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ORIGINAL ARTICLE

Audit quality and sentiment biases in going-concern opinions

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ABSTRACT

This research analyzed whether audit quality reduces sentiment biases existing in an auditor's opinion. Considering that measures based on data from opinion surveys have limitations regarding interpretation, and that aggregate measures using market data vary only in time series and not in cross-section, the results observed in this study bridge a major gap, by showing not only that sentiment influences an auditor's opinion, but also that a proxy for sentiment at the firm level is more appropriate than aggregate measures. Sentiment can influence an independent auditor's opinion on the operational continuity of the client company and audit quality can reduce sentiment biases existing in an auditor's opinion. In optimistic times, auditors subject to sentiment may be less likely to issue negative opinions on the operational continuity of audited companies undergoing financial difficulties. Considering audit quality as a characteristic of audit firms established a priori and based on the premises that higher audit quality is linked to greater auditor's expertise, experience, and independence, it was expected that higher quality would be able to reduce sentiment biases existing in an auditor's opinion. To test this hypothesis, 251 non-financial companies listed on the B3 were analyzed by using logistic regression within the period from 2010 to 2018. Firm-level sentiment showed a negative association with the probability of issuing going-concern opinions, indicating that auditors issue fewer negative opinions on the operational continuity of audited companies when firm sentiment is optimistic. Thus, evidence suggests that the research hypothesis is not rejected, considering that more independent auditors are able to mitigate the bias of this type of sentiment on their opinion regarding company operational continuity.

Keywords: sentiment, audit quality, going-concern opinion.

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Qualidade da auditoria e vieses do sentimento em opiniões going-concern

RESUMO

Esta pesquisa analisou se a qualidade da auditoria diminui os vieses do sentimento presentes na opinião do auditor. Considerando que medidas baseadas em dados oriundos de pesquisa de opinião têm limitações quanto à interpretação, e que medidas agregadas utilizando dados de mercado variam apenas em série de tempo e não em cross-section, os resultados observados neste trabalho preenchem uma lacuna importante, ao evidenciar não apenas que o sentimento influencia a opinião do auditor, mas também que uma proxy de sentimento em nível de firma é mais adequada do que medidas agregadas. O sentimento pode influenciar a opinião do auditor independente sobre a continuidade operacional da empresa cliente e a qualidade da auditoria pode diminuir os vieses do sentimento presentes na opinião do auditor. Em momentos otimistas, auditores objeto do sentimento podem se mostrar menos propensos a emitir opiniões negativas sobre a continuidade operacional das empresas auditadas em dificuldades financeiras. Considerando a qualidade da auditoria como característica das firmas de auditoria estabelecidas a priori e baseando-se nas premissas de que a maior qualidade da auditoria está ligada a maior expertise, experiência e independência dos auditores, esperava-se que uma maior qualidade conseguisse reduzir os vieses do sentimento presentes na opinião do auditor. Para testar essa hipótese foram analisadas, por meio de regressão logística, 251 empresas não financeiras listadas na B3, durante o período de 2010 a 2018. O sentimento em nível de firma apresentou uma associação negativa com a probabilidade de emissão de opiniões going-concern, indicando que auditores emitem menos opiniões negativas sobre a continuidade operacional das empresas auditadas, quando o sentimento da firma é otimista. Dessa maneira, as evidências sugerem a não rejeição da hipótese da pesquisa, ao considerar que auditores mais independentes conseguem mitigar o viés desse tipo de sentimento sobre sua opinião quanto à continuidade operacional das empresas.

Palavras-chave: *sentimento, qualidade da auditoria, opinião going-concern.*

1. INTRODUCTION

Recent empirical evidence suggests that investor sentiment affects the value relevance of accounting information (He et al., 2020), under the premise that periods of high sentiment are accompanied by heightened investor attention to corporate news, helping to incorporate accounting information into prices and thus making accounting information more relevant. Also, investors tend to monitor their investments more when the market is rising than when the market is declining, a phenomenon named as ostrich effect (Karlsson et al., 2009).

On the other hand, investor optimism in high sentiment periods may make them overly optimistic about firm future prospects and, consequently, ignore accounting information and become less attentive to current performance, making accounting variables less relevant to asset prices in high sentiment periods (Povel et al., 2007).

Regardless of the source of sentiment that influences the rational or irrational decisions of investors and managers, biases caused by sentiment can be reflected in one of the main sources of information for asset pricing in financial markets: financial statements. In this way, empirical evidence indicates that investor sentiment regarding firm attributes plays a crucial role in manager propensity to manipulate financial statements (Hedge & Zhou, 2019).

Thus, manager optimism/pessimism levels, originating from various sources of sentiment, can intentionally or unintentionally bias the preparation of accounting information, with an impact on reported measures that are not generally accepted accounting principles (GAAP) (Brown et al., 2012), on the estimation of accruals (Hribar et al., 2017), on the use of discretionary accruals for earnings management (Miranda et al., 2018; Park, 2018; Simpson, 2013), as well as on the level of conservatism in accounting statements.

Given the influence of sentiment on the decisions of individuals operating in the capital market, the literature has sought to explore monitoring mechanisms that can mitigate this influence, with a predominance of studies that analyze the influence of market analysts (Miranda et al., 2018). Another major mechanism for monitoring management behavior consists in independent auditors, the focus of this study. The audit service requires the auditor to express an opinion on financial statements prepared by their client, in order to attest whether relevant distortions may exist in financial statements. In this sense, auditors have incentives and skills to perform services

with a high degree of quality. Furthermore, a certain level of independence is required so that the auditor is not threatened by risks of familiarity or financial dependence and exercises a lower degree of scrutiny over the financial statements of the client company (Defond & Zhang, 2014).

Although professional standards require auditors to be independent enough to issue unbiased opinions, psychological factors can reduce auditor monitoring capacity and influence their decision-making. There is evidence that auditors may be subject to the same sentiment biases as investors and managers (Leone et al., 2013). Empirical evidence suggests that auditor opinions are based on their future expectations about the company and the economy, interpreting the future economic scenario for the company more optimistically in favorable economic times (Leone et al., 2013), or interpreting the future prospects of companies more pessimistically during economic crises (Ettredge et al., 2017; Geiger et al., 2014). In this way, extreme market moments can reduce auditor monitoring capacity and bias their opinions (Leone et al., 2013).

The influence of auditors on the information process goes beyond issuing an opinion on the existence of material distortions in financial statements, and audit quality can also influence investor perception of the information reported. Upon understanding that the audited company has material uncertainties regarding its operational continuity in the short term, the auditor may choose to change the basis for preparing financial statements or, if they see that the accounting basis for operational continuity is still appropriate, include an emphasis paragraph in their report, drawing attention to this condition, as established by NBC TA 570 – Operational Continuity. In the literature, the inclusion of an emphasis paragraph that reports doubts about entity operational continuity is identified as going-concern (GC) opinions.

