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Investor Sentiment and Earnings Management: Evidence on the use of discretionary accruals to meet earnings benchmarks

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ABSTRACT

This work investigates whether investor sentiment influences earnings management, specifically on using discretionary accruals to meet earnings benchmarks. The sample includes all non-financial firms listed on B3 (Bolsa, Brasil, Balcão) between 2010 and 2017. We use a GMM (Generalized Method of Moments) panel estimation to analyze the general relationship between investor sentiment and earnings management, and a logistic regression to analyze whether high sentiment increases the likelihood of management occurring in specific cases. As a result, it was not possible to conclude that investor sentiment influences the general use of earnings management. However, there was a higher probability of using earnings management to outperform the previous period's earnings when the sentiment was pessimistic. Our results are robust to alternative periodicities for the sentiment index and different ways of discretionary accruals estimation.

KEYWORDS:
Behavioral Finance, Investor Sentiment, Earnings Management, Earnings Benchmarks

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Sentimento do Investidor e Gerenciamento de Resultados: Evidências sobre o uso de *accruals* discricionários para atingir *benchmarks* de lucros

RESUMO

Este trabalho investiga se o sentimento do investidor exerce influência sobre o gerenciamento de resultados, especificamente na utilização de *accruals* discricionários para superar benchmarks pré-definidos. Foram analisadas empresas não financeiras listadas na B3 (Brasil, Bolsa e Balcão) durante o período de 2010 a 2017. Utilizou-se estimação de painel em GMM (Generalized Method of Moments) para analisar a relação geral entre sentimento do investidor e gerenciamento de resultados e regressões logística para averiguar se o sentimento alto aumenta a probabilidade de ocorrer gerenciamento em casos específicos. Como resultado, não foi possível concluir que o sentimento do investidor exerce influência sobre o gerenciamento de resultados em sua forma geral, entretanto observou-se uma maior probabilidade da utilização de gerenciamento de resultados para superar resultados de períodos anteriores quando o sentimento é pessimista. Esses resultados mostraram-se robustos à utilização de diferentes periodicidades para o índice de sentimento e diferentes formas de estimação dos *accruals* discricionários.

PALAVRAS-CHAVE:

Finanças Comportamentais, Sentimento do Investidor, Gerenciamento de Resultados, *Benchmarks* de Lucros

1. INTRODUCTION

A growing body of literature has been documenting how the relation between investor behavior and corporate decisions influence bond issuance, investment levels, compensation packages, and, recently, the quality of accounting information (Baker & Wurgler, 2002; Ali & Gurun, 2009; Grundy & Li, 2010; Brown et al., 2012; Alimov & Mikkelson, 2012; Simpson, 2013; Miranda et al., 2018).

By perceiving a market's optimism (pessimism) bias in periods of high (low) sentiment, managers tend to manage earnings in order to disclose inflated earnings (conservative), taking advantage of optimistic biases (pessimistic) in the expectations of investors and analysts (Ali & Gurun, 2009; Simpson, 2013). Park (2015) adds on by analyzing the influence of investor sentiment on the likelihood of using earnings management specifically to outperform earnings benchmarks such as analyst forecasts, previous performances, and positive profits.

In the Brazilian context, studies that address earnings management and investor sentiment are insipid and, to some extent, present divergent results. For example, Santana et al. (2020) documented a positive relation between investor sentiment and discretionary accruals. However, Miranda (2018) investigated whether the managers of firms listed on the Brazilian stock exchange exercised earnings management in times of high sentiment via catering channels to attract investors. The results rejected the research hypothesis, but additional analyses showed that, conditional on revenue growth, managers manage more results to capture short-term investors. Miranda et al. (2018) add in presenting evidence that the greater monitoring exercised by market analysts decreases the propensity to manage absolute accruals in times of greater optimism.

In view of the evidence, partially divergent, we emphasize the importance of research that deepens the theme in order to clarify the understanding about the relation between investor sentiment and earnings management in the Brazilian market. In this context, this study is motivated by the investigation of the following problem: how does investor sentiment help explain the use of earnings management by accruals in general and specifically to achieve earnings benchmarks? Thus, this work aims to investigate, specifically, whether investor sentiment influences earnings management, specifically in the use of discretionary accruals to overcome predefined benchmarks.

For this purpose, the study used panel estimation (system-GMM) to analyze the influence of investor sentiment on earnings management in a broad way. Logistic regressions were used to analyze the probability of optimistic sentiment influencing specific forms of the use of discretionary accruals to meet predefined benchmarks.

As a contribution, this work advances the literature by analyzing specific practices of earnings management, such as the probability of using DA to reach earnings benchmarks, and the only research in this sense that has been had access (Park, 2015) to use indirect ways to calculate the earnings management and not measures calculated by accruals discretionary models, such as those used in this work.

2. LITERATURE REVIEW

The evidence documented by the seminal work of Baker and Wurgler (2006) led to the emergence of numerous studies that helped consolidate research on investor sentiment in the international literature (Zhou, 2018). In addition to questionnaire-based measures (Brown & Cliff, 2005) and the established sentiment index proposed by Baker and Wurgler (2006), new measures have emerged, such as those based on textual data (Jiang et al., 2019; McGurk et al., 2020) and, more recently, image-based (Obaid et al., 2022). Despite the different measures, the above-mentioned studies converge in demonstrating that investor sentiment plays an important role in explaining the stock return, especially in actions that are difficult to arbitrate (Baker & Wurgler, 2006; Jiang et al., 2019; McGurk et al., 2020; Obaid et al., 2022).

In Brazil, Yoshinaga and Castro (2012) was one of the first studies to document evidence that investor sentiment plays an important role in explaining stock returns, since stock prices can deviate from fundamental value due to behavioral bias and the difficulty of arbiters to correct the prices of certain stock groups. Part of these deviations, known as market anomalies, can be explained by investor sentiment (Xavier & Machado, 2017) and or by investor attention (Yoshinaga & Rocco, 2020). Other studies add that investor sentiment is also related to trading volume (Marschner & Ceretta, 2019) and volatility (Ferreira et al., 2021), as well as being related to economic uncertainty and monetary policy (Marschner & Ceretta, 2021).

