

CUE496 - Do the Words Matter? An Analysis of the Linguistic Sentiment of Earnings Conference Calls and Abnormal Stock Returns in Brazilian Companies

Autoria

Lívia Arruda Castro

UNIVERSIDADE FEDERAL DO CEARÁ

Dante Baiardo Cavalcante Viana Junior

UNIVERSIDADE FEDERAL DO CEARÁ

Vera Maria Rodrigues Ponte

UNIVERSIDADE FEDERAL DO CEARÁ

Maiara Chagas Lima

UNIVERSIDADE FEDERAL DO CEARÁ

Resumo

In finance and accounting literature, different aspects are presented as possible factors related to stock returns. More recently, studies have been dedicated to analyzing the potential influence of the tone and sentiment of corporate reports, newspaper articles, press releases, and investor message boards on stock prices. Thus, based on assumptions of Legitimacy Theory, we investigate whether cumulative abnormal returns (CAR) on the stocks of Brazilian listed companies are associated with the linguistic sentiment of quarterly earnings conference calls. Using a sample of 78 observations related to the conference calls of 24 companies listed in the Novo Mercado segment in 2016-2017, we measured CAR using the market model and the linguistic sentiment of earnings conference calls using IBM's Watson Natural Language Understanding platform. An analysis of the results of statistical tests such as descriptive results, correlation matrix, and correspondence analysis enables it to be inferred that, in general, there is a positive association between cumulative abnormal returns and the linguistic sentiment of quarterly conference calls. Thus, it is conjectured the possibility that the speeches made by managers in conference calls legitimize company performance in the market, by altering the perception of investors in the stock market and leading to implications for the value of the stocks traded.

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ABSTRACT

In finance and accounting literature, different aspects are presented as possible factors related to stock returns. More recently, studies have been dedicated to analyzing the potential influence of the tone and sentiment of corporate reports, newspaper articles, press releases, and investor message boards on stock prices. Thus, based on assumptions of Legitimacy Theory, we investigate whether cumulative abnormal returns (CAR) on the stocks of Brazilian listed companies are associated with the linguistic sentiment of quarterly earnings conference calls. Using a sample of 78 observations related to the conference calls of 24 companies listed in the Novo Mercado segment in 2016-2017, we measured CAR using the market model and the linguistic sentiment of earnings conference calls using IBM's Watson Natural Language Understanding platform. An analysis of the results of statistical tests such as descriptive results, correlation matrix, and correspondence analysis enables it to be inferred that, in general, there is a positive association between cumulative abnormal returns and the optimism sentiment of quarterly conference calls. Thus, it is conjectured the possibility that the speeches made by managers in conference calls legitimize company performance in the market, by altering the perception of investors in the stock market and leading to implications for the value of the stocks traded.

Keywords: Linguistic Sentiment; Conference Calls; Abnormal Returns.

1 INTRODUCTION

The question we address is whether cumulative abnormal returns (CAR) on the stocks of Brazilian listed companies are associated with the linguistic sentiment of quarterly earnings conference calls. In finance and accounting literature, the disclosure strategies in the narratives of financial statements and other supplementary information have been presented as possible factors that impact stocks prices and returns.

The theoretical framework proposed by Legitimacy Theory (Clarkson et al., 2008; Deegan, 2002; O'Donovan, 2002; Suchman, 1995; Stanton, Stanton, & Pires, 2004) seeks to establish congruence between the social values associated with or implied by companies' activities and the norms of acceptable behavior in the larger social system they are part of. Corporate reports present a great opportunity for companies to build their reputation and demonstrate compliance with the values of society, since their narratives are a result of corporate decisions. Therefore, the use disclosure strategies by companies derives from the understanding that organizations are encouraged to use such strategies in their discourses when their legitimacy is under threat, as a result of failing to present clear, neutral, and concise speech narratives, as the accounting and financial standards preach.

Recently, international studies have been dedicated to analyzing the potential influence of the tone and sentiment of corporate reports, press releases, investor message boards, and conference calls on stock prices. Most of these studies concentrate on the texts of financial reports (Loughran and McDonald, 2011; Merkl-Davies and Brennan, 2007; Cho et al., 2010; Huang, Teoh, and Zhang, 2014; Pagliarussi, Guimarães, and Ferreira, 2015; Machado and Silva, 2017), and only a few on voluntary disclosure, such as in conference calls (Price, Doran, Peterson, and Bliss, 2008; Blau, Delisle, and Price, 2015; Moreira, Ramos, Kozak-Rogo, and Rogo, 2016) and Apimec Meeting Presentations (Comelato and Terra, 2008).