In this way, the issuance of emphasis paragraphs with GC opinions causes a conflict of interest between the client company and the audit firm, since this type of assessment by an auditor generates economic consequences for the client company. Among the consequences for the client company of issuing a GC opinion are the negative market reaction, with an impact on the price of its stocks, and the impact caused on relations with customers and suppliers, which accelerates company financial deterioration, making the issuance of a GC opinion a 'self-fulfilling prophecy' (Guiral et al., 2015).

Financial, operational, and macroeconomic conditions are the main drivers of auditor assessment of company operational continuity. Financial conditions are related to difficulties in settling payments or receipts owed by the entity. Operationally, company continuity may be affected by the loss of key clients or suppliers, the loss of key management personnel, or increased sector competition. In this way, the literature indicates that auditor decisions may also be subject to biases caused by inadequate expectations (Leone et al., 2013).

Given that external auditors need to assess whether financial statements reflect firm performance in all material respects, they suffer reputational damage for failing to maintain a good-quality service. Thus, auditors assess risk in their activity through two mechanisms: price of services and conservatism in opinion. Therefore, increasing the price of services and increasing the level of conservatism in their report (opinion) constitute rational responses to increased risk in auditing activities.

So, auditor opinion biases may contain a rational or irrational component. First, publicly admitting that a company is at operational risk may accelerate its financial deterioration process (Guiral et al., 2015). Thus, auditors would have reasons to provide more optimistic opinions about business expectations, to avoid the damage that issuing a GC opinion could have on a company. At the same time, the responsibility for having led a company into financial difficulties may affect their future in the labor market.

In view of the above, audit quality emerges as a set of qualitative characteristics capable of reducing possible biases in auditor opinion. In the literature, these characteristics are linked to a higher experience/expertise level in the provision of services and a higher degree of independence and professional skepticism, assumptions required in current auditing standards.

The underlying literature has explored the effect of extreme economic moments on the issuance of GC opinions (Chen et al., 2018; Ettredge et al., 2017; Geiger et al., 2014; Leone et al., 2013) without, however, establishing a causal relationship between market sentiment and possible biases existing in the independent auditor opinion. In this way, this study aims to bridge this gap, analyzing whether sentiment affects the issuance of GC opinions by independent auditors and whether audit quality can reduce the biases of sentiment existing in auditor opinion.

Among prior studies, Leone et al. (2013), a pioneer in establishing a theoretical relationship between auditor behavior and optimism and pessimism levels in the financial market, is the closest to ours. However, we have made progress in five aspects.

First, Leone et al. (2013) considered times of market optimism and pessimism subjectively, defining periods of euphoria as the time interval between January 1999 and April 2000, when the so-called 'internet bubble' took place in the U.S. markets. Although there is a consensus in the literature that this period can be considered a moment when investors priced assets traded in the financial market with excessive optimism, an analysis on the relationship between audit opinion and sentiment must consider their various dimensions and how an auditor can be affected by them. It is expected that, in times of euphoria, auditor opinion also carries an optimistic component about the prospects of an audited company, causing them to stop issuing negative opinions on audited company's operational continuity in necessary situations.

Second, unlike the definition of sentiment explored by Baker and Wurgler (2007), the research study by Leone et al. (2013) did not disaggregate the macroeconomic factors that could partially justify the underlying sentiment that affected the overpricing of technology companies at that time and, consequently, auditor opinion. By disaggregating the macroeconomic situation from the optimistic market moment, the authors could extract a sentiment variable that, for instance, did not peak within the period considered excessively optimistic. Furthermore, sentiment was explored in an aggregated manner, without showing variations between companies, and it was assumed that sentiment had a similar influence on auditor opinion on the operational continuity of companies for the entire sample, ignoring specific sentiment factors that could vary between companies.

Third, auditor opinions are also based on perceptions of company managers, who may react to sentiment in an irrational or opportunistic manner (Baker & Wurgler, 2013). However, the study by Leone et al. (2013) did not consider the irrational element that may directly affect company manager perception and indirectly affect auditor's.

Fourth, the study by Leone et al. (2013) did not consider the informational dimension when analyzing the relationship between sentiment and auditing. Auditor influence on the informational process goes beyond issuing an opinion on company operational continuity and their role in improving accounting information quality. Thus, audit quality can also influence investor perception of the information reported.

Finally, although Leone et al. (2013) analyze the relationship between sentiment and auditing, the proxies used to represent auditor quality are limited to their classification as 'Big N.' The limitation of proxies that represent audit quality prevents a broader view of auditor characteristics, influencing the relationship between sentiment and auditing. Furthermore, in Brazil, the mandatory rotation of audit firms is adopted, which is focused on mitigating the unfavorable factors of prolonged exposure of the same auditor to the audited entity, reflecting on audit quality, a central aspect of this research.

2. RESEARCH HYPOTHESIS

As specified by auditing standards, independent auditor opinion should contain an emphasis paragraph regarding events or conditions that may raise significant doubts about audited entity ability to keep operating. These paragraphs are referred to in the international literature as GC opinion and are distinct from auditor reservations regarding the inadequacy of the accounting basis of operational continuity in similar contexts.

An independent auditor is influenced by the underlying market situation when issuing GC opinions (Leone et al., 2013). When analyzing whether a company will enter into discontinuation in the future, the auditor must evaluate financial, operational, and macroeconomic information. Auditor optimism may be influenced by periods of high optimism and avoid issuing GC opinions for companies with financial difficulties, as they judge business prospects with an exaggerated degree of optimism. If the origin of the sentiment is management biased expectations about company future business, the auditor may be influenced by optimistic managers and avoid issuing a GC opinion, since overly optimistic expectations of managers may contain an irrational component characterized as managerial sentiment (Ji & Lee, 2015).

A similar relationship is expected when the origin of sentiment is based on macroeconomic expectations about the market as a whole. A situation of economic depression is imagined, where there is an increased frequency of issuing GC opinions. Even if current macroeconomic fundamentals point out limitations in the operational capacity of companies in an economy, investor sentiment refers to beliefs not justified by fundamentals, which can confuse judgments based on rational expectations.

In this situation, optimistic sentiment during an economic recession could bias auditor judgment,

increasing the likelihood of not issuing a GC opinion at appropriate times. Furthermore, in times of market euphoria, there is a greater supply of resources to fund business activities, either through obtaining credit or through the greater volume of capital held by optimistic investors. Auditors can take this into account when analyzing how the ease of obtaining resources can help the company to keep operating normally (Leone et al. 2013).

Also, auditors may avoid issuing GC opinions in times of euphoria, when considering the future gains from maintaining the relationship with their client, since issuing a GC opinion is contrary to client interest. Periods of economic growth provide opportunities for auditors to increase their fees, due to a buoyant market (Ettredge et al., 2017; Leone et al., 2013).

Issuing a GC opinion materially contravenes the interests of client companies, as it may accelerate the bankruptcy process of these companies, since suppliers, customers, employees, creditors, and investors may avoid maintaining relationships when the possibility of bankruptcy becomes significant. Issuing unfavorable opinions about the client may also result in the audit firm being replaced in the execution of the reasonable assurance service, known as opinion shopping (Defond & Zhang, 2014; Tepalagul & Lin, 2015).