Most of these studies in the national literature use market variables according to the method similar to that proposed by Baker and Wurgler (2006, 2007). However, there are some studies in Brazil that use different measures as proxies for investor sentiment, such as the Getúlio Vargas Foundation Consumer Confidence Index (Marschner & Ceretta, 2021); textual sentiment of news (Machado & Silva, 2017; Galdi & Gonçalves, 2018; Silva & Machado, 2019) and social networks such as *Twitter* (Souza, 2020). From the perspective of managers, behavioral finance outlines two approaches. In the first approach, it is considered that investors are not totally rational and, in the second approach, it is believed that it is the managers of firms that are not totally rational. Still, both approaches can occur at the same time. In the approach of irrational investors, managers can perceive mispricing in the market and respond to investor expectations

by making corporate decisions that maximize the value of the company in the short term, but that in the long run, as prices are corrected, decrease the value (Baker et al., 2004).

Some of the corporate decisions made by managers to take advantage of investor sentiment include issuing equity securities (Baker & Wurgler, 2002; Rossi & Marotta, 2010), investment levels (Grundy & Li, 2010; Alimov & Mikkelson, 2012), compensation plans (Grundy & Li, 2010), disclosure (Bergman & Roychowdhury, 2008; Brown et al., 2012; Alimov & Mikkelson, 2012) and, most recently, the management of accruals (Ali & Gurun, 2009; Simpson, 2013; Miranda et al., 2018; Miranda, 2018).

Studies on the relation between investor sentiment and *accruals are* still scarce, especially the works of Ali and Gurun (2009) and Simpson (2013) in the international context and Miranda et al. (2018) and Miranda (2018) in the Brazilian context. Ali and Gurun (2009) observed that the mispricing of accruals is higher in periods of high sentiment. The authors found evidence that the accruals reported by the firms are higher in periods of high sentiment, especially in small firms, considered difficult to evaluate/arbitrate and with less market monitoring than the other. The findings of the study corroborate the hypothesis that managers manage accruals in order to take advantage of investor sentiment.

Simpson (2013) investigates managers' propensity to manage earnings through accruals in periods of high and low sentiment, reporting more optimistic and conservative earnings, respectively. In general, it was found that, in periods of high sentiment, the use of positive abnormal accruals to inflate profits increases, while the opposite occurs in periods of low sentiment. The results also indicated that, in periods of high sentiment, the probability of using positive abnormal accruals is higher to avoid the disclosure of losses. Park (2015) specifically analyzes the influence of investor sentiment on the likelihood of using earnings management to overcome benchmarks of earnings (analyst forecasts, comparison with previous periods and conversion of negative earnings into positives). Unlike Simpson (2013), there was a higher probability of managing positive earnings in periods of low sentiment.

In the Brazilian context, Miranda et al. (2018) found evidence that the greater monitoring exercised by market analysts decreases the propensity to manage absolute accruals in times of greater optimism. Furthermore, Miranda (2018) investigated whether the managers of firms listed on the Brazilian stock exchange exercised earnings management in moments of high sentiment via catering channels to attract investors. The results rejected the research hypothesis, but additional analyses showed that—conditional on revenue growth—managers manage more earnings to capture short-term investors.

3. METHODOLOGY

3.1. Sample

We start our sample by collecting data from all firms listed on the B3 between 2010 and 2017. We chose to use as the beginning of the series the post-implementation period of IFRS in Brazil and, for the end of the series, the most recent period with data available for the variable representing investor sentiment ($Sent_t$). Financial firms and those that did not present data for some of the variables used in the research were excluded from the sample. Each company's financial variables were collected through the Thompson Reuters® database. The variables $NIPO_t$ and NEI_t were collected through the website of the CVM (Comissão de Valores Mobiliários), the Brazilian regulator like American regulator the SEC (Securities and Exchange Commission). The variables $TURN_t$ and DA_t were collected through the Economatica® data provider. Since lagged variables

were used in four quarters, the number of periods for estimating regression models was reduced from 28 to 24 quarters. The final sample had a total of 1,856 observations from 103 firms.

3.2. MEASUREMENT OF *DISCRETIONARY ACCRUALS*

To measure discretionary accruals, the models of Dechow et al. (1995) and Kothari et al. (2005) and Pae (2005). Dechow et al. (1995) proposed a modification to the Jones (1991) model that decreases the measurement error caused by the assumption that revenues are non-discretionary. The specification of this first model for the calculation of non-discretionary accruals (NDA), known as the modified Jones model, uses the values of the original parameters of the estimation by the Jones (1991) model plus the correction of the variation of revenues by the variation of accounts receivable (ΔREC_{it}), as shown in Equation (1).

$$\frac{NDA_{it}}{A_{it-1}} = \alpha_1 \left[\frac{1}{A_{it-1}} \right] + \alpha_2 \left[\frac{\Delta REV_{it} - \Delta REC_{it}}{A_{it-1}} \right] + \alpha_3 \left[\frac{PPE_{it}}{A_{it-1}} \right] \qquad (1)$$

Where:
$\Delta REC_{it} \rightarrow$ Change in net receivables in t minus Net Receivables of company i from period t to period t-1.

Another model we use is that of Kothari et al. (2005), in which the authors also propose an adjustment of the Jones (1991) model to business performance. The estimation model of discretionary accruals adjusted to performance is shown in Equation (2):

$$\frac{TA_{it}}{A_{it-1}} = \alpha_0 + \alpha_1 \left[\frac{1}{A_{it-1}} \right] + \alpha_2 \left[\frac{\Delta REV_{it} - \Delta REC_{it}}{A_{it-1}} \right] + \alpha_3 \left[\frac{PPE_{it}}{A_{it-1}} \right] + \alpha_4 ROA_{it} + \varepsilon_{it} \qquad (2)$$

Where:
$ROA_{it} \rightarrow$ Return on total assets of the company i at the end of the period t-1.

Finally, we estimate the model of Pae (2005). This model shows the need to consider the association between accruals and operating cash flows and their reversal over time. Pae (2005) found that the modified Joni's model has better predictive power when added to these variables. The estimation was made through equation (3) which shows the new model proposed by the said author for the estimation of discretionary accruals:

$$\frac{TA_{it}}{A_{it-1}} = \alpha_0 + \alpha_1 \left[\frac{1}{A_{it-1}} \right] + \alpha_2 \left[\frac{\Delta REV_{it} - \Delta REC_{it}}{A_{it-1}} \right] + \alpha_3 \left[\frac{PPE_{it}}{A_{it-1}} \right] + \alpha_4 \left[\frac{CF_{it}}{A_{it-1}} \right] + \alpha_5 \left[\frac{CF_{it-1}}{A_{it-1}} \right] + \alpha_6 \left[\frac{TA_{it-1}}{A_{it-1}} \right] + \varepsilon_{it} \qquad (3)$$

The main ways of estimating the calculation models of DA are: (i) regressions in time series for each company i; (ii) regressions in cross-sectional estimated for each sector s at each period t; (iii) regressions in cross-sectional estimated for each period t using all the firms in the sample; (iv) regression with all firms and sample periods, together; (v) regression for each sector s used all periods of the sample.