Conference calls seem to change investors' perceptions, consequently impacting stock returns. Recently, this practice has been used by listed companies as a disclosure mechanism

in order to ensure a better understanding of the results reported to stakeholders. In the United States, this practice is mandatory for listed companies on a quarterly basis. It is known as the “Earnings Conference Call” and its transcription is also disclosed as a report. In Brazil, this practice is still considered as a voluntary mechanism of disclosure, since it is still not regulated by the Brazilian Securities and Exchange Commission (CVM). Nevertheless, the practice represents a unique instrument of disclosure, since it proposes the interaction between two important agents, managers and financial analysts, thus contributing to improving the legitimacy of firms.

The Earnings Conference Call is separated into sections that seem to influence investors in different ways (Blau et al., 2015). The first is the introduction, where management provides an explanation of quarterly performance and any other voluntary additional information. The second part is the question and answer session, when participants can ask the manager about non disclosed information or any unclear disclosed information. Therefore, unlike with any other mandatory or voluntary disclosure mechanism, the manager may be asked about the information disclosed at the moment it is disclosed (Moreira, Ramos, Kozak-Rogo, & Rogo, 2016).

We analyzed the potential association between the linguistic sentiment of the quarterly earnings conference calls and the stock returns of Brazilian listed companies. We based our inferences on a sample of 78 observations related to the conference calls of 24 companies listed in the B3 – Brasil Bolsa Balcão of the Novo Market segment, which only includes companies with high standards of corporate governance, during the period 2016-2017. We employed statistical tests, such as descriptive results, correlation matrix, and correspondence analysis. In general, we found evidence of a positive association between the linguistic sentiment present in the conference calls, specifically related to the questions and answers sections, and abnormal company returns.

This study contributes in three general aspects. First, despite the existence of some studies focusing on tone of language that use a sample of Brazilian firms, it is possible to perceive that these studies have focused on financial statements or management reports (Machado, & Silva, 2017; Pagliarussi, Aguiar, & Galdi, 2016; Pagliarussi, Guimarães, & Ferreira, 2015). Thus, by focusing on conference calls, we make a valuable contribution to this literature. Second, we offer a contribution to the literature on tone of language by measuring linguistic sentiment using IBM’s Watson Natural Language Understanding platform, thus widening the discussion on the theme and going beyond the traditional metrics proposed by the literature (Loughran & McDonald, 2011), which have already been discussed in many studies.

Finally, we expect to make a contribution to the market by giving stakeholders – principally managers – an idea of the importance of tone of language and its implications in the stock market. It is important to note that “textual analysis is an emerging area in accounting and finance and, as a result, the corresponding taxonomies are still somewhat imprecise” (Loughran & McDonald, 2016, p. 2). This study provides a professional and academic verification of the relevance of linguistic aspects to the financial market.

The remainder of this paper is structured in four more sections. In the next section, we present the theoretical framework and some studies on disclosure strategies and text sentiment, outlining the hypotheses. The following two sections describe the data collection and analysis and discuss the results, followed by a section with statistical tests. A summary and conclusion are provided in the final section.

2 BACKGROUND AND HYPOTHESIS DEVELOPMENT

According to Deegan (2002), organizations are part of wider society and compete for scarce resources. In this context, they must continually guarantee their ongoing existence in

order to access the resources, accomplish their mission, and maximize shareholder wealth. In the literature, the premise that entities must act according to the values, principles, rules, and ethical behavior expected by society relates to legitimacy theory. Suchman (1995) identifies this legitimacy as the perception or general assumption that the actions of an entity are desirable or appropriate inside some social context built by standards, values, beliefs, and definitions. To grant legitimacy, society must notice the good behavior of the organization, through the matching of its practices and the standards set by the environment where it operates (O'Donovan, 2002).

From this perspective, we may conclude that companies seek to establish congruence between the social values associated with or implied by their activities and the norms of acceptable behavior in the larger social system they are part of, which is demonstrated through the communication between the company and society, often carried out via corporate reports and related mandatory and voluntary disclosures.