Given the above, it is expected that auditors will be influenced by sentiment when deciding whether to issue a GC opinion. In this sense, Ettredge et al. (2017) documented that auditors become less independent in times of economic recession, issuing fewer GC opinions for fear of harming their clients and subsequently being replaced by them at a time when the business environment makes it increasingly hard to attract clients. So, if auditors are subject to sentiment in their pessimistic state, they may become less independent by maintaining the belief that the loss of a client at a time when revenue is hard to generate may harm their own future operational capacity, suggesting that the issuance of GC opinions decreases in more pessimistic times.

Additionally, NBC TA 200(R1) establishes professional skepticism as an ethical requirement related to financial statement auditing, suggesting cases in which an auditor should perform a more critical analysis of audit evidence. The standard also recommends that the auditor require additional audit evidence in cases of doubts regarding reliability of the information obtained, and that the auditor consider management member's honesty history when analyzing audit evidence reliability.

The literature also establishes that auditors become more skeptical in the presence of overconfident managers (Ji & Lee, 2015), issuing GC opinions more frequently in appropriate situations (Ji & Lee, 2015). Evidence suggests that audit quality can mitigate management optimistic biases. If managers are the object of managerial sentiment and become overly optimistic, more independent auditors may react strategically by becoming more skeptical, performing a greater number of audit procedures, and increasing the frequency of issuing GC opinions for companies whose management team shares these characteristics.

In the presence of biases that may influence auditor decisions to issue emphasis paragraphs on the operational continuity of companies, audit quality can help mitigate these biases. Although the literature does not have a consensus on how to define the quality of audit services performed by firms that provide assurance services to requesting companies, the main determinants of audit quality are based on auditor competence and independence (Defond & Zhang, 2014).

Auditor competence refers to their ability to effectively identify violations in the client's accounting system and to properly assess the accuracy and completeness of the financial information submitted. Auditor independence is related to the likelihood that they will report a violation in the client's accounting system, where a higher degree of independence may prevent opportunistic behavior on the part of the auditor, such as hesitation in reporting problems in order to maintain a profitable relationship with the client. In this context, higher competence and independence levels may reduce potential biases, whether intentional or not, contained in auditor judgment about the financial condition of the audited company.

However, there are no direct ways to measure these two characteristics, with several proxies being adopted in the literature to represent the degree of competence and independence of independent auditors, considering higher audit quality when the auditor or audit firm has characteristics that indicate greater experience, expertise, or independence, which are reflected in the outputs of the audit service, including auditor judgment with regard to the financial situation of an audited company.

Thus, considering prior research that establishes that extreme economic times can influence the independent auditor opinion on the operational continuity of the client company (Leone et al. 2013), there is also evidence that auditors with characteristics that denote higher audit quality may have attenuated biases.

In this context, audit quality is defined as characteristics of the auditor or audit firm that indicate greater auditor experience, expertise, or independence, reflected in the outputs of the audit service, including the auditor opinion. Based on these arguments, the following research hypothesis is proposed:

- Audit quality reduces sentiment biases in auditor opinion.

In this sense, it is expected that the better audit quality, considered a priori as characteristics of the auditor who performs the reasonable assurance service, the lesser the influence of sentiment on the auditor's own opinion.

3. METHODOLOGY

3.1 Data and Sample

The research sample consisted of 251 non-financial companies listed on the Brazil Stock Exchange (Brasil, Bolsa, Balcão [B3]), covering the period from 2010 to 2018. The period was chosen due to the availability of data regarding characteristics of the independent audit service provided to selected companies and because it coincided with the use of the International Financial Reporting Standards (IFRS) for the disclosure of company financial information, avoiding possible effects of changes in accounting standards on the research variables.

The collection of financial data for companies was carried out in the Thomson Reuters® and Economatica® databases and in the Reference Forms made available by companies listed on the website of the Brazilian Securities and Exchange Commission (Comissão de Valores Mobiliários [CVM]) and B3. The macroeconomic variables were collected from the websites of the B3, the CFO Magazine Business Outlook Survey (Duke University questionnaire), the Brazilian Institute of Geography and Statistics (Instituto Brasileiro de Geografia e Estatística [IBGE]), the Central Bank of Brazil (Banco Central do Brasil [BCB]), the Institute of Applied Economic Research (Instituto de Pesquisa Econômica Aplicada [IPEA]), the World Bank, and the National Bureau of Economic Research (NBER).

3.2 Description of Variables

Sentiment proxies are calculated in 3 different ways. For investor sentiment (SentInv*t*), the first component of a principal component analysis (PCA) was used, consisting of 4 variables: a) NIPOt: Moving average of the last 12 months of the sum of initial public offering (IPO) and Follow-on in month *t*; b) ADt: Proportion of rising stocks in relation to falling stocks in month *t*; c) PDIVt: Dividend premium in month *t*; and d) PartInvIndt: Participation of individual investors in the financial trading volume of the B3 in month *t*.

Considering that each proxy will probably include some sentiment component, as well as aspects related to and unrelated to sentiment (Baker & Wurgler, 2006) and that there may be a delay in capturing sentiment by some proxies (Baker & Wurgler, 2006), a new variable was created for each proxy with its 12-month lag. Thus, for each pair of variables (contemporary and lagged), the one with the highest correlation with the first component of the PCA created was chosen.

Finally, in order to isolate an irrational component, all variables were orthogonalized by macroeconomic factors. To do this, the following variables were used: growth in gross domestic product (GDP), broad consumer price index (índice de preços ao consumidor amplo [IPCA]), growth in consumption of durable and non-durable goods and services, employment growth, and the NBER recession indicator. According to this method, the PCA was generated with residuals resulting from the regression of each variable against the macroeconomic variables. The PCA result variable (SentInvt), with monthly frequency, was adopted as a proxy for investor sentiment, being selected according to the month in which the auditor released their audit opinion regarding the client company's financial statements.

Managerial sentiment (SentGert) was calculated by having Hribar et al.'s (2017) model as a basis, where the optimism level about the company's own future (BELIEFt), present value in the form, was decomposed into an element justified by the available information (EXP_BELIEFt) and another unjustified or 'irrational' component (UNEXP_BELIEFt). The decomposition of the two components contained in the managerial optimism level was performed by orthogonalizing the variable against the same macroeconomic factors used to decompose the proxy for investor sentiment.

Since the managerial sentiment variable is reported on a quarterly basis and the variables used to orthogonalize this variable are reported on a monthly basis, the same value of the managerial sentiment variable was considered for all months in the quarter, under the assumption that

managerial sentiment does not vary significantly between months in the same quarter. In the proposed model, the values predicted by regression of managerial optimism level against the macroeconomic variables represent the 'rational' component of business manager expectations (EXP_BELIEFt), while the model residue represents the 'irrational' component existing in manager expectations (UNEXP_BELIEFt), which was adopted as a proxy for managerial sentiment (SentGert), something consistent with Hribar et al. (2017).