Approach (i) was used to calculate the DA of the firms with at least 10 valid observations on the sample for the estimation of the models. This method is restricted in the Brazilian context due to the lack of sufficient data to form long time series. However, the use of quarterly data increases the periods available for estimation, allowing the use of this method rarely documented in national surveys. The use of time series decreased the incidence of outliers when confronted with the approach (iv) that used panel estimators, performed for comparison purposes, since the data of each estimate are specific to the company.

The choice of models derived from the Jones (1991) model considers the use of the most widespread models in the literature of earnings management, where, despite their limitations, it allows the comparison of the results with previous studies that used this model and with the work of Simpson (2013), the main basic research for the current study. Although the KS model (1995) is considered more appropriate for the Brazilian context (Martinez, 2008), the use of this model requires the use of instrumental variables, which would restrict the sample of the study in question (Martinez, 2013). The results reported will be those where the Pae model (2005) was used to estimation the DAs, being informed when divergences between the results were observed using the Pae model (2005), Dechow et al. (1995) and Kothari et al. (2005).

3.3. INVESTOR SENTIMENT

To measure investor sentiment, we opted for the Baker and Wurgler approach (2007). The authors argue that investor sentiment is difficult to measure directly and use imperfect proxies to capture the common market expectation factor that is not related to macroeconomic variables that may justify expectations.

Many of the variables used by Baker and Wurgler (2007) to measure investor sentiment are not available or are difficult to collect in the Brazilian environment. For this reason, to measure investor sentiment in this work, a procedure similar to that of Bake and Wurgler (2007) was used according to Xavier and Machado (2017) who estimated an index for the Brazilian market. The proxies used to measure investor sentiment are (i) the number of IPOs (Initial Public Offering) ($NIPO_t$); (ii) the percentage of issuing equity securities in relation to total securities issued by firms (NEI_t); (iii) stock turnover ($TURN_t$); and (iv) proportion of highs and lows in stock prices (AD_t).

The Principal Component Analysis (PCA) technique was used to obtain a component common to these proxies. PCA was performed with the variables in the t-period and their lags (t-1) since some variables may carry components of investor sentiment that will only be felt in the future. The choice between the proxies in t or t-1 was made according to their correlation with the first component, as presented in Panel C of Table 1.

The choice of only one component is in line with that practiced in previous studies (Baker & Wurgler, 2006; Yoshinaga & Castro, 2012; Miranda, 2018), which is corroborated by Kaiser's rule (1960) in which our first component is the only one with eigenvalue greater than 1, specifically an autovalue of 1.43 and with an explanation of 51.43% of variances. It is also emphasized that the check of checkpoint tests through the Barlett test to analyze supports the choice of variables selected as adequate for the formation of components.

The last step for calculating the index is the regression of each proxy against macroeconomic variables, in order to separate the effects of the economic cycle from the sentiment component.

Following previous studies (Baker & Wurgler, 2006; Xavier & Machado, 2017; Miranda et al., 2018), a dummy of OECD recession, GDP growth, unemployment rate, consumption of durable and non-durable goods as macroeconomic variables was used. Thus, it was possible to perform a new PCA with the residuals of the regressions, comparing the residuals of the variables with their lags and choosing the best component for calculating the investor's sentiment index ($Sent_t$).

Once the index is built monthly and the data for earnings management and other variables are calculated quarterly, the index was used for the last month of the t quarter ($SentMONTH_t$) and its quarterly average ($SentQRT_t$) in subsequent analyses.

3.4. CONTROL VARIABLES AND ECONOMETRIC MODEL

The econometric model includes some control variables not related to investor sentiment that can influence the level of earnings management of the firms included on our sample. Consistent with Simpson (2013) and Miranda et al. (2018), proxies are used to represent investment opportunities ($Growth_{it}$), leverage it level, future performance (ROE_{t+1}) and company size ($Size_{it}$).

Growth firms may have larger abnormal accruals than mature firms. The Market-to-Book index is used to represent market expectations about the company's future growth. More leveraged firms have incentives to manage accruals positively so as not to violate covenants that require the maintenance of low debt rates. At the same time, more leveraged firms typically raise funds at a higher cost depending on their risk. The leverage is calculated by the relation between the liabilities payable and the total assets ($Leverage_{it}$) and a negative relation between this variable and the DA is expected.

Less profitable firms have incentives to use DA as a way to increase profits and avoid a fall in the stock price or the replacement of the management team. Firms with good results may try to "accumulate" profits to use in future periods when their profitability is low. Avoiding political costs associated with the taxation of more profitable sectors by the government also offers incentives for earnings management through the minimization of accruals (Jones, 1991). Future profitability is represented by return on equity for the following quarter (ROE_{it+1}) which is calculated by the ratio between profit before extraordinary items and equity.

Like profitable firms, the size of firms is also associated with the occurrence of political costs associated with the visibility of large firms by society, which demands greater supervision, taxation, and engagement in social causes. Larger firms have incentives to manage DA in a negative way to try to reduce their size or profitability. $Size_{it}$ is by the logarithm of total assets.

Equation (4) demonstrates the estimation model that analyzes the relation between investor sentiment ($Sent_{it}$), in its monthly form ($SentMONTH_t$) and quarterly ($SentQRT_t$), and earnings management (DA_{it}). The $Control_{it}$ notation represents a vector with the control variables $Growth_{it}$, $Leverage_{it}$, ROE_{t+1}, and $Size_{it}$. Also, four lags of the dependent variable were added to control by the reversal of accruals in future periods. Finally, the $QRT4_t$ variable is a dummy that assumes value 1 in the last annual quarter and 0 in the remaining quarters to control the trend of companies to manage earnings more frequently in the last quarter of the fiscal year (Simpson, 2013).

$$DA_{it} = \lambda_0 + \lambda_1 Sent_{t+1} + \sum_{j=1}^{4} \lambda_2 DA_{it-1} + \lambda_3 QRT4_t + \lambda_4 Control_{it} + u_{it} \qquad (4)$$

Unlike Simpson (2013) and Miranda et al. (2018) who used the lagged sentiment variable in a period (t-1) and Park (2015) and Miranda (2018) who used the variable in its contemporary

form (t), this computed variable was used for the following period (t+1). Since companies prepare their financial statements after the end of the period to which they refer (t+1), it is understood that they are more likely to be under the influence of sentiment in this same period. However, it is reported when there is a difference between the results obtained using the sentiment in the reporting period (t+1) and in the period to which the financial statements refer (t), as well as in Park (2015) and Miranda (2018).