Stanton, Stanton, and Pires (2004) argue that mandatory and voluntary corporate disclosures represent a great opportunity for entities to demonstrate compliance with the values of society, since they are accessed by a wide audience and account for the financial and equity situation of entities with clarifications, justifications, and explanations regarding their activities. Thus, there is the understanding by researchers that organizations are encouraged to use disclosure strategies when their legitimacy is under threat, since the narratives are a consequence of corporate decisions. In this context, corporate disclosure narratives can be used to build the corporate reputation of an organization in order to improve its legitimacy (Clarkson et al., 2008)

According to Merkl-Davies and Brennan (2007), the main disclosure strategies in textual narratives are rhetorical manipulation, which includes persuasive language and alternates between optimistic and pessimistic speeches, and syntactic manipulation, which includes difficult terms to understand. These authors argue that companies can use disclosure strategies in the narratives of financial statements and other supplementary reports in order to disseminate selective information, failing to present clear, neutral, and concise speech narratives in light of unfavorable situations to the organization.

The strategy of rhetorical manipulation corresponds to the sentiment of the text, which can also be understood as the tone of the words used to compose the disclosure speech. Thus, the sentiment of the text affects how the information is interpreted and understood, allowing the speech to express an optimistic, a pessimistic, or a neutral tone, depending on the choice of terms used in the communication process (Davis et al., 2012).

When determined by opportunistic behavior, the choice of words used in the textual narratives of corporate disclosure may result in persuasive language, which results in a misleading understanding, deliberately distorting its content (Merkl-Davies & Brennan, 2007). In this context, we noticed a growing number of studies about disclosure strategies, mostly investigating the textual narratives of corporate financial reports and their impact on the earnings of entities, in addition to a few studies analyzing the textual sentiment of corporate reports and also the transcriptions of Earnings Conference Calls.

Most of the studies which have investigated the sentiment of the textual narratives of disclosure have evaluated the levels of optimism and certainty in the texts by categorizing the words used. The studies that have investigated disclosure reports in English have mostly used DICTION software, which automatically calculates optimism and certainty scores in texts based on a dictionary parametrized in different word lists (DIGITEX, 2000). On the other hand, the studies that have investigated the sentiment of textual narratives in Portuguese have mostly used the list of positive and negative words proposed by Aguiar (2012), a pioneering study in Portuguese, which used the frequency of positive and negative words found in texts in order to calculate the sentiment index proposed by Loughran and McDonald (2011).

Loughran and McDonald (2011) developed six word lists in order to reflect the sentiment of texts: negative, positive, uncertainty, litigious, strong modal, and weak modal words. Based on the frequency of the words, they analyzed the texts of the SEC's 10-K reports for around 8,000 listed companies during the period from 1994 to 2008. The authors found evidence that some word lists are related to market reactions around the 10-K filing date, trading volume, unexpected earnings, and subsequent stock return volatility. This study suggests that textual analysis can contribute to our ability to understand the impact of information on stock returns, and even if tone does not directly cause returns it might be an efficient way for analysts to capture other sources of information.

Merkl-Davies and Brennan (2007) and Cho et al. (2010) investigated the sentiment of corporate reports as an aspect of the quality of disclosure. Both studies found high levels of optimism and uncertainty in the textual narratives of the reports, which indicates the use of disclosure strategies. The results also indicated that low-performing companies emphasize good news, while distracting from texts with bad news, reinforcing the relationship between sentiment and performance. Price, Doran, Peterson, and Bliss (2008) examined the incremental informativeness of quarterly earnings conference calls and the corresponding market reaction, based on the abnormal returns and trading volume influenced by the sentiment of conference call transcriptions. The findings presented that the sentiment of the conference call is a significant predictor of abnormal returns and trading volume. Furthermore, conference call sentiment dominates earnings surprises over the 60 trading days following the call. The authors highlight that the question and answer section of the conference call has incremental explanatory power for post-earnings announcement drift and this significance is primarily concentrated in firms that do not pay dividends, illustrating differences in investor behavior based on the level of cash flow uncertainty. The results also showed that a context specific linguistic dictionary has more explanatory power than a more widely used general dictionary.

Huang, Teoh, and Zhang (2014) investigated the verbal tone of quarterly results announcements, considering the sentiment of the text. Despite the argument that stock pricing considers the information available to the market, the authors found evidence of manipulation of the verbal tone of the disclosures, indicating that investors may be temporarily misled by the sentiment of the texts. Blau et al. (2015) investigated whether sophisticated investors interpret the sentiment of earnings conference calls differently from the general investor population, by examining short selling activity and its relationship with earnings conference call sentiment. They used the unique setting of earnings conference calls to evaluate short sellers' interpretations of the sentiment of the conference calls by examining their investing decisions. The result indicates that sophisticated sellers interpret the sentiment of conference calls more completely than general investors. The incomplete stock price reaction by general investors is due to the lack of reliability that they place on this qualitative information, resulting in overpriced stocks.

