,t-250:t} + \varepsilon_{t+1}$$

A: News only in Valor

	a	β₁	β₂	β₁₂	c	d₁	d₂
Group 1	**139.00**	- 10.80	- 20.30	- 0.21	**0.61**	- 83.60	3.18
R² : 0.369	(0.001)	(0.484)	(0.076)	(0.862)	(0.000)	(0.527)	(0.579)
Group 2	**9.63**	1.28	- 0.75	- 2.21	**0.62**	- 8.74	- 0.23
R² : 0.296	(0.000)	(0.054)	(0.100)	(0.066)	(0.000)	(0.719)	(0.710)
All	**62.50**	- 1.14	- 4.56	**- 11.30**	**0.60**	- 38.80	1.94
R² : 0.367	(0.000)	(0.828)	(0.116)	(0.022)	(0.000)	(0.404)	(0.615)

B: News only in Folha

	a	β₁	β₂	β₁₂	c	d₁	d₂
Group 1	**135.00**	- 6.66	**- 20.00**	- 0.42	**0.61**	- 80.10	2.89
R² : 0.370	(0.000)	(0.578)	(0.005)	(0.635)	(0.000)	(0.540)	(0.632)
Group 2	**9.89**	- 0.12	**- 1.18**	- 1.67	**0.62**	- 8.94	- 0.23
R² : 0.295	(0.000)	(0.829)	(0.024)	(0.317)	(0.000)	(0.715)	(0.703)
All	**63.10**	- 3.78	**- 6.61**	**- 13.90**	**0.60**	- 35.90	1.86
R² : 0.367	(0.000)	(0.654)	(0.030)	(0.025)	(0.000)	(0.443)	(0.636)

C: News simultaneously released in Folha and Valor

	a	β₁	β₂	β₁₂	c	d₁	d₂
Group 1	**137.00**	- 12.00	**- 21.80**	0.01	**0.61**	- 83.50	2.91
R² : 0.371	(0.000)	(0.362)	(0.001)	(0.980)	(0.000)	(0.528)	(0.630)
Group 2	**9.89**	**- 2.43**	**- 1.17**	- 2.87	**0.62**	- 8.82	- 0.23
R² : 0.295	(0.000)	(0.029)	(0.019)	(0.283)	(0.000)	(0.719)	(0.706)
All	**64.00**	- 9.22	**- 7.42**	**- 11.50**	**0.60**	- 37.40	1.87
R² : 0.368	(0.000)	(0.383)	(0.021)	(0.012)	(0.000)	(0.428)	(0.636)

The numbers inside parentheses next to each variable are the p-values. Bolded numbers represent significant coefficients at 5%.

Table 7 shows the regression for positive news in *Folha*. We can see that the classification of the news changes the coefficient significance of the variable "good days" for both groups when compared to Table 6 (β_{12} is not significant anymore). There are three kinds of events that influence this coefficient, "no news on a good day", "positive news on a good day" and "negative news on a good day". Since the event "negative news on a good day" is not in the sample of the regression of Table 7 (and it was in the regression of Table 6), the result suggests that the lack of this information makes the coefficient lose significance. This means that the event "negative news on a good day" can help explain the decrease in trading volume the next day, probably because it causes a higher volume on the current day. Therefore, we can conclude that only when the news is negative for the firm and in periods (and when the stock index level is high) there is a positive reaction of the trading volume on the current day of the news.

Table 7 – Regression of trading volume considering news classified as positive ones in *Folha*.

$$Vol_{i,t+1} = a + \beta_1.NewsB_{i,t} + \beta_2.D_t^G + \beta_{12}.NewsB_{i,t}.D_t^G + c.Vol_{i,t} + d_1.ret_{i,t} + d_2.ret_{i,t-250:t} + \varepsilon_{t+1}$$

News classified as positive ones in Folha

	a	β_1	β_2	β_{12}	c	d_1	d_2
Group 1	**112.00**	- 3.14	2.77	- 2.15	**0.55**	**- 509.00**	- 5.70
R² : 0.368	(0.000)	(0.606)	(0.528)	(0.242)	(0.000)	(0.008)	(0.162)
Group 2	**11.00**	- 2.42	0.65	- 9.47	**0.58**	91.00	**2.19**
R² : 0.589	(0.020)	(0.429)	(0.657)	(0.206)	(0.004)	(0.140)	(0.028)
All	**97.50**	- 3.42	1.28	- 18.60	**0.54**	**- 401.00**	- 5.08
R² : 0.367	(0.000)	(0.477)	(0.739)	(0.196)	(0.000)	(0.002)	(0.121)

The numbers inside parentheses next to each variable are the p-values. Bolded numbers represent significant coefficients at 5%.

When the news is positive, the recognition of the day as "good" loses importance to explain trading volume (β_2 is not significant anymore). Furthermore, the coefficient of the past stock returns is significant and the sign suggests a positive impact on the next day trading volume for Group 2 (companies with less media coverage) and a negative impact for Group 1 and the whole sample.

5.2 Considerations

As previously described, this study investigated the relationship between the attention of investors in Brazil, measured by media coverage, and the volume traded on the Brazilian Stock Exchange. The conclusions of previous works show that investors' behavior is biased by constrained cognitive resources. It is possible to observe that the trading volume increases during an event of high attention and then this effect reverses.

The first point observed in the present study is that the stock trading volume decreases the day after news on "good days", which suggests an immediate effect of the published news. This result is similar to that of Yuan (2015) and his notion that the news effects on trading volume are larger on "good days", as investors sell more in those periods. Barber and Odean (2008) also argue that investors tend to buy more stocks on days of high attention, with decreasing trading in the upcoming days.

Another point to be emphasized is that news on "no good days" does not affect market behavior the next day to the firms with liquid stocks. This effect is also found by Chan (2003),

who examined the impact of the media on stock returns and showed that the market takes longer to reflect news on non-positive periods.

Regarding the division of the groups by size and liquidity of the companies, the significance of the coefficient of the variable "news on no good days" in less liquid firms to explain trading volume is related to previous studies. For instance, in assessing the relationship between media coverage and stock returns, Chan (2003) found a stronger effect on small caps and Gadarowski (2002) also reported similar results.

6. Conclusion

The literature suggests that investor attention play an important role in market behavior. Given the vast amount of information available about firms and stock trading, it is inevitable that investors have to be selective. This paper studies the link between a proxy of attention effect, media coverage, and the stock trading volume of firms listed on the Brazilian stock exchange. Media coverage may attract attention of unsophisticated investors. To our knowledge, this is the first study to investigate the effects of market-wide attention on a measure of stock performance in the Brazilian market.

We measure the firms' media coverage through daily news in the printed newspaper versions of the Brazil's leading business newspaper and of the Brazil's general newspaper with largest circulation. For the latter we could also detect whether the news is positive or negative.

The results suggests that the trading volume is negatively related to news on previous days. This happens because the strong positive reaction occurs on the same day of the news release in the printed newspapers, suggesting that unsophisticated investors react to this news. However, this result is only significant for news in periods with high stock index level and when the news is negative for the firm. Another result is that less visible companies in the media are more susceptible to the attention effect when news is more widespread.

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