Firm sentiment (SentFirmit) was calculated by having Seok et al.'s (2019a, 2019b) model as a basis, adapted to the Brazilian context, so that variable periodicity was turned into monthly. Unlike investor sentiment (SentInvt) and managerial sentiment (SentGert) indexes, which are measured in aggregate for the whole market, the firm sentiment index is measured for each company *i* by means of four proxies that represent investor demand for the stocks of these companies: (i) the relative strength index (RSI) for a 14-day time window; (ii) the psychological line index (PLI), obtained by the proportion of highs and lows of a stock in a 12-day time window; (iii) the adjusted turnover rate (ATR), calculated by the ratio between the number of stocks traded and the outstanding stocks of each company, multiplied by the ratio between company return in a given period and the module of that return; and (iv) the logarithm of trading volume (LTV).

The proxy variables for firm sentiment (RSI_{it}, PLI_{it}, ATR_{it}, and LTV_{it}) were regressed against market return (Bovespa Index [IBOVESPA]) above the risk-free rate (SELIC), to remove the effect of market fluctuations on each firm's individual sentiment. Residual values of each variable estimated for each firm *i* in each period *t* are considered as the individual proxies free of market effects.

Next, a PCA was used to calculate the first component common to the four individual proxies for firm sentiment, which represented firm sentiment calculated individually for each company *i* in each period *t*. Since lack of company stock liquidity in the sample can compromise the market indexes adopted as proxies for firm sentiment, only companies that had stocks with the Economatica® liquidity index above 0.001 were used. For companies that had more than one stock traded on the market, the most liquid stock was used.

Audit quality is defined as market assessment of auditor ability to detect major misstatements and disclose them (DeAngelo, 1981). The great challenge lies in measuring this quality (Jokar & Daneshi, 2020). According to Watkins et al. (2004), audit quality has two dimensions (reputation and supervision), with the reputation dimension being related to auditor competence and independence and the supervision dimension being related to the auditor's actual competence and independence as perceived by stakeholders. It is noticed that this approach focuses on auditor service, being influenced by business characteristics, management profile, governance structure, economic conditions, auditor/client relationship, among other factors (Dantas & Medeiros, 2015).

Thus, this article has adopted several proxies to capture the perceived audit quality, following both dimensions (competence and independence), in order to capture exposure to litigation and reputation risks and audit firm independence, as well as training quality and professional experience of its employees, with the measurement method described below. The first proxy for audit quality was a dummy variable, which represents companies audited by firms classified as Big N.

Currently, in the global audit services market, 4 companies are classified as Big N: a) Deloitte; b) Ernst & Young; c) KPMG; and d) PricewaterhouseCoopers. The variable $Big4_{it}$ has a value of 1 when a company *i* is audited by one of these four audit firms in period *t*, and 0 otherwise. This proxy is widely used in the literature and it was adopted in studies that attempted to capture differences in audit quality between large and small audit firms (Chen et al., 2018; Crockett & Ali, 2015; Defond et al., 2016; Ettredge et al., 2017; Ji & Lee, 2015; Leone et al., 2013; Mitra et al., 2019; Park, 2018). Companies audited by firms classified as Big N are expected to have better audit quality.

Expertise in an industry is the second proxy adopted to measure audit quality. The first measure for expertise in an industry is calculated by the ratio between the revenues obtained by an audit firm in an industry *s* and the sum of the revenues obtained by all audit firms that provided services for that same industry (ESP_{it}). This variable is measured for each audit firm *a* in each period *t* and identifies the auditor's degree of expertise in the operating sector of a company *i* as the audit firm's market share. Prior studies used this variable to measure auditor expertise (Krishnan, 2005).

According to Reichelt and Wang (2010), an auditor *a* is an expert in a sector *c* when they hold 40% or more of the revenues in that sector. That said, the dummy variable $DESP_{it}$ was created, which represents expert auditors with this characteristic. Company *i* audited by an audit firm specializing in its industry during a period *t* shows a value of 1 for this variable and 0 otherwise ($DESP_{it}$).

For these two variables, a higher value is associated with companies audited by expert auditors and, consequently, a better audit quality.

The other proxies for audit quality are more closely linked to audit firm independence. The next variable representing audit quality is related to the abnormal compensation received by the audit firm. To calculate the variable representing abnormal audit compensation, Martinez and Moraes' (2017) model was estimated for each company *i* in each period *t*, where audit compensation is regressed against several components that seek to explain its composition (qualitative and quantitative characteristics of the audit firm and the audited company) and the residual value of this regression is considered a compensation above or below its fair value.

Another proxy for audit quality adopted was the compensation received by the audit firm for the provision of other services. Higher revenue from these services may compromise auditor independence. However, the literature provides several options for using this variable (Cahan et al., 2008; Ruddock et al., 2006). This variable was measured by the ratio between revenues from the provision of other related services in period *t* (NAS_{it}) in relation to the total compensation received by the audit firm in a given period *t* (TF_{it}) for the provision of services to the same company *i*. The greater the importance of other revenues in auditor compensation, the lower their independence. This variable was represented by the symbol NAS/TF_{it}.

Another variable used to capture the independence between the audit firm and the client company was the length of their relationship. This variable was measured by the number of consecutive periods in which the company was audited by the same firm, herein termed $Tenure_{it}$ (Chen et al., 2018).

To facilitate the interpretation of this set of variables, it was decided to turn the audit quality variables calculated by means of continuous variables (ESP_{it}, $AbAFEE_{it}$, NAS/TF_{it}, and $Tenure_{it}$) into dummies, which assume a value of 1 the higher the audit quality, and 0 the lower the audit quality. To do this, the variables were segregated according to their median and those that theoretically have a positive relationship with audit quality (ESP_{it} and $AbAFEE_{it}$) assume a value of 1 when their values are above the median of the sample observations and 0 otherwise. For the variables in which a negative relationship with audit quality is expected (NAS/TF_{it} and $Tenure_{it}$), their dummies assume a value of 1 when their values are below the median of the sample observations and 0 otherwise. In this way, the explanatory variables that measure audit quality now have the same meaning (positive relationship with audit quality) and they have similar interpretations in the estimated models, facilitating the comparison of the results obtained in the hypothesis tests.

Finally, the probability of insolvency ($Risk_{it}$) was calculated by having Altman's (1968) Z-Score concept as a basis, re-estimated by Altman et al. (1979), which measures the probability of company insolvency based on financial indicators.