Pagliarussi et al. (2015) analyzed the sentiment of information provided in the narrative sections of annual reports and the corporate financial performance of a sample of 120 companies listed on the BM&FBovespa in 2009, -60 with a greater positive variation and 60 with a greater negative variation in net accounting profit. The authors classified keywords into three central topics – profitability, growth, and management – in order to capture the sentiment of the texts. Based on the frequencies in the texts, logistic regressions were used to compare the sentiment of the texts with earnings. The results indicated that in the information linked to the topic of profitability, the sentiment of the text is harmonious with earnings. In the information relating to growth, the harmony is partial. The results also revealed that the more subjective the information, the greater the conflict.

Moreira, Ramos, Kozak-Rogo, and Rogo (2016) analyzed whether the type of news and earnings persistence influence the amount of voluntary information disclosed by companies. The authors used the transcriptions of the conference calls of the companies listed on the BM&FBovespa, in the period from 2008 to 2015, as a proxy for voluntary disclosures. The results indicate that companies with bad news share more information during conference calls than companies with good news. In addition, there was evidence that companies with positive and transitory earnings disclose a greater volume of information than companies with positive and permanent results. Regarding the companies with negative results, the authors did not identify any relationship between persistence and the informational content disclosed.

Comerlato and Terra (2008) investigated whether the information disclosed at Apimec Meeting Presentations during the discussions may influence the abnormal stock returns of Brazilian listed companies. According to the authors, even when the financial reports were already disclosed, there is concern about managers revealing privileged information during the discussion with analysts at those meetings. Thus, the authors analyzed the abnormal stock returns of the companies that promoted Apimec Meeting Presentations during the period from 1997 to 2001. However, the evidence indicates that information disclosed at these meetings did not have any effect on abnormal stock returns.

Machado and Silva (2017) investigated the market reaction during the third quarter of 2014, specifically analyzing the performance of Brazilian industries and the sentiment of the texts of quarterly earnings reports. The analysis revealed that when the company has a lower performance than analysts expect, the sentiment of the reports tends to provoke negative reactions in the market, but there was no evidence of reactions to the sentiment when the company exceeds those expectations. Thus, the results lead to the perception that the sentiment of the reports tends to influence investors at moments of uncertainty about future cash flows from the assets.

In line with legitimacy theory and the hypothesis that textual narratives are a consequence of corporate decisions, we argue that the discourse of corporate disclosure may be intentional and systematically manipulated. We draw on prior research (Moreira et al., 2016; Pagliarussi et al., 2015; Machado & Silva, 2017) and expect that firms use terms as well as language and verbal tone to deliberately obfuscate or mislead the communication presented in their quarterly earnings conference calls. Therefore, we posit that firms with discourse involving optimistic sentiment may change the perception of investors in order to cause positive returns in the stock market for the stocks traded, which is in line with the theoretical framework proposed in other studies (Blau et al., 2015; Cecchini, Aytug, Koehler, & Pathak, 2010; Henry, 2008). Thus, we formulate the following hypotheses:

Hypothesis: There is a positive association between the linguistic sentiment of earnings conference calls and abnormal stock returns.

3 SAMPLE AND RESEARCH DESIGN

3.1 Sample

Our sample consists of Brazilian companies listed in the B3 – Brasil Bolsa Balcão of the New Market segment, which only includes companies with high standards of corporate governance (Bovespa, 2018). We analyzed six conference calls from each firm: four related 2016 and two related to the first half of 2017. Due mainly to the fact that our analyses required the transcription of conferences calls in English, which caused a considerable reduction in possible observations, our analyses were based on 78 observations of firm-quarter earnings conference calls. Table 1 shows the sample divided by quarters.