It is observed that the model may suffer from concurrency problems, since firms may be more profitable or less leveraged because they are managing their earnings more aggressively. Furthermore, the inclusion of the lagged variable causes serial correlation problems in panel estimators. As a solution, the Generalized Method of Moments (GMM) was used, calculated according to the specifications of Arellano and Bover (1995) and Blundell and Bond (1998) also known as system-GMM. The two-stage estimator (*two-step*) was used to perform the estimates. In finite samples, the *two-step estimator* has a tendency to skew standard errors. Windmeijer (2005) correction was used to resolve this problem. In previous studies, no means of mitigating possible problems of endogeneity were identified (Simpson, 2013; Park, 2015; Miranda et al., 2018), with the exception of the work of Miranda (2018) and Santana et al. (2020).

The assumption of the presence of multilinearity was verified with the use of the Variance Inflation Factor test, and no results above 5.0 were found, which could indicate the presence of a high degree of colinearity among the explanatory variables. Furthermore, the assumption of absence of serial correlation with order (x) was tested using the Arellano-Bond test and the validity of the instruments was verified by means of the Sargan test. Finally, the Wald test examines whether there is a model specification error when testing whether at least one coefficient is zero. All these tests are shown below each estimated model. A significance level of 5% was used to reject the null hypotheses of each test.

We also developed logistic regression models to investigate the incidence of specific earnings management methods, which are: (i) the use of positive earnings management (Simpson, 2013; Park, 2015); (ii) the use of positive earnings management to avoid reporting losses (Simpson, 2013; Park, 2015); and (iii) the use of positive earnings management to demonstrate profit growth compared to the same half of the previous fiscal year (Park, 2015).

The dependent variable in (i) assumed value 1 when the discretionary accruals of the respective semester were positive (POSDA) and 0, otherwise. The dependent variable for (ii) assumed value 1 when the reported profit decreased from discretionary accruals went from positive to negative (BEAT_ZERO), evidencing the use of positive earnings management to avoid reporting losses, and 0, otherwise. The dependent variable in (iii) assumed value 1 when the decreased reported profit of discretionary accruals was lower than the profit reported in the same half of the previous fiscal year (E_INCREASE), evidencing the use of positive earnings management to avoid reporting a decrease in results compared to past periods, and 0, otherwise. When calculating the variables (BEAT_ZERO) and (E_INCREASE), Park (2015) categorizes the earning management performance to meet benchmarks when the difference between the reported profit and the benchmark is between 0.0000 and 0.0025. This is progressing by using discretionary accruals as a more direct way to categorize earnings management to exceed profit targets.

4. ANALYSIS OF RESULTS

4.1. DESCRIPTIVE STATISTICS

Statistics are displayed in this section. The total accruals corresponded to, on average, 0.12% of the value of the assets quarterly. The median is negative, which indicates that cfos were higher than the profit before the extraordinary items for more than half of the sample. The variable DA was calculated by the Pae model (2005), its value is positive, but close to zero, depending on the tendency of the regression models to report a mean close to zero for the errors of the model. The maximum and minimum values indicate management of positive accruals that corresponds to 108.99% of the value of total assets and management of negative accruals that corresponds to 47.12% of the value of total assets. These management measures may seem unrealistic, which is one of the limitations of outcome management proxies based on NDA estimation. Despite this limitation, the calculation of DA by the Pae model (2005) using the method (iv) with dummies variables for the sectors, as well as in Paulo (2007) and Mota et al. (2017), we obtained even more extreme maximum and minimum values of, respectively, 121.04% and -80.49%, which reinforces our criterion of choosing time series models for the estimation of AD.

For the variables used in the robustness tests (POSDA, BEAT_ZERO, E_INCREASE) only the means were analyzed, which represent the percentage of observations about that situation in relation to the general observations. Given the particularities of estimates by linear regression, where the mean tends to zero, the POSDA variable is observed in 51.44% of the total observations, indicating a balance between the amount of positive and negative values for AD. In about 5.22% of observations, profit management is used to turn losses into small profits (BEAT_ZERO). In Park (2015), a lower proportion of this practice was observed in the sample analyzed (2.71%). It is also observed that in 8.42% of the observations the firms used positive DA to report earnings above those obtained in the same quarter of the previous fiscal year, against 2.81% of the occurrences recorded in Park (2015).

The sentiment index, both monthly (SentMONTH$_t$) and quarterly (SentQRT$_t$) do not have theoretical interpretation, so it cannot be said, from its values, whether the sentiment is optimistic or pessimistic. Considering only that their higher values are linked to a high sentiment and the lower values are linked to a low sentiment.

The Market-to-Book index, which represents business growth opportunities (Growth$_{it}$), averages 1.2736 and a median value of 1.0290. The values indicate that, on average, the market value of the shareholders' equity of firms is greater than their book value. These values may indicate that the company presents investment opportunities already priced by the market or that accounting is not being able to measure, through the value of shareholders' equity.

The firms leverage (Leverage$_{it}$) shows a mean of 31.51% and a median of 29.31%. The data show that equity finances most of the firms' resource application. The maximum value above 1 indicates that there are firms with negative equity in the sample, a situation of short-time liabilities.

The profitability indices (ROA$_{it}$ and ROE$_{it}$) present positive values for the mean and median, indicating the predominance of quarterly profits in our sample. The results for these variables are lower, when compared to other jobs, because they use only quarterly profit in their calculation. Finally, the values for the Size$_{it}$ variable indicate that the sample is quite comprehensive, comprising large and small firms.