3.3 Econometric Models

Prior studies have established that the issuance of a GC opinion is a function of the underlying sentiment, audit quality, and the audited company's risk level. To analyze the hypothesis of this research, that audit quality reduces sentiment biases existing in auditor opinion, the model of Equation 1 was adopted:

$$Pr(GC_{it}) = \alpha_0 + \alpha_1 Sent_t + \alpha_2 AQ_{it} + \alpha_3 Sent_t * AQ_{it} + \alpha_4 Risk_{it} + \varepsilon_{it} \quad (1)$$

where GC_{it} is a dummy variable that assumes the value of 1 when the auditor issues a GC opinion and 0 otherwise for each company *i* in each period *t*; $Sent_t$ is a proxy for investor sentiment ($SentInv_t$) and managerial sentiment ($SentGer_t$), calculated for each period *t* or for firm sentiment ($SentFirm_{it}$), calculated for each company *i* in each period *t*; AQ_{it} is a vector of explanatory variables that contains the individual proxies for audit quality, used alternately in each model; $Risk_{it}$ is the probability of insolvency based on Altman's (1968) Z-Score, calculated for each company *i* in each period *t*.

The research hypothesis will be tested by analyzing the coefficients resulting from the estimation of Equation 1, which will be estimated by using logistic regression. The intercept coefficient (α_0) measures the increase or decrease in the probability of issuing a GC opinion when sentiment is close to its neutral value ($Sent_t = 0$) and when audit quality is low ($AQ_{it} = 0$). At the same time, the coefficient of the audit quality variables (α_2) measures the increase or decrease in the probability of issuing a GC opinion when sentiment is close to its neutral value ($Sent_t = 0$) and when audit quality is high ($AQ_{it} = 1$). The

comparison between the sign and significance of the α_2 coefficient in relation to the α_0 coefficient indicates the different probabilities of issuing a GC opinion between audit firms with characteristics that denote high or low audit quality and when, theoretically, there is an absence of sentiment.

The coefficient α_1 measures the increased or decreased probability that auditors with characteristics that denote low quality (AQit = 0) issue a GC opinion according to the underlying sentiment. The research hypothesis assumes that auditors are the object of sentiment, including auditors with characteristics that denote low quality. If low quality auditors are the object of sentiment, a lower probability of issuing GC opinions is expected when the sentiment is optimistic, which suggests a negative and statistically significant coefficient α_2.

On the other hand, the coefficient α_3 measures the increased or decreased probability that auditors with characteristics that denote high quality (AQit = 1) issue a GC opinion according to the underlying sentiment. The research hypothesis establishes that audit quality reduces the sentiment biases existing in auditor opinion. This hypothesis can be validated in two ways, depending on the comparison between the coefficients α_1 and α_3.

If the coefficient α_1 is negative and statistically significant, a coefficient α_3 that is also negative and statistically significant, but with an absolute value lower than the coefficient α_1 ($\alpha_3 < \alpha_1$), indicates that auditors with characteristics that denote better quality are also subject to sentiment, but to a lesser extent, when compared to auditors with characteristics that denote lower quality, validating the hypothesis of this research. If the coefficient α_1 is negative and statistically significant and the coefficient α_3 has a positive sign and statistical significance, this result may indicate that higher quality auditors react strategically to sentiment, becoming more conservative when investors or managers are more optimistic, also validating the hypothesis of this research.

However, if the coefficient α_1 is negative and statistically significant and the coefficient α_3 is not statistically significant, this may be an indication that audit quality is not able to mitigate the biases of sentiment. In this case, auditors who have characteristics that denote higher quality are the object of sentiment in the same way as auditors who have characteristics that denote low audit quality.

The variable $Risk_{it}$ is continuous and has values ranging from 0 to 1, according to each company's insolvency probability. Once this variable is inserted into the model, the interpretation of the other coefficients is given considering that company insolvency risk is zero ($Risk_{it} = 0$). The research hypothesis does not distinguish company risk level, when analyzing the relationship between sentiment, audit quality, and auditor opinion. Since the probability of issuing a GC opinion is directly proportional to the audited company's insolvency risk, a positive and statistically significant coefficient α_4 is expected.

4. RESULTS

4.1 Exploratory Analysis

It was observed that in 16.99% of the sample observations there are GC opinions issued by auditors. Ettredge et al. (2017), in a sample of U.S. companies, obtained an average of 6.9% of the sample observations with GC opinions issued by auditors for companies for the first time. In Leone et al. (2013), with a sample of technology companies that carried out an IPO during the U.S. internet bubble period, 12.7% of the observations contained companies with GC opinions issued by independent auditors. Therefore, it is clear that, within the period analyzed, the Brazilian environment has a higher proportion of companies where auditors issued GC opinions.

An average of 42.74% was observed for the variable $Risk_{it}$, suggesting a high risk of bankruptcy for companies listed on the Brazilian stock exchange. For a similar sample of Brazilian companies, Martins and Ventura (2020) found an average index of 16.91% for this indicator. This difference can be justified by the decision to also keep in the sample companies that were delisted within the period analyzed, which includes companies that went bankrupt or underwent judicial recovery.

The percentage of observations where companies were audited by firms classified as Big 4 was 72.44%, demonstrating a concentration of the audit market in Brazil. For the variables representing expert auditors (ESP_{it} and $DESP_{it}$), it was found that audit firms providing

the companies analyzed with services hold, on average, 22.13% of the market share of total revenues in the respective sectors in which they execute reasonable assurance services. The dummy variable representing expert auditors had an average of 17.46%, indicating the percentage of observations where an audit firm is responsible for more than 40.00% of the total revenues of audit services provided to the sector in which they operate.

The abnormal compensation variable ($AbAFEE_{it}$) has a mean and median value close to zero, as it is calculated by using the multiple linear regression method. Since this variable is calculated by the difference between actual and predicted values, a higher value for $AbAFEE_{it}$ indicates the existence of a premium in auditor compensation, being interpreted as a characteristic associated with better audit quality, while lower values signal insufficient compensation for the service provided. The variable calculated by Martinez and Moraes (2017) had similar values, with a tendency towards more negative values.

The ratio between revenues from other services and total compensation received by the audit firm in a given period (NAS/TF_{it}) had an average of 4.95%, but with a median value close to zero, indicating that this average was influenced by high positive values contained in the sample. On average, auditors provide reasonable assurance service for listed companies for 2.87 uninterrupted years ($Tenure_{it}$). The median value for this variable is close to 2 years, showing reasonable turnover of the audit firm responsible for the financial statements of listed companies. At the same time, there are cases of auditors who remained performing these services for a maximum period of 25 years, which indicates a high threat of familiarity between the audit firm and the audited company.

The sentiment variables had average values close to their median. The median or average values can be considered periods where the sentiment is less extreme, suggesting a low or neutral bias in these periods. The managerial sentiment variable ($SentGer_t$) has a smaller number of observations, because the form used to build it was only instituted in Brazil from the third quarter of 2012 onwards.

4.2 Research Hypothesis Analysis

In order to investigate the relationship between audit opinion, audit quality, and sentiment, the models numbered 1 to 18, contained in tables 1, 2, and 3, were estimated. In the analyses, a minimum significance level of 5% was considered for the inferences made. First, investor sentiment ($SentInv_t$) was used as the independent variable, which represents sentiment in models numbered 1 to 6 (Table 1). The models considered valid for the analysis of this hypothesis are those whose tests for the joint significance of regressors (F-test) have statistical significance at a minimum level of 5%. The accuracy level shows that around 90.23% of the predictions were correctly made by the estimated models.