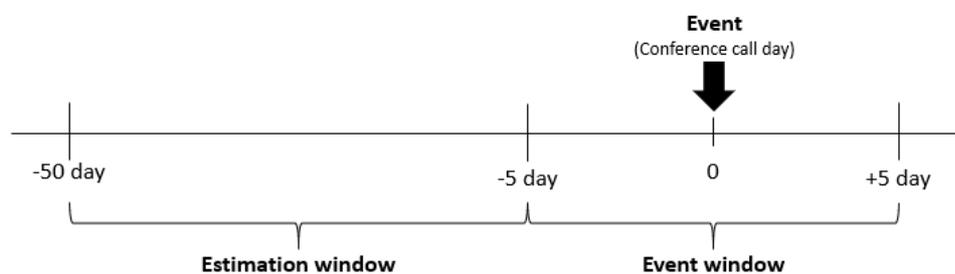
Table 1 – Sample: Conference calls of companies by quarters

Company	1Q2016	2Q2016	3Q2016	4Q2016	1Q2017	2Q2017	Total
ALIANSCCE	0	0	0	0	0	1	1
BRF SA	1	1	0	0	0	0	2
COPASA	1	1	1	1	1	1	6
COSAN	1	1	1	1	0	0	4
CPFL ENERGIA	1	1	0	0	0	0	2
CSU CARDSYST	0	1	0	0	0	0	1
ENGIE BRASIL	1	1	1	1	1	1	6
ESTACIO PART	1	0	1	1	1	1	5
EVEN	0	1	1	1	1	1	5
FLEURY	0	1	0	0	0	0	1
IGUATEMI	0	1	0	1	0	0	2
JBS	0	0	1	0	1	1	3
JSL	0	1	1	0	0	0	2
LINX	1	1	1	0	0	0	3
MAGAZ LUIZA	1	1	0	0	1	1	4
METALFRIO	1	0	0	0	0	0	1
MILLS	0	0	0	0	1	0	1
ODONTOPREV	1	1	1	1	1	1	6
PORTO SEGURO	1	1	1	0	1	1	5
QGEP PART	1	1	1	0	0	0	3
SPRINGS	0	0	1	0	1	0	2
TECHNOS	1	1	0	0	1	0	3
TIM PART S/A	1	1	1	1	1	1	6
TOTVS	1	1	1	0	0	1	4
Total	15	18	14	8	12	11	78

3.2 Measurement of Variables

As it is related to the methodologies of event study, calculating abnormal stock returns requires the “event date”, the “estimation window”, and the “event window” to be defined. In this study, the “event date” corresponds to the conference call day for each firm and quarter.

The “estimation window” covers the period between -50 days and -6 days before the day of the firms’ conference calls, thus forming a temporal window of 45 days. Despite some studies using larger estimation windows (Fé Junior, Nakao, & Souza, 2015), 45 days had to be used here in order not to mix the results between the quarters. Finally, the “event window” ran from 5 days before to 5 days after the conference calls. Figure 1 shows a graphic representation of the temporal windows:

**Figure 1 – Time line of event study**

The abnormal stock returns were calculated using the market model, which relates the return on any given security to the return on the market portfolio (MacKinlay, 1997). For this author, for any security i , the market model is defined as in Equation 1:

$$R_{it} = \alpha_i + \beta_i R_{mt} + \varepsilon \quad (\text{Equation 1})$$

Where:

R_{it} : period-t returns on security i;

R_{mt} : period-t returns on the market portfolio.

β_i was calculated for each firm in the estimation window using OLS estimations, considering the Ibovespa index as the market portfolio (R_{mt}). Both stock and market portfolio returns were calculated using continued capitalization, as represented in equations 2 and 3, respectively:

$$R_{it} = \ln\left(\frac{P_{i,t}}{P_{i,t-1}}\right) \quad (\text{Equation 2})$$

$$R_{mt} = \ln\left(\frac{P_{ibovespa,t}}{P_{ibovespa,t-1}}\right) \quad (\text{Equation 3})$$

Where:

R_{it} : period-t returns on security i;

R_{mt} : period-t returns on the market portfolio.

Finally, given the market model parameter estimates, the abnormal stock returns were calculated as the difference between the real stock return in the event window and the estimated stock return calculated by the model equation (Equation 1), which can be represented algebraically by MacKinlay (1997):

$$AR_{it} = R_{it} - (\hat{\alpha} + \hat{\beta}_i R_{mt}) \quad (\text{Equation 4})$$