Table 1
Descriptive statistics

Panel A - Descriptive statistics of firm's sample

Variables	Average	Median	Standard deviation	Maximum	Minimum
TA_{it}/A_{it-1}	-0.0012	-0.0032	0.0823	1.2121	-1.0000
DA_{it}/A_{it-1}	0.0004	0.0003	0.0397	1.0899	-0.4712
POSDA	0.5144	1.0000	0.4999	1.0000	0.0000
BEAT_ZERO	0.0522	0.0000	0.2224	1.0000	0.0000
E_INCREASE	0.0842	0.0000	0.2778	1.0000	0.0000
$Sent(MONTH)_t$	-5.3467	-0.8981	8.8211	16.3670	-22.0150
$Sent(QRT)_t$	5.7908	0.7645	7.7929	0.8501	–21.0950
$Growth_{it}$	1.2736	1.0290	4.1458	61.0022	-103.8251
$Leverage_{it}$	0.3151	0.2931	0.2600	3.3333	[a] 0.000
ROA_{it}	0.0031	0.0057	0.0516	1.2121	0.8462
ROE_{it+1}	0.0170	0.0162	0.5666	20.34483	-9.7778
$Size_{it}$ (million R$)	Nine. two. 377	2.900	19.726	179. 99th	11

Panel B - Descriptive statistics of sentiment proxies

Variable	Average	Median	Minimum	Maximum
$NIPO_t$	13.640	7.000	0.000	88.000
NEI_t	0.380	0.275	0.000	0.976
$TURN_t$	0.001	0.001	-0.002	0.007
AD_t	1.239	1.206	0.656	2.099

Panel C - Correlation table between proxies the first component (step 1 and 2)

	$NIPO_t$	$NIPO_{t-12}$	NEI_t	NEI_{t-12}	$TURN_t$	$TURN_{t-12}$	AD_t	AD_{t-12}	PCA_{step1}
$NIPO_{t-12}$	0.30***								
NEI_t	0.18**	0.05							
NEI_{t-12}	-0.24***	0.18**	-0.25***						
$TURN_t$	0.62***	-0.06	0.06	-0.37***					
$TURN_{t-12}$	0.38***	0.66***	0.25***	0.01	-0.12				
AD_t	0.42***	-0.19**	-0.06	-0.31***	0.61***	0.02			
AD_{t-12}	0.37***	0.40***	0.32***	-0.06	-0.17*	0.55***	0.02		
PCA_{step1}	0.81***	0.80***	0.14*	-0.04	0.35***	0.65***	0.15*	0.48***	
PCA_{step2}	0.67***	0.53***	0.55***	-0.17*	0.1	0.80***	0.14*	0.82***	0.74***

Notes: Statistical significance: 1%***, 5% **, 10%*; [a] Positive number less than 0.0001; [b] Negative number greater than -0.0001.

4.2. Influence of investor sentiment on earnings management

The analysis begins with the influence of investor sentiment on the DA reported between 2010 and 2017 by the firms in our sample. Table 2 shows the results of estimates that use as a dependent variable the DA calculated by the Pae model (2005) and a dummy variable that assumes value 1 when the estimated DA are positive (POSDA). In models 1 and 2, there is no statistical significance for the $Sent_{t+1}$ variable, represented both by the sentiment calculated for the first month of the quarter and for the sentiment calculated by the average of the monthly values for the quarter. The results are robust to the use of the sentiment variable in its contemporary form ($Sent_t$) and to the DA estimated by the modified Jones model (Dechow et al., 1995) and Jones adjusted to performance (Kothari et al., 2005), estimates not reported in the results tables.

The results are different from those obtained by Simpson (2013) and Miranda et al. (2018), who found a greater positive and absolute management of accruals, respectively, in periods of high sentiment. However, both surveys differ due to proxies for the earnings management and investor sentiment and the periodicity of the data.

Table 2

Influence of investor sentiment on earnings management.

	DA	DA	POSDA	POSDA
DA_{it-1}	0.1691 (0.2872)	-0.1722 (0.1158)	0.0895 (0.0941)	0.0951 (0.0940)
DA_{it-2}	-0.2096 (0.3739)	-0.2101 (0.1471)	*-0.1619 (0.0945)	*-0.1587 (0.0944)
DA_{it-3}	*-0.4256 (0.2373)	-0.4292 (0.0472)	0.1119 (0.0939)	0.1061 (0.0941)
DA_{it-4}	0.0922 (0.3381)	0.0984 (0.3048)	0.2852 (0.0939)	0.2857 (0.0941)
$MONTHSent_{t+1}$	-0.0002 (0.0004)	–	0.0095 (0.0059)	–
$QRTSent_{t+1}$	–	0.0004 (0.0021)	–	0.0191 (0.0061)
$LastQRT_t$	0.0054 (0.0060)	0.0085 (0.0156)	0.0818 (0.1114)	0.1485 (0.1139)
$Growth_{it}$	-0.0001 (0.0014)	-0.0001 (0.0012)	-0.0045 (0.0131)	-0.0047 (0.0131)
$Leverage_{it}$	-0.1208 (0.0810)	**-0.1188 (0.0466)	0.2771 (0.1816)	-0.2500 (0.1821)
ROE_{it+1}	0.0009 (0.0049)	0.0008 (0.0029)	-0.0155 (0.0729)	-0.0102 (0.0728)
$Size_{it}$	-0.0121 (0.0110)	**-0.0110 (0.0046)	0.0274 (0.0275)	0.0284 (0.0275)
_Intercepto	0.3016 (0.2621)	0.2805 (0.1002)	0.5701 (0.6030)	0.5497 (0.6035)
Model	(1)	(2)	(3)	(4)
Wald χ^{2} [a]	687.80	585.42	–	–
Largest VIF	3.98	3.85	1.08	1.11
AR(5) [b]	0.9195	0.9243	–	–
Sargan [h]	98.8153	99.4959	–	–

Table 2
Cont.

	DA	DA	POSDA	POSDA
McFadden Adjusted R²	–	–	50.46%	27.95%
Likelihood Log	–	–	-1.275	–1.271
Akaike criterion	–	–	2.572	2.565
% Correctly Predicted	–	–	55.33%	55.82%
Number of observations	1.856	1.856	1.856	1.856
Number of individuals	103	103	103	103
Number of instruments	274	274	–	–

Notes: Coefficients with standard errors in parentheses; Statistical significance: 1%***, 5% **, 10%*; [a] Wald test for general significance of regression model coefficients by Sys-GMM; [b] Arellano and Bond test of serial order correlation (x); [c] Sargan test of overidentification of restrictions.