In order to analyze the research hypothesis, it is necessary to compare the signs and significance of the coefficients that represent the probability of issuing GC opinions according to the underlying sentiment, when the audit quality is high (α_3) and low (α_1). First of all, it is observed that audit firms classified as Big 4 ($Big4_{it} = 1$) and having a greater degree of expertise in the sectors of audited companies ($DESP_{it} = 1$ and $ESP_{it} = 1$) are less likely to issue GC opinions, identified by the negative sign and statistical significance for the coefficient α_2. At the same time, auditors with a shorter relationship with audited companies ($Tenure_{it} = 1$) are more likely to issue GC opinions.

Among the variables of interest in this study, the coefficient for investor sentiment (α_1) did not show statistical significance in any of the models contained in Table 1, indicating that this category of sentiment does not influence the probability that auditors with characteristics that denote low quality ($AQ_{it} = 0$) issue GC opinions, contrary to what was expected by this study.

When analyzing the influence of investor sentiment on the probability of issuing GC opinions by auditors with characteristics that denote high quality ($AQ_{it} = 1$), it can be noticed that the coefficients α_3 reported in the models also do not have statistical significance. This result suggests that investor sentiment does not influence auditor opinion, with characteristics that denote low quality, on the client company's operational continuity.

Table 1
Logit model that analyzes the relationship between audit opinion (GC_{it}), audit quality (AQ_{it}), and investor sentiment ($SentInv_t$)

$Pr(GC_{it}) = \alpha_0 + \alpha_1 SentInv_t + \alpha_2 AQ_{it} + \alpha_3 SentInv_t * AQ_{it} + \alpha_4 Risk_{it} + \varepsilon_{it}$

Variables	$Big4_{it}$	$DESP_{it}$	ESP_{it}	$AbAFEE_{it}$	NAS/TF_{it}	$Tenure_{it}$
Intercept	***–5.6477	***–7.1803	***–6.4886	***–7.7403	***–7.5435	***–7.4879
	(0.3644)	(0.3809)	(0.3833)	(0.4582)	(0.4171)	(0.3766)
$SentInv_t$	0.0730	–0.0294	–0.0671	0.1412	0.1022	–0.0333
	(0.1419)	(0.1049)	(0.1216)	(0.1664)	(0.2745)	(0.1428)
AQ_{it}	***–1.5339	**–0.5089	***–1.1026	0.0590	*0.4113	**0.4092
	(0.1689)	(0.2562)	(0.1859)	(0.1990)	(0.2493)	(0.1675)
$SentInv_t$ x AQ_{it}	–0.0300	0.2284	0.2503	–0.3308	–0.1367	0.2277
	(0.1925)	(0.3069)	(0.2134)	(0.2241)	(0.2939)	(0.1922)
$Risk_{it}$	***10.7132	***11.9084	***11.2836	***13.0661	***11.8004	***12.1028
	(0.7131)	(0.7683)	(0.7654)	(0.9246)	(0.7734)	(0.7440)
Model	(1)	(2)	(3)	(4)	(5)	(6)
N observations	2,019	1,837	1,837	1,512	1,838	1,971
F-Test	***85.36	***61.97	***67.76	***50.02	***61.98	***67.74
R^2 Cox & Snell	0.2936	0.2454	0.2636	0.2497	0.2447	0.2522
R^2 Nagelkerke	0.4920	0.4246	0.4559	0.4367	0.4234	0.4314
Log likelihood	–565.96	–534.03	–511.68	–424.03	–534.93	–579.53
Area under the ROC curve	87.35%	84.15%	86.15%	84.46%	84.07%	84.16%
Accuracy	0.9009	0.9004	0.9058	0.9054	0.8999	0.9011
Sensitivity	0.9785	0.9890	0.9884	0.9899	0.9903	0.9897
Specificity	0.5191	0.4175	0.4561	0.4298	0.4070	0.4349

Note: *Coefficients and standard errors (in parentheses) reported. Statistical significance: *10%, **5%, ***1%.*
Source: *Prepared by the authors.*

As proposed, the coefficient for the variable $Risk_{it}$ is positive and statistically significant in all reported models, suggesting that companies with a higher insolvency risk are more likely to have audit firms issuing GC opinions.

In models numbered 7 to 12 (Table 2), managerial sentiment ($SentGer_t$) is used as the independent variable that represents the underlying sentiment. All models contained in Table 2 had statistical significance for the F-Test at the minimum level of 5%, indicating that at least one of the model's regressors has a coefficient different from zero. The accuracy level shows that approximately 90.38% of the predictions were correctly made by the estimated models.

Again, a lower probability was observed that audit firms classified as Big 4 ($Big4_{it} = 1$) and those with a greater degree of expertise in the sectors of audited companies ($DESP_{it} = 1$ and $ESP_{it} = 1$) issue GC opinions, given the negative and statistically significant sign for the coefficient α_2. Regarding the variables of interest in this study, the coefficients α_1 and α_3 did not show statistical significance in any of the models estimated in Table 2, suggesting that managerial sentiment does not induce auditors to biases when issuing their opinion regarding client company's operational continuity.

Table 2
Logit model that analyzes the relationship between audit opinion (GC_{it}), audit quality (AQ_{it}), and management sentiment ($SentGer_t$)

$Pr(GC_{it}) = \alpha_0 + \alpha_1 SentGer_t + \alpha_2 AQ_{it} + \alpha_3 SentGer_t * AQ_{it} + \alpha_4 Risk_{it} + \varepsilon_{it}$						
Variables	**$Big4_{it}$**	**$DESP_{it}$**	**ESP_{it}**	**$AbAFEE_{it}$**	**NAS/TF_{it}**	**$Tenure_{it}$**
Intercept	***–6.1234	***–7.5314	***–6.9254	***–8.1277	***–7.8619	***–7.7699
	(0.4221)	(0.4429)	(0.4464)	(0.5261)	(0.4691)	(0.4308)
$SentGer_t$	0.0052	–0.0015	0.0100	–0.0024	0.0020	–0.0125
	(0.0341)	(0.0261)	(0.0312)	(0.0421)	(0.0647)	(0.0346)
AQ_{it}	***–1.5269	**–0.5847	***–1.2064	*0.3517	0.3169	*0.3083
	(0.1765)	(0.2777)	(0.1960)	(0.2035)	(0.2525)	(0.1723)
$SentGer_t * AQ_{it}$	–0.0729	–0.1088	–0.0869	0.0179	–0.0174	–0.0073
	(0.0491)	(0.0818)	(0.0562)	(0.0564)	(0.0700)	(0.0476)
$Risk_{it}$	***11.7370	***12.6924	***12.2827	***13.6208	***12.6640	***12.7659
	(0.8434)	(0.9008)	(0.9078)	(1.0612)	(0.9053)	(0.8560)
Model	(7)	(8)	(9)	(10)	(11)	(12)
N observations	1,627	1,478	1,478	1,201	1,478	1,587
F-Test	***69.03	***51.44	***54.96	***41.64	***51.33	***56.39
R^2 Cox & Snell	0.3207	0.2700	0.2882	0.2735	0.2675	0.2745
R^2 Nagelkerke	0.5241	0.4569	0.4878	0.4658	0.4528	0.4575
Log likelihood	–455.57	–427.97	–409.28	–339.25	–430.45	–472.37
Area under the ROC curve	87.93%	84.77%	86.79%	84.77%	84.45%	84.46%
Accuracy	0.8967	0.9053	0.9073	0.9067	0.9066	0.9004
Sensitivity	0.9775	0.9911	0.9895	0.9901	0.9911	0.9894
Specificity	0.5322	0.4691	0.4897	0.4742	0.4774	0.4706