Also according to MacKinlay (1997, p. 21), “the abnormal return observations must be aggregated in order to draw overall inferences for the event of interest”. Thus, the Cumulative Abnormal Return (CAR) was calculated for each firm and quarter using the sum of abnormal stock returns from the beginning of the event window (t_1 , -5 days before the conference call) until the end of that window (t_2 , +5 days after the conference call), as expressed in Equation 5:

$$CAR_i(t_1, t_2) = \sum_{t=t_1}^{t_2} AR_{it} \quad (\text{Equation 5})$$

With regards to measuring of linguistic sentiment of the conference calls, in the literature related to linguistic tone applied in finance, it is possible to perceive a lot of studies that have focused on classifying the tone of discourses in positive and negative terms (Blau et al. 2015; Price, Doran, Peterson, & Bliss, 2012), principally by focusing on the Laughran and McDonald (2011) metrics. In the search to contribute with new perspectives linked to the theme of linguistic analysis, we measured the textual sentiment of the conference call discourses using IBM’s Watson Natural Language Understanding (NAU) platform. Developed by the company IBM, the Watson platform aggregates several tools in the area of computing and programming. The NAU platform is a collection of APIs that offer text analysis through natural language processing. This set of APIs can analyze text to help understand its concepts, entities, keywords, sentiment, and other elements (Watson, 2018).

Thus, following the proposal from Blau et al. (2015), each conference call was analyzed in the NAU platform, separating the analyses into three sections: introduction (INTRO), questions and answers (Q&A), and overall (OVERALL). Three different variables were generated for each conference call analyzed, according to the three analyzed sections. The NAU platform gives a sentiment index, ranging from -1 for speeches with a less optimistic sentiment, to +1 for discourses with an optimistic sentiment.

3.3 Statistical procedures

After the CAR and sentiment index measurements for the conference calls were carried out, descriptive statistics and temporal chart analyses were performed. Finally, in order to investigate any association between abnormal returns and conference call sentiment, a correlations matrix (Spearman correlation) and correspondence analysis of the variables were carried out. Non-parametric tests were chosen due to the reduced number of observations.

4 RESULTS

Table 1 shows a descriptive statistic of the CAR and sentiment analyses related to the three dimension of conference calls (Intro, Q&A, and Overall). In general, we observe a high coefficient of variation (CV) of cumulative abnormal returns, which is reflected in a high range of maximum and minimum values of the CAR variable. We also note a lower sentiment in the Q&A sections (0.2674) compared to the introduction (0.3024), which corroborates with the findings of Blau et al. (2015). This suggests a more positive sentiment of speech in the introductory section – when only managers speak – compared to the question and answer section, where analysts often address less optimistic issues and consequently generate a more negative discourse.

Table 2 – Overall Descriptive Statistics of Quantitative Variables

Variables	N	Mean	Median	p.25	p.75	SD	Min	Max	CV
CAR	78	-1.0173	-0.5428	-2.8804	1.2160	3.8588	-10.0606	7.1922	-3.7933
SENT _{Intro}	78	0.3024	0.3350	0.1800	0.4475	0.2049	-0.3100	0.7500	0.6776
SENT _{Q&A}	78	0.2674	0.2650	0.1200	0.4175	0.2129	-0.2200	0.8700	0.7963
SENT _{Overall}	78	0.2941	0.3100	0.1925	0.4050	0.1736	-0.2100	0.7600	0.5903

Note: CAR = Cumulative abnormal returns from event window. SENT_{Intro} = textual sentiment of conference call introduction section. SENT_{Q&A} = textual sentiment of conference call questions and answers section. SENT_{Overall} = textual sentiment of conference call overall.

Figures 2 and 3 present the cumulative returns and cumulative abnormal returns, respectively, over the event window analyzed (5 days before and 5 days after the conference calls), segregating companies with high and low overall sentiment by considering the median of the SENT_{Overall} variable.