When analyzing the logistic regression models used to infer whether the sentiment influences the practice of positive earnings management (models 3 and 4), statistical significance is perceived in the sentiment variable only in model 4, which uses sentiment as the average of the months of the respective quarter. These results are not confirmed by model 3 nor are they robust to the use of other proxies for the calculation of earnings management or the use of the sentiment variable in its contemporary form. The results contradict the findings of Simpson (2013), who estimated a logistic regression model to analyze whether optimistic sentiment influenced the practice of positive earnings management in the firms analyzed. Thus, the results lead us to the conclusion that, in general, investor sentiment does not influence the use of discretionary accruals for the practice of earnings management. Except for lagged variables (DA_{it-x}), none of the others showed statistical significance in the estimates that were robust to the other calculated models, also considering other proxies for the earnings management or the use of contemporary sentiment used in the unreported earnings.

4.3. INFLUENCE OF INVESTOR SENTIMENT ON EARNINGS MANAGEMENT TO MEET EARNINGS BENCHMARKS

Although we do not observe a relation between investor sentiment and the practice of managing positive earnings, we investigate or use specific ways of using DA to achieve pre-defined goals. The main models present in the literature concern the use of DA to turn losses into small profits (ZERO_BEAT), to report profits higher than those of the same period of the previous fiscal year (E_INCREASE) and to exceed market analysts' profit targets. Since the sample size is limited, restricting it only to companies monitored by analysts would further decrease its size. Furthermore, information on analyst forecasts is mostly available in the form of annual estimates, which would further reduce our observations since quarterly data was used for the survey. This procedure is also used by Mian and Sankaraguruswamy (2012) by avoiding including in their study sample only firms that are monitored by analysts, justifying that analyst forecasts are approaching the goal of exceeding the result of the same period of the previous fiscal year. In this case, the first two tests are performed to assess the influence of investor sentiment on the two specific forms of earnings management.

Table 3 shows the results of estimates that use as a dependent variable the occurrence of positive earnings management to avoid reporting losses (BEAT_ZERO) and to avoid reporting reduced profits compared to the same quarter of the previous fiscal year (E_INCREASE). Both models are estimated using DA calculated by the Pae model (2005) and the sentiment for the next period (t+1). However, robustness tests were performed using other proxies for the calculation of DA (Dechow et al., 1995; Kothari et al., 2005) and the sentiment in its contemporary form (t).

In models 5 and 6, which analyzed the influence of investor sentiment on the use of earnings management to avoid reporting losses (BEAT_ZERO) there is no statistical significance in the model interest variable (Sent$_{t+1}$). The results are different from those found by Park (2015), who found a greater propensity of companies to use earnings management to avoid reporting losses in periods of low sentiment. Again, no statistical significance was observed for the control variables used in the model.

Table 3
Influence of investor sentiment on earnings management to exceed goals.

	BEAT_ZERO	BEAT_ZERO	E_INCREASE	E_INCREASE
MONTHSent$_{t+1}$	0.0178 (0.0127)	–	–0.0250 (0.0087)	–
QRTSent$_{t+1}$	–	0.0066 (0.0129)	–	–0.0056 (0.0089)
LastQRT$_t$	–0.1255 (0.2433)	–0.1611 (0.2494)	–0.1879 (0.1669)	–0.1009 (0.1684)
Growth$_{it}$	–0.0256 (0.0263)	–0.0240 (0.0258)	**–0.0407 (0.0175)	**–0.0427 (0.0177)
Leverage$_{it}$	0.3457 (0.2771)	0.3359 (0.2777)	1.5434 (0.2851)	1.5510 (0.2851)
ROE$_{it+1}$	–0.1941 (0.1644)	–0.1927 (0.1673)	–0.0285 (0.1124)	–0.0426 (0.1109)
Size$_{it}$	–0.1185 (0.0573)	–0.1178 (0.0572)	–0.2499 (0.0404)	–0.2485 (0.0404)
_Intercepto	**–0.1289 (1.2386)	**–0.2144 (1.2346)	2.9361 (0.8609)	3.0477 (0.8595)
Model	(5)	(6)	(7)	(8)
Largest VIF	1.05	1.11	1.08	1.10
McFadden R² Set	–0.46%	–0.67%	5.44%	4.91%
Verisioisland Log	–412	–413	–705	–709
Akaike criterion	838	840	1.425	1.433
% Predicted Correctly	94.07%	94.07%	85.88%	85.88%
No observations	1.856	1.856	1.856	1.856
Number of individuals	103	103	103	103

Notes: Coefficients with standard errors in parentheses; Statistical significance: 1%***, 5% **, 10%*.

In the following analysis, it was observed, however, that the use of earnings management to signal a growth in profits in relation to the same period of the previous fiscal year (E_INCREASE) is negatively related to investor sentiment, indicating that, in pessimistic periods, the probability of companies using accruals is higher to exceed the profits for the same quarter of the previous fiscal year, consistent with Park's findings (2015). Although model 7 is not confirmed by model 8, the results of this estimation are robust to the use of other proxies for the calculation of DA and the use of contemporary sentiment in the analysis. Among the 10 unreported models that analyze the probability of using earnings management to demonstrate profit growth compared to the same quarter of the previous fiscal year (E_INCREASE), all indicated a negative association between this practice and investor sentiment, whether the estimated sentiment in its monthly form (MONTHSent), quarterly (QRTSent), contemporary (t) or future (t+1).

An increase in this practice of managing earnings in periods of low sentiment may signal that firms tend to inflate their profits in pessimistic periods, when probably most of the market is experiencing unsatisfactory results. The realization of this type of earnings management in periods of low sentiment could differentiate the company from its competitors and boost the price of its shares (Park, 2015). Although managers have incentives to report growth in results through managing accruals in periods of high sentiment, bad news about changes in profits in pessimistic periods generates a negative reaction in the share price (Mian & Sankaraguruswamy, 2012).

The prospectus theory (Kahneman & Tversky, 1979) establishes that the utility function of investors is asymmetric, where losses are more significant than gains in the same amount. In this case, it would make sense for managers to use earnings management to avoid a reduction in relation to the earnings benchmark of the same period in the past at times when a reduction in the stock price is more likely to occur (low sentiment). The behavior expected by Simpson (2013), of greater use of positive discretionary accruals in optimistic moments could occur in reverse, where managers would show preference to increase or avoid a reduction in the stock price of their companies at pessimistic times than to promote an increase in the price of their shares in optimistic periods.