Note: *Coefficients and standard errors (in parentheses) reported. Statistical significance: *10%, **5%, ***1%.*
Source: *Prepared by the authors.*

This result contrasts with the relationship expected by the literature, which indicates that auditors become more skeptical in the presence of overconfident managers, issuing GC opinions more frequently in appropriate situations (Ji & Lee, 2015). As observed in the models contained in Table 1, which used investor sentiment as a proxy for the underlying sentiment, the variable $Risk_{it}$ was positive and significant, indicating that companies with a higher insolvency risk are more likely to have audit firms issuing GC opinions.

Models numbered 13 to 18 in Table 3 use firm-level sentiment ($SentFirm_{it}$) as a proxy for underlying sentiment. This proxy has the advantage of capturing possible idiosyncrasies of each company that are not captured by aggregate-level sentiment proxies. All models estimated in Table 3 have statistical significance for the joint significance test of regressors at the minimum level of 5%, indicating that at least one of the coefficients has a value other than zero. The accuracy level shows that approximately 93.00% of the forecasts were correctly made by the estimated models, values above those obtained when investor sentiment and managerial sentiment were used as proxies for sentiment.

As in the previous estimates, the probability of issuing GC opinions was higher when audit firms were classified as Big 4 ($Big4_{it} = 1$) and when these firms had a greater degree of expertise in the sectors of audited companies ($ESP_{it} = 1$). However, unlike the other models, the coefficient for firm sentiment (α_1) was negative and statistically significant in models numbered 14 to 18, suggesting that sentiment has a negative relationship with the probability that independent auditors with characteristics that denote lower quality issue GC opinions. Thus, firm-level sentiment becomes more useful for predicting the probability that independent auditors issue GC opinions for audited companies.

The negative and statistically significant result for the coefficient α_1 suggests that auditors with characteristics that denote low quality may be subject to underlying sentiment bias when issuing their report. The hypothesis of this research establishes that audit quality can reduce

these biases. The interaction between sentiment and audit quality (α_3) showed statistical significance only in models 13, 17, and 18, which use the variables $Big4_{it}$, NAS/TF_{it}, and $Tenure_{it}$ as proxies for audit quality.

Table 3
Logit model that analyzes the relationship between audit opinion (GC_{it}), audit quality (AQ_{it}), and firm sentiment ($SentFirm_{it}$)

$Pr(GC_{it}) = \alpha_0 + \alpha_1 Sent_t + \alpha_2 AQ_{it} + \alpha_3 SentFirm_{it} * AQ_{it} + \alpha_4 Risk_{it} + \varepsilon_{it}$

Variables	$Big4_{it}$	$DESP_{it}$	ESP_{it}	$AbAFEE_{it}$	NAS/TF_{it}	$Tenure_{it}$
Intercept	***–5.7337	***–7.7486	***–7.0889	***–7.6826	***–8.1207	***–8.2405
	(0.6561)	(0.6612)	(0.6681)	(0.7111)	(0.7128)	(0.6684)
$SentFirm_{it}$	–0.0711	***–0.3889	***–0.3953	**–0.4187	***–0.9618	***–0.6178
	(0.1591)	(0.1189)	(0.1433)	(0.1642)	(0.2607)	(0.1556)
AQ_{it}	***–1.8905	–0.2107	***–1.0283	–0.1915	0.1380	0.4673
	(0.3012)	(0.3805)	(0.3007)	(0.3252)	(0.3816)	(0.2909)
$SentFirm_{it}$ x AQ_{it}	**–0.4196	–0.0368	0.0799	0.0732	**0.7019	**0.4851
	(0.2068)	(0.2783)	(0.2193)	(0.2357)	(0.2874)	(0.2103)
$Risk_{it}$	***10.8041	***12.0872	***11.7464	***12.3166	***12.4921	***12.5918
	(1.2902)	(1.3649)	(1.3656)	(1.4958)	(1.4092)	(1.3404)
Model	(13)	(14)	(15)	(16)	(17)	(18)
N observations	966	900	900	744	901	952
F-Test	***33.06	***25.61	***27.56	***21.72	***25.82	***28.12
R^2 Cox & Snell	0.2322	0.1862	0.1999	0.1883	0.1923	0.2069
R^2 Nagelkerke	0.4670	0.3874	0.4160	0.3899	0.4004	0.4209
Log likelihood	–204.47	–202.05	–194.40	–167.74	–198.64	–211.67
Area under the ROC curve	88.44%	84.58%	85.86%	83.30%	85.63%	85.43%
Accuracy	0.9317	0.9267	0.9378	0.9274	0.9279	0.9286
Sensitivity	0.9907	0.9926	0.9938	0.9940	0.9938	0.9941
Specificity	0.4476	0.3407	0.4396	0.3421	0.3407	0.3762

Note: *Coefficients and standard errors (in parentheses) reported. Statistical significance: *10%, **5%, ***1%.*
Source: *Prepared by the authors.*

The negative and statistically significant sign for the coefficient α_3 in model 13 indicates that auditors classified as Big 4 ($Big4_{it} = 1$) issue fewer GC opinions in optimistic periods when compared to auditors not classified as Big 4. This indication can be interpreted as if Big 4 auditors are more financially dependent on the companies they audit, since these auditors perform reasonable assurance services preferably for larger companies, and consequently receive higher compensation. This situation makes auditors more dependent on client companies and less likely to issue opinions that are at odds with the management goals of these companies, especially in optimistic periods, contradicting the hypothesis of this research.

Furthermore, it may indicate that auditors classified as Big 4 have a selection bias in choosing client companies in optimistic periods, prioritizing those where the probability of bankruptcy is lower, which indicates a lower probability that the companies at stake issue GC opinions. On the other hand, the positive and statistically significant sign for this coefficient suggests that auditors who are less financially independent ($NAS/TF_{it} = 1$) and have a shorter relationship with the client company ($Tenure_{it} = 1$) issue a greater number of GC opinions in optimistic periods in relation to companies that are more financially dependent ($NAS/TF_{it} = 0$) and have a longer relationship with the client company ($Tenure_{it} = 0$).