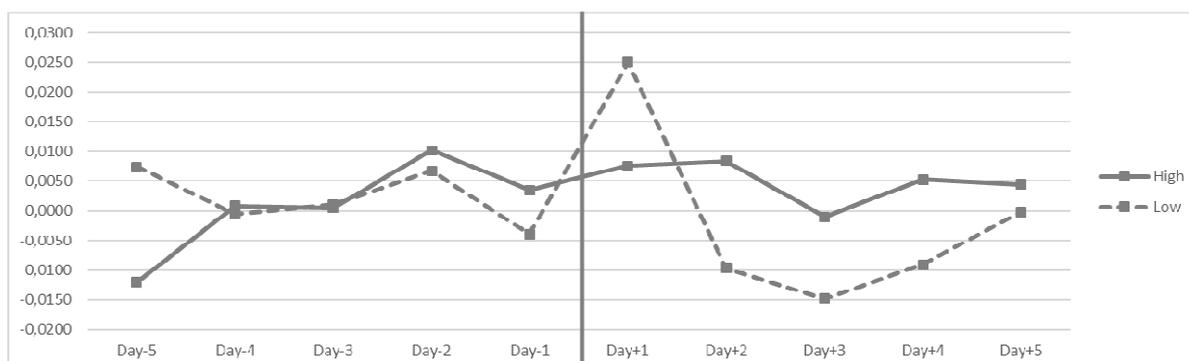


Figure 2 – Cumulative returns over event window

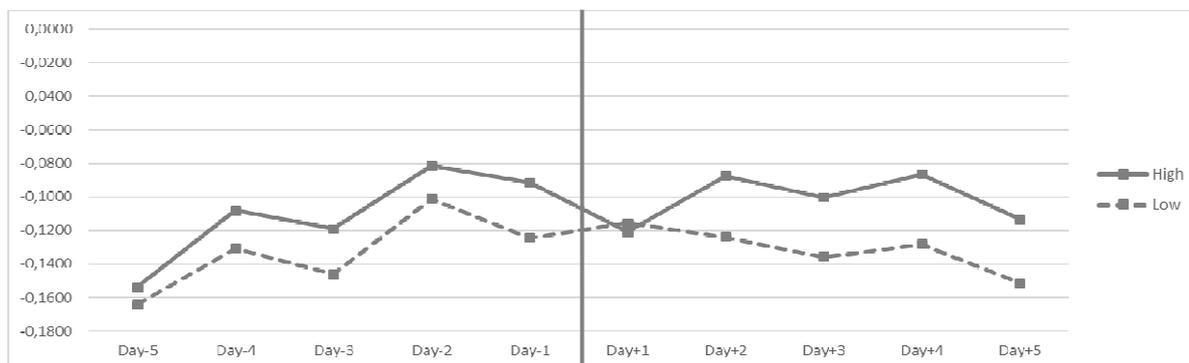


Figure 3 – Cumulative abnormal returns over event window

In general, it is possible observe that the companies with high conference call sentiment present a higher cumulative return compared to the companies classified as low sentiment after the day of the Conference Call (Day 0). The difference between the companies regarding the linguistic sentiment of conference calls stands out more after analyzing cumulative returns (Figure 2), comparing pre and post event. After the conference calls, the companies with more positive linguistic sentiment present a higher return than those with low sentiment.

Table 3 shows the correlation matrix between the analyzed variables. We chose the Spearman coefficient due to the reduced number of observations. In general, we can observe a positive and significant correlation between CAR and $SENT_{Q\&A}$, suggesting that the greater linguistic sentiment in the questions and answers section in earnings conference calls, the greater the abnormal returns. We were unable to find any significant relationship between CAR and other variables related to conference calls ($SENT_{Intro}$ and $SENT_{Overall}$). We thus highlight the possibility of greater stock market sensitivity to the linguistic sentiment of the question and answer section included in earnings conference calls, compared to the introduction section or even the conference call as a whole, where it was not possible to verify any significant correlations from a statistical viewpoint.

Table 3 – Matrix Correlation (Spearman Coefficient)

	CAR	$SENT_{Intro}$	$SENT_{Q\&A}$	$SENT_{Overall}$
CAR	1.0000			
(p-value)	-			
$SENT_{Intro}$	0.1381	1.0000		
(p-value)	(0.204)	-		
$SENT_{Q\&A}$	0.2192	0.2674	1.0000	
(p-value)	(0.043)	(0.000)	-	
$SENT_{Overall}$	0.1485	0.2941	0.3100	1.0000
(p-value)	(0.172)	(0.000)	(0.000)	-

CAR = Cumulative abnormal returns from event window. $SENT_{Intro}$ = textual sentiment of conference call introduction section. $SENT_{Q\&A}$ = textual sentiment of conference call questions and answers section. $SENT_{Overall}$ = textual sentiment of conference call overall.

Lastly, Figure 4 shows the perceptual map of the correspondence analysis regarding the association between CAR and the three variables related to the linguistic sentiment of earnings conference calls ($SENT_{Intro}$, $SENT_{Q\&A}$, and $SENT_{Overall}$). All the variables were classified into Low, Medium-Low, Medium-High, and High, using quartiles.