For this way of earnings management, the variables representing growth expectations (Growth$_{it}$), leverage (Leverage$_{it}$) and the size of the listed firms (Size$_{it}$) were still significant. So, there is a lower probability of earnings management practice to exceed targets based on previous period earnings in growing, unleveraged, and larger firms.

5. FINAL CONSIDERATIONS

This work aimed to analyze whether investor sentiment influences earnings management, specifically in using discretionary accruals to meet predefined benchmarks. The results indicate that investor sentiment does not impact the DA reported by companies in a broad way or with the specific objective of avoiding reporting losses. However, we showed evidence that, in pessimistic moments, there is a greater probability that companies use earnings management to report higher earnings than those recorded in the same period of the previous fiscal year. The existence of a negative or zero relation between investor sentiment and earnings management is in line with the propositions of Mian and Sankaraguruswamy (2012), Simpson (2013), Miranda et al. (2018), and Santana et al. (2020). According to these authors, managers have incentives to use discretionary accruals, especially in a positive way, in periods of high sentiment.

The main hypothesis to explain these findings is that managers prefer to increase or avoid a reduction in the price of their shares at pessimistic times when using earnings management to inflate their profits than to boost the price of their shares at optimistic times. These results could also be a consequence of increased monitoring of investors and regulatory bodies in more optimistic periods since market agents could already speculate the incentives for the manager's opportunistic behavior.

Furthermore, there may be an alternative explanation. The influence of foreign investors in the Brazilian market could be related to this phenomenon, since the foreign investor would exert less pressure on earnings due to being influenced by the sentiment of their country of origin. At the same time, there is a risk that proxies have failed to capture a market sentiment or earnings management. The procedure to compute investor sentiment originates from variables that indirectly represent the current sentiment of optimism or pessimism in the capital market. On the other hand, the calculation models of DA stem from an expected NDA measure based on the characteristics of the companies, and the problem of omitted variables in the calculation of The DA is potential. Given these limitations, we recommended that future research analyze this phenomenon using other proxies.

Among the studies closer to the approach used in this research, the results differ from Simpson (2013), who found a positive relation between earnings management and investor sentiment. However, when analyzing the use of earnings management to overcome the earnings of the same quarter in the previous period, results like those of Park (2015) were obtained, where this practice occurs more frequently in pessimistic periods. The results presented in this work can serve as a guide mainly for the decisions of investors and policymakers. For example, portfolio allocation decisions can be improved by considering that the earnings inflated through discretionary accruals can also occur in times of pessimism. Additionally, public policy trainers can improve their understanding of the impact of market sentiment on earnings management practice.

Despite the contributions, this work has limitations that pave the way for future research. For example, we did not consider analyst forecasts as a profit benchmark for considerably decreasing the sample. In addition, new works could use emerging techniques that can estimate proxies for investor sentiment from unstructured data, such as texts or images of financial reports, analyst opinion, transcription of results from earnings calls, or social media.

REFERENCES

Ali, A., & Gurun, U. G. (2009). Investor sentiment, *accruals* anomaly, and *accruals* management. *Journal of Accounting, Auditing & Finance*, *24*(3), 415-431. https://doi.org/10.1177/0148558X0902400305

Alimov, A., & Mikkelson, W. (2012). Does favorable investor sentiment lead to costly decisions to go public?. *Journal of Corporate Finance*, *18*(3), 519-540. https://doi.org/10.1016/j.jcorpfin.2012.02.004

Arellano, M., & Bover, O. (1995). Another look at the instrumental-variable estimator of error-components models. *Journal of Econometrics*, *68*(1), 29-52. https://doi.org/10.1016/0304-4076(94)01642-D

Baker, M., & Wurgler, J. (2002). Market timing and capital structure. *The Journal of Finance*, *57*(1), 1-32. https://doi.org/10.1111/1540-6261.00414

Baker, M., & Wurgler, J. (2006). Investor sentiment and the cross-section of stock returns. *The Journal of Finance*, *61*(4), 1645-1680. https://doi.org/10.1111/j.1540-6261.2006.00885.x

Baker, M., & Wurgler, J. (2007). Investor sentiment in the stock market. *The Journal of Economic Perspectives*, *21*(2), 129-151. https://doi.org/10.1257/jep.21.2.129

Baker, M., Ruback, R. S., & Wurgler, J. (2004). *Behavioral corporate finance: A survey* (Working paper No. w10863). National Bureau of Economic Research.

Bergman, N. K., & Roychowdhury, S. (2008). Investor sentiment and corporate disclosure. *Journal of Accounting Research*, *46*(5), 1057-1083. https://doi.org/10.1111/j.1475-679X.2008.00305.x

Blundell, R. W., & Bond, S. R. (1998). Initial conditions and moment restrictions in dynamic panel data models. *Journal of Econometrics*, *87*(1), 115-143. https://doi.org/10.1016/S0304-4076(98)00009-8

Brown, G. W., & Cliff, M. T. (2005). Investor sentiment and asset valuation. *The Journal of Business, 78*(2), 405–440. https://doi.org/10.1086/427633

Brown, N. C., Christensen, T. E., Elliott, W. B., & Mergenthaler, R. D. (2012). Investor sentiment and pro forma earnings disclosures. *Journal of Accounting Research*, *50*(1), 1-40. https://doi.org/10.1111/j.1475-679X.2011.00427.x

Dechow, P. M., Sloan, R. G., & Sweeney, A. P. (1995). Detecting earnings management. *The Accounting Review*, *70*(2), 193-225.