These results suggest that characteristics that grant auditors greater independence (Leone et al., 2013) are related to less sentiment bias in their opinion about the audited company's operational continuity. Thus, the research hypothesis in models 17 and 18 cannot be rejected, suggesting that more independent auditors are able to mitigate firm sentiment bias existing in the auditor's own opinion. The risk variable once again had a positive and statistically significant coefficient, in line with the interpretation that greater insolvency risk is linked to greater probability of independent auditors issuing GC opinions.

The results obtained showed that sentiment indicators at the aggregate level ($SentInv_t$ and $SentGer_t$) have less power to influence independent auditor opinion, contradicting the findings of Leone et al. (2013). On the other hand, the results observed are in line with what Zhou (2018) highlights, that measures based on data from opinion surveys have limitations in terms of interpretation, as they are limited in data scope and frequency, and accuracy, since the responses depend on research design, as well as respondent quality, considering that an informed respondent may not respond and whoever responds may not have an incentive to tell the truth (Zhou, 2018). Furthermore, aggregate measures using market data vary only in time series and not in cross-section, and company characteristics vary in cross-section, thus, using aggregate measures with market data to explain specific firm characteristics may contain noise (Hedge & Zhou, 2019; Seok et al., 2019b).

So, the sentiment calculated at the firm level ($SentFirm_{it}$) becomes more suitable for analyzing possible biases in independent auditor opinion about client companies, since it captures individual variations in investor expectations about companies, which are probably incorporated by independent auditors when issuing a GC opinion. In general, the results for the sentiment variables showed that the sentiment calculated at the firm level influences the probability of issuing GC opinions, while the sentiment calculated at the aggregate level did not bias independent auditor opinion about the listed company's operational continuity.

Among the characteristics that contribute to mitigating the bias caused by firm sentiment in auditor opinion there are a lower proportion of revenues earned from other services offered to the client company (NAS/TF_{it}) and a shorter continuous audit period ($Tenure_{it}$). The literature classifies these variables as proxies for auditor independence, which may be an indication that more independent auditors can become more conservative in optimistic periods, in order to prevent possible biases from influencing their opinion regarding the client company's operational continuity.

4.3 Robustness Tests

This subsection has sensitivity tests to verify the consistency of the results obtained previously. In the first test, the sample was partitioned at the median, according to company risk. The models based on Equation 1 were re-estimated for the two samples, consisting, respectively, of companies with higher and lower insolvency risk, to analyze whether insolvency risk influences the relationship between audit opinion, audit quality, and investor sentiment. Most of the models estimated for the samples where the companies had lower risk did not show a valid specification, after analysis of the general significance test of the models (F-test). For the riskier companies ($Risk_{it}$ above the median), the only relevant change in results was reduced influence of firm sentiment ($SentFirm_{it}$) on the probability that companies issue GC opinions, indicating that this effect is not more intense in companies with higher bankruptcy probability.

In order to reduce the dimensionality of the audit quality variables, a new proxy was calculated through a PCA between the audit quality variables in their original form ($ACPAudit_{it}$). The variables chosen to generate the PCA were those that had the greatest explanatory power over the variance of data used to generate the PCA, with the following variables being selected: $Big4_{it}$, ESP_{it}, natural logarithm of revenues from related services ($LnNAS_{it}$) and $Tenure_{it}$. Finally, the audit quality index was turned into a dummy ($DACPAudit_{it}$), taking a value of 1 when the index is above the sample median, indicating better audit quality, and a value of 0 otherwise. According to the tests performed, the first PCA component with these four variables explained 44.10% of data variation. The other models tested with all the other variables had inferior results.

Thus, the models based on Equation 1 were re-estimated, considering the audit quality index ($DACPAudit_{it}$), with the aim of representing several audit firm characteristics through a single construct. By reducing audit firm characteristics into a single construct, no relationship was observed between audit opinion, audit quality, and sentiment, contradicting the hypothesis of this study. The variable firm sentiment ($SentFirm_{it}$) maintained its significance in this context, reinforcing the assumption

that auditors are influenced by the underlying sentiment when issuing a GC opinion. Also, the audit quality index was not significant, indicating that some audit firm characteristics may capture influences on the probability of issuing GC opinions, but this fact is not observed when considering these characteristics altogether.

5. FINAL REMARKS

Empirical evidence suggests that audit quality, considered as characteristics of audit firms established a priori that seek to measure greater auditor expertise, experience, and independence can reduce sentiment biases existing in the opinion of the auditors themselves. Based on this assumption, it was expected that in optimistic periods the probability of issuing GC opinions for the sample companies would be reduced, configuring an optimistic sentiment bias in independent auditor opinion. At the same time, it was expected that, in pessimistic periods, there would be a greater probability of issuing GC opinions for the sample companies. The role of audit quality would be to reduce these biases. To do this, three sentiment indexes, adapted to the Brazilian market, were used to measure this relationship.

The results of this research showed that investor sentiment and managerial sentiment have little influence on the likelihood that independent auditors issue GC opinions. Characteristics that provide the auditor with greater financial independence can mitigate investor sentiment effects on independent auditor opinion, while a lower auditor expertise level was related to a lower influence of managerial sentiment on the opinion of these auditors. The fact that expert auditors have a greater bias towards managerial sentiment contained in their opinion may mean that, by being in contact with several managers from the same sector with an optimistic bias, these auditors may see the optimistic perspectives of these managers on the companies in the sector as likely.

On the other hand, firm sentiment showed a strong negative association with the likelihood of issuing GC opinions, indicating that auditors issue less negative opinions about the audited company's operational continuity when the underlying sentiment is optimistic. Additionally, it was observed that firm sentiment bias contained in auditor opinion was reduced by characteristics that denoted greater independence, in financial terms and in the length of the relationship between audit firm and audited company. In this way, considering sentiment at the firm level, the initial evidence suggests that the research hypothesis is not rejected, considering that more independent auditors are able to mitigate the bias of this type of sentiment on their opinion regarding the sample company's operational continuity.

However, this result should be interpreted with caution, since there are indications that the observed relationships may be sensitive to the sentiment proxy used. It can also be concluded that sentiment indicators at the aggregate level (SentInvt and SentGert) have less power to influence independent auditor opinion, thus making sentiment at the firm level more appropriate for analyzing possible biases in independent auditor opinion about client companies.

This study has some methodological limitations that may affect the results of analyses, but which are inherent to research in the finance and accounting areas.

First, the building of sentiment indexes presupposes that the rational aspects contained in their formulation are purged from the variables. The econometric procedures used to break down the variables into expectations justified and not justified by economic fundamentals may not perfectly separate these two factors, which could result in sentiment indexes that carry in their composition economic aspects that could rationally influence the dependent variables of research.

Second, although categorizing audit quality variables into dummies contributes to a better interpretation of results, there is an information loss resulting from change in the specification of these variables.

Finally, the same audit variable can have several meanings, depending on the context in which it is inserted, and it may be positively or negatively related to audit quality.

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