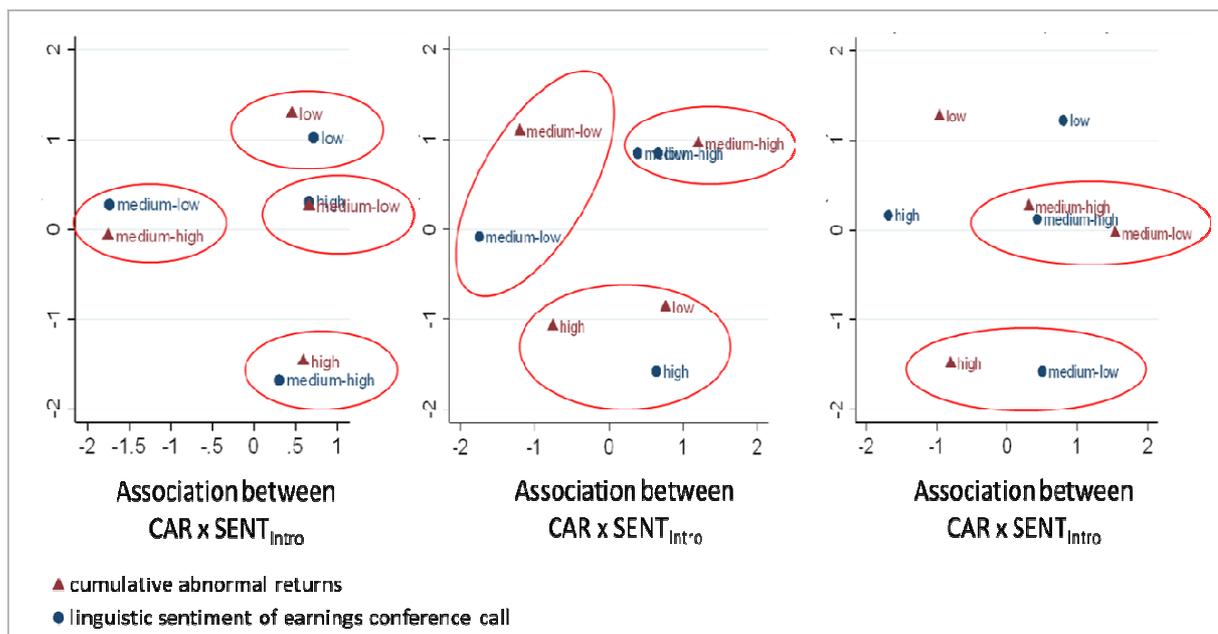


Figure 4 – Correspondence analysis between cumulative abnormal returns (CAR) and linguistic sentiment of earnings conference call (SENT)

Regarding the association between CAR and $SENT_{Intro}$, it is possible to observe an evident approximation between Low CAR and Low $SENT_{Intro}$. In this context, we still observe close proximity between Medium-Low CAR and Medium-High $SENT_{Intro}$, as well as between High CAR and Medium-High $SENT_{Intro}$. Thus, when analyzed in sets, the results suggest a possible positive association between abnormal stock returns and the linguistic sentiment of the introduction of conference calls, although this association is not perfectly positive. According to Figure 4, the positive association between CAR and $SENT_{Q\&A}$ seems to be even more evident, considering the proximity in the perceptual map between the Medium-High CAR and Medium-High $SENT_{Q\&A}$ categories, as well between Medium-Low CAR and Medium-Low $SENT_{Q\&A}$ – thus confirming the results of the Spearman correlation matrix.

In general, in spite of the evident limitations related to the reduced number of observations analyzed, it is possible to verify a positive association between abnormal returns on the Brazilian companies' shares and the linguistic sentiment present in the earnings conference calls.

5 CONCLUSIONS

We investigated whether cumulative abnormal returns (CAR) on the stocks of Brazilian listed companies are associated with the linguistic sentiment of quarterly earnings conference calls. The study is based on a sample of 78 observations related to the conference calls of 24 companies listed in the B3 – Brasil Bolsa Balcão of the Novo Market segment, which only includes companies with high standards of corporate governance, during the period 2016-2017. We employ statistical tests, such as descriptive results, correlation matrix, and correspondence analysis. The results enable it to be inferred that, in general, there is a positive association between cumulative abnormal returns and the linguistic sentiment of quarterly conference calls.

In spite of the evident limitations related to the reduced sample, the results obtained from this study suggest the possibility that the speeches made by managers in conference calls legitimize company performance in the market, by altering the perception of investors in the stock market and leading to implications for the value of the stocks traded. This relates to

concerns about how disclosure strategies can affect the optimism sentiment of discourses and influence investors, since it corresponds to a discretionary practice, despite all the accounting rules and standards to reduce informational asymmetry.

Finally, for future research we suggest the addition of other strategic reports, such as Quarterly Earnings Releases, and a comparison between companies in different contexts, such as the North American, European, and Asian ones, which could reveal new associations due to cultural values and influence the cumulative return on stocks.

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