Ferreira, T. S., Machado, M. A., & Silva, P. Z. (2021). Asymmetric impact of investor sentiment on brazilian stock market volatility. *RAM. Mackenzie Administration Magazine, 22*(4), eRAMF210208. https://doi.org/10.1590/1678-6971/eRAMF210208

Galdi, F. C., & Gonçalves, A. (2018). Pessimism and uncertainty of the news and the behavior of investors in Brazil. *Business Administration Journal, 58*(2), 130-148. https://doi.org/10.1590/S0034-759020180203

Grundy, B. D., & Li, H. (2010). Investor sentiment, executive compensation, and corporate investment. *Journal of Banking & Finance*, *34*(10), 2439-2449. https://doi.org/10.1016/j.jbankfin.2010.03.020

Jiang, F., Lee, J., Martin, X., & Zhou, G. (2019). Manager sentiment and stock returns. *Journal of Financial Economics*, *132*(1), 126-149. https://doi.org/10.1016/j.jfineco.2018.10.001

Jones, J. J. (1991). Earnings management during import relief investigations. *Journal of Accounting Research*, *29*(2), 193-228. https://doi.org/10.2307/2491047

Kahneman, D., & Tversky, A. (1979). Prospect theory: an analysis of decision under risk. *Econometrica*, *47*(2), 263-291. https://doi.org/10.2307/1914185

Kothari, S. P., Leone, A. J., & Wasley, C. E. (2005). Performance matched discretionary *accrual* measures. *Journal of Accounting and Economics*, *39*(1), 163-197. https://doi.org/10.1016/j.jacceco.2004.11.002

Machado, M. A. V., & Silva, M. D. O. P. (2017). Analysis of textual sentiment of quarterly performance reports of Brazilian industries. *Society, Accounting and Management*, *12*(1), 6-25. http://doi.org/10.21446/scg_ufrj.v12i1.13395

Marschner, P. F., & Ceretta, P. S. (2019). How does trading volume react to investor sentiment? *Journal of Accounting and Organizations*, *13*, e163596. https://doi.org/10.11606/issn.1982-6486.rco.2019.163596

Marschner, P. F., & Ceretta, P. S. (2021). Investor sentiment, economic uncertainty and monetary policy in Brazil. *Accounting & Finance Magazine*, *32*(87), 528-540. https://doi.org/10.1590/1808-057x202113220

Martinez, A. L. (2008). Detecting earnings management in Brazil: estimating discretionary *accruals*. *Accounting & Finance Magazine*, *19*(46), 7-17. https://doi.org/10.1590/S1519-70772008000100002

Martinez, A. L. (2013). Earnings management in Brazil: a survey of the literature. *Brazilian Business Review*, *10*(4), 1-29. https://doi.org/10.15728/bbr.2013.10.4.1

McGurk, Z., Nowak, A., & Hall, J. C. (2020). Stock returns and investor sentiment: textual analysis and social media. *Journal of Economics and Finance*, *44*(3), 458-485. https://doi.org/10.1007/s12197-019-09494-4

Mian, G. M., & Sankaraguruswamy, S. (2012). Investor sentiment and stock market response to earnings news. *The Accounting Review*, *87*(4), 1357-1384. https://doi.org/10.2308/accr-50158

Miranda, K. F. (2018). *Investor sentiment and the influence of the investment horizon on corporate decisions* [Doctoral thesis, Federal University of Paraíba].

Miranda, K. F., Machado, M. A., & Macedo, L. A. (2018). Investor sentiment and earnings management: does analysts'monitoring matter? *Mackenzie Administration Journal*, *19*(4), 1-29. http://doi.org/10.1590/1678-6971/eramf180104

Mota, R. H. G., da Cunha, A. C., de Oliveira, A. F., & Paulo, E. (2017). Profit forecasting and earnings management: Empirical evidence in the Brazilian stock market. *Revista Universo Contábil*, *13*(1), 6-26.

Obaid, K., & Pukthuanthong, K. (2022). A picture is worth a thousand words: Measuring investor sentiment by combining machine learning and photos from news. *Journal of Financial Economics*, *144*(1), 273-297. https://doi.org/10.1016/j.jfineco.2021.06.002

Pae, J. (2005). Expected Accrual Models: The impact of operating cash flows and reversals of accruals. *Review of Quantitative Finance and Accounting, 24*, 5–22. https://doi.org/10.1007/s11156-005-5324-7

Park, S. (2015). Investor sentiment and earnings management: evidence from Korea. *Investment Management and Financial Innovations*, *12*(4), 81-89.

Paulo, E. (2007). *Manipulation of accounting information: a theoretical and empirical analysis on operational models of earnings management detection* [Doctoral thesis, University of São Paulo].

Rossi, J. L., Jr., & Marotta, M. (2010). Equity market timing: testing through IPO in the Brazilian market. *Revista Brasileira de Finanças*, *8*(1), 85-101. https://doi.org/10.12660/rbfin.v8n1.2010.1349

Santana, C. V. S., Santos, L. P. G. dos ., Carvalho Júnior, C. V. de O., & Martinez, A. L.. (2020). Investor sentiment and earnings management in Brazil. *Revista Contabilidade & Finanças, 31*(83), 283–301. https://doi.org/10.1590/1808-057x201909130

Silva, M. D. O. P., & Machado, M. A. V. (2019). Textual sentiment index: an empirical analysis of the impact of news on systematic risk. *Contemporary Accounting Journal, 16*(40), 24-42.

Simpson, A. (2013). Does investor sentiment affect earnings management? *Journal of Business Finance & Accounting*, *40*(7-8), 869-900. https://doi.org/10.1111/jbfa.12038

Souza, D. M. S. (2020). *The effect of manifest investor sentiment via Twitter on returns and volume traded in the Brazilian stock market* [Master's thesis, Federal University of Paraíba].

Windmeijer, F. (2005). A finite sample correction for the variance of linear efficient two-step GMM estimators. *Journal of Econometrics*, *126*(1), 25-51. https://doi.org/10.1016/j.jeconom.2004.02.005

Xavier, G. C., & Machado, M. A. V. (2017). Anomalies and investor sentiment: empirical evidences in the Brazilian market. *Brazilian Administration Review*, *14*(3), 1-25. https://doi.org/10.1590/1807-7692bar2017170028

Yoshinaga, C. E., & Castro, F. H. F. D., Jr. (2012). The relationship between market sentiment index and stock rates of return: a panel data analysis. *Brazilian Administration Review*, *9*(2), 189-210. https://doi.org/10.1590/S1807-76922012000200005

Yoshinaga, C., & Rocco, F. (2020). Investor attention: can google search volumes predict stock returns? *BBR. Brazilian Business Review*, *17*(5), 523-539. https://doi.org/10.15728/bbr.2020.17.5.3

Zhou, G. (2018). Measuring investor sentiment. *Annual Review of Financial Economics*, *10*, 239-259.

AUTHOR'S CONTRIBUTION

CAMV: Conception of the idea, research planning, data collection, analysis of the results and writing of the text. GCX: Research planning, data collection, analysis of results and writing of the text. WGLL: Research planning, interpretation of the results and final writing of the text.

CONFLICTS OF INTEREST

The authors declare that there is no conflict of